FEARNA STORAGE

Fearna Pumped Storage Hydro Scheme
CAR Licence Report

Main Report

September 2025

Quality Information

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Executive Summary

Introduction

The function of the Fearna Pumped Storage Hydro (PSH) project would be to create a large-scale long duration electricity storage (LDES) scheme with up to 1,800MW generation capacity to store and release energy from or to the electricity transmission system. The Proposed Development / Controlled Activities would help to balance supply and demand for grid power at a national scale. The electricity storage capacity of the Proposed Development will be up to 36 gigawatt hours (GWhr), which equates to 20 hours of generation at 1,800 MW. This would make it amongst the largest energy storage facilities in the UK, providing a very significant contribution towards meeting the Scottish Government's commitment to pumped storage hydro, as set out in the Scottish Energy Strategy. The Proposed Development / Controlled Activities would reuse existing hydropower and other infrastructure during the construction and operational phases, to minimise impacts on the water and wider environment.

Water Management

The Proposed Development is to build and operate a new PSH with an installed capacity of up to 1800 Megawatts (MW) utilising the existing hydropower reservoir Loch Quoich as the lower storage reservoir and Loch Fearna as the upper storage reservoir. Flows would be abstracted and returned to the reservoirs at the rates provided in this chapter.

The maximum energy storage of the Proposed Development would be up to 36 GWh, which corresponds to a useable water storage volume of up to 45Mm^3 (million cubic metres) in the reservoir system.

On commencement of operations, the upper reservoir would be pumped full using the available stored water in the lower reservoir.

The Proposed Development would only operate between agreed minimum and maximum levels of the proposed upper and lower reservoirs and fully within the current operational range of Loch Quoich. There would be no impact on the current downstream flow regime from Loch Quoich.

All existing CAR Licences, namely CAR/L/1011471 covering the Ness catchment and CAR/L/1090786 covering the Allt a' Mheil hydro scheme would be unaffected by the Proposed Development.

Compensation flows would be passed through the two dams forming the upper reservoir, namely the Fearna Dam and Coire Dubh dam.

There would be no significant geomorphological effect from the proposed controlled activities, however sediment augmentation to the River Garry in the downstream catchment is proposed as a biodiversity enhancement.

The effect of the proposed controlled activities on the temperature regime of Lochs Quoich and Fearna has been analysed, together with any potential effect on downstream waterbodies. Detailed modelling of Loch Quoich by SLR using TUFlow 3D software has shown that the seasonal thermocline regime within the loch would continue during the controlled activities,

with a predicted increase on water temperature over the 12 and 48 month simulation periods at the discharge point of the Quoich reservoir through the dam and tunnel of 0.2°C and a peak temperature increase in the month of September of 1.0°C and average of 0.4°C. It is predicted that these changes will not have a material effect on the temperature regime of the Gearr Garry, to which the Quoich reservoir discharges, which has a baseline seasonal temperature variation of approximately 15°C that is largely driven by ambient temperatures rather than the temperature of the water feeding it from Loch Quoich.

Effect on Biodiversity – Aquatic

This report considers the likely effects of the Fearna Pumped Storage Hydro scheme on the water environment for the purposes of Controlled Activity Regulations. The scope includes the impact on the water environment only, encompassing waterbodies, watercourses, fish fauna, fish habitat, macroinvertebrates and macrophytes where a direct impact is likely to occur during the operation of the Proposed Development because of the controlled activity.

The chapter was prepared by Gavia Environmental Ltd, with specialist input from [redacted] of Glasgow University.

A total of 16 likely effects were identified. Three of these were scoped out due to predicted negligible impacts and included ingress & entrainment, impingement and noise & vibration.

Assessment of magnitude, importance and significance of 12 remaining factors concluded:

Negative effects (13 in total) ranged in significance from:

- Very Low (impact on riverine spawning habitat, fish attraction to intake, fragmentation of habitat, Reduction in macrophyte cover, reduction in macroinvertebrate abundance (Loch Fearna), Water temperature changes from water transfer);
- Low (reduction in egg viability & hatch success, fish stranding and water quality reduction);
- Moderate (reduction in food availability for fish and Reduction in macroinvertebrate abundance (Loch Quoich)); and
- High (fluctuations in water level).

Mitigation would be provided in the form of high quality artificial spawning habitat areas created below the minimum Loch Quoich drawdown level. These habitats would feature optimal spawning substrates for Arctic charr and would be regularly maintained to prevent siltation from fine sediment. Current spawning opportunity on loch margins is often affected by existing drawdown thus presenting an opportunity for ecological enhancement. In addition to simply mitigating the effect of the pumped storage it is highly likely that a well-conceived mitigation plan would result in an environmental net gain, compared with the current position for Arctic charr.

Effect on Terrestrial Ecology

An Ecological Impact Assessment (EcIA) has been completed which evaluates the potential ecological impacts associated with the proposed Fearna Pumped Storage Hydro (PSH) development, focusing on designated sites, habitats and protected species. The EcIA provides a comprehensive assessment of the ecological implications during both construction and

operational phases, detailing predicted impacts, mitigation measures, biodiversity enhancements, and anticipated residual effects.

The proposed development site comprises a variety of ecologically sensitive areas, including Annex 1 habitats and Scottish Biodiversity List Priority Habitats, some of which qualify as Priority Peatland, Ancient Woodland, and Caledonian Pinewood. The project area also supports protected and notable species, including otter, pine marten, red squirrel, amphibians, reptiles, dragonflies, and other protected Scottish Biodiversity List (SBL) invertebrates. The main potential impacts identified include:

The construction of dams, access tracks, and reservoirs would result in the permanent loss of certain habitat areas and temporary loss/modification/degradation of others:

- Peat and carbon-rich soils would be lost and disturbed, affecting soil integrity and carbon storage. Construction activities may also alter water flow and quality, potentially impacting adjacent peatland, wetland, and aquatic habitats.
- Risks to protected and notable species include habitat degradation, fragmentation of foraging and commuting habitats, disruption of rest and breeding sites, pollution incidents, and potential for vehicle collisions.

To address these impacts, a Biodiversity Enhancement and Management Plan (BEMP) would be produced, with specific, measurable goals for habitat restoration, enhancement, and biodiversity net gain. An outline of this BEMP is included with the EIAR chapter at Appendix 8.7: OBEMP. Key mitigation and biodiversity net gain strategies include:

- Woodland, peatland, and montane scrub habitats would be restored or created in the Glen Garry Forest to compensate for habitat loss, including significant areas of riparian restoration / planting.
- A Peat and Soil Management Plan and water quality protocols (aligned with SEPA guidelines) would reduce the risk of contamination and protect water and soil resources.
- Measures such as timed enabling works and vegetation clearance, speed restrictions, translocation of vulnerable species would be implemented to reduce disturbance to wildlife and minimise ecological impacts during construction activities.

An Invasive Non-Native Species (INNS) Management Plan would be implemented to prevent the spread of invasive species, including biosecurity protocols for construction activities.

After the application of mitigation measures, the residual effects on most ecological receptors are expected to be non-significant, with a moderate to high confidence level in the effectiveness of the mitigation strategies. Long-term habitat restoration efforts are anticipated to promote recovery and provide biodiversity net gain, reducing long-term impacts on local populations and sensitive habitats.

Effect on Biodiversity - Ornithology

The ornithology EIA considers the potential effects of the Proposed Development / proposed controlled activities on relevant wild bird populations and reaches conclusions on the likely significant effects on ornithology.

Three protected species, Common Scoter (Melanitta nigra), Black-throated Diver (Gavia Arctica) and Red-throated Diver (Gavia stellata) would be affected by the proposed controlled activities' effects on waterbodies and watercourses.

The potential effects during construction and operation of the Proposed Development on designated sites (selected for avian ecology features) have been assessed. A detailed assessment of effects on West Inverness-shire Lochs Special Protected Area (SPA), which is functionally linked to the Site, is provided in a separate shadow Habitats Regulations Appraisal (sHRA) report.

After mitigation / compensation, it is assessed that there would be no residual negative effect from the construction or operational activity of the Proposed Development on any ornithological receptors within the area.

Effect on Economy

The economic effect of the Proposed Development has been assessed in accordance with the SEPA Guidance Note WAT-SG-67.

The assessment has determined that the significance of the effect on the economy as a consequence of the Proposed Development is **Positive High to Very High**.

Effect on Health & Safety

The likely effects of the Proposed Development on the population in terms of human health and human safety has been assessed under the following categories:

- the risk of ill-health or disease;
- the risk of injury; or
- human well-being more generally.

The assessment concludes that the following effects would give rise to effects with the significances tabulated below.

Effect	Type of Effect	Magnitude of Effect	Importance of Effect	Significance of Effect
Ill Health or Disease				
Private water supplies	Negative	Small	Medium	Low
Hydrocarbon pollution	Negative	Small	Medium	Low
Risk of Injury				
Public / Construction interface	Negative	Small	Very High	Moderate - High
Water Hazards	Negative	Very Small	Very High	Low
Road Traffic Accidents	Negative	Very Small - Small	Very High	Low - Moderate
Human Well Being				
Disturbance to recreational access	Negative	Very Small	Medium	Low

Effects on Recreation

The assessment addresses only direct impacts on recreation and access, with those associated with visual amenity assessed in Chapter 11 - Visual Amenity and Landscapes.

The forms of public recreation known to take place within and around the site of the Proposed Development, and which have been assessed in this Chapter are as follows:

- Canoeing;
- Swimming;
- Angling; and
- Hillwalking on the Munro Spidean Mialach.

The Proposed Development has the potential to impact upon recreational use and access within the proposed site and surrounding area. Some effects relate to construction disturbance and modifications to water discharges. Construction and operational disturbance would be managed by provision of the measures outlined in the Section 36 planning application EIAR Appendix 14.1 – Draft Access Management Plan.

All impacts on recreation and access within the water environment during both construction and operation have been assessed as Negligible. The impact on hillwalking on the Munro Spidean Mialach from the construction and operation of the Fearna Reservoir has been assessed as Very Low.

Effect on Well Being – Visual Amenity and Landscapes

The LVIA has identified that there would be localised significant landscape and visual effects occurring during the construction of the Proposed Development within an area extending up to around 5 km and affecting the landscape character and special qualities of localised parts of the Moidart Morar and Glen Shiel SLA, and WLA 18. Significant effects are also predicted to the visual amenity of those using the minor road to Kinloch Hourn and walking routes to the mountains of Gleouraich and Spidean Mialach, and Gairich.

Significant effects to landscape areas would reduce after 15 years to an area affected by the upper reservoir and dams within around 4 km. Significant visual effects would be limited to those accessing the Gleouraich / Spidean Mialach walking route. An additional cumulative significant effect is predicted for those accessing the Gairich walking route within a scenario where the Beinn Bheag wind farm is also operational.

Whilst some longer term significant effects within this localised area are predicted to qualities of the SLA and WLA 18, within which the Proposed Development would be situated, the wider effect on these areas as a whole would not be significant.

Economic Opportunities for Disadvantaged Groups

The effect of the Proposed Development on economic opportunities for disadvantaged groups has been assessed in accordance with the SEPA Guidance Note WAT-SG-67.

The Construction stage of the project will provide around 500 employment opportunities for semi-skilled and skilled workers. The approximately 7-year construction period is the focus of the assessment on opportunities for disadvantaged groups.

The Operational stage of the project will require around 29 skilled workers. The Authorised Person continues to explore training and educational opportunities for these skilled workers such that there would be a benefit to disadvantaged groups, but this is ongoing and as such has been omitted from this assessment.

The assessment has determined that the Proposed Development has a Positive effect of very low Significance relating to economic opportunities to disadvantaged groups. It should however be noted that as part of a sensitivity analysis it was considered that if a significant proportion of the workforce was to come from the 5% most deprived areas of Scotland, then the significance of effect becomes Medium to High.

Effects on Climate Change

The effect of the Proposed Development on climate change has been assessed in accordance with the SEPA Guidance Note WAT-SG-67.

The assessment set out below has determined that the Proposed Development has a Positive effect of Very High Significance on Climate Change.

Invasive Non-Native Species (INNS)

The risk of the introduction, transfer or spread of INNS to or within the area of the Proposed Development by the controlled activities and their construction and operation has been considered, and the following risks identified:

- The risk of transfer of fishes from Loch Quoich to Loch Fearna
- The risk of introduction of INNS from outside the development area through the transport and deployment of personnel, equipment and materials.

Based on practical considerations, it is not proposed to try to prevent the potential transfer of fishes from Loch Quoich to Loch Fearna. Both waterbodies sit fully with the catchment of Loch Quoich, with no water transferring out-of-catchement.

The risk of introduction of INNS to the development area through the transport and deployment of personnel, equipment and materials would be controlled by the implementation of biosecurity controls included in the project's Construction Environmental Management Document (CEMD), which would be drafted in compliance with the latest version of the SEPA guidance "Biosecurity Management of INNS for Construction Sites and Controlled Activities" and the Ness Catchment Biosecurity Plan 2021 – 2030.

The mitigation outlined above is considered a robust approach to minimise the INNS risk to the catchments potentially affected by the construction and operation of the Proposed Development and associated controlled activities. It is considered that the mitigation proposed means that the risk of INNS transfer is low.

Draft Balancing Test

The Applicant has undertaken a draft balancing test and considers that the Proposed Development has positive benefits that outweigh those that are negative.

Further assessment was then done using a sensitivity analysis which involved assessing the implications of applying a best case and worst-case assumptions in relation to aspects of those effects about which you are uncertain. The effects that are classed as Moderate-High or greater are listed in the table below along with the results of the sensitivity analysis.

Effect	**Type of Effect**	**Significance of Effect**	**sensitivity analysis**
Fluctuations in water level in Loch Fearna	Negative	High	sensitive to uncertainties
Public / Construction interface	Negative	Moderate - High	sensitive to uncertainties
Economy	Positive	High to Very High	insensitive to uncertainties
Climate Change	Positive	Very High	insensitive to uncertainties

The Very High positive effect on Climate Change was very robust when scrutinised in the sensitivity analysis and remained at Very High positive effect even with adjustment of associated factors used to determine the overall significance. This supports the conclusion that the very high positive effect on Climate Change is of a magnitude that concludes that the project has resulting greater positive benefits than negative.

Contents

List of Appendices

Appendix A	Upper Reservoir Pollution Prevention Plan
Appendix B	Outline Construction Environmental Management Document
Appendix C	Hydrology Study
Appendix D	Geomorphology Report - SAR
Appendix E	Geomorphology Report – PSH Area
Appendix F	River Garry Sediment Augmentation Appraisal
Appendix G	Baseline Survey of Temperatures in Loch Quoich and the Gearr Garry
Appendix H	Calculation of Temperature Effect per Cycle
Appendix I	Assessment of Temperature Variance in Loch Quoich
Appendix J	Aquatic Ecology Surveys
Appendix K	Summary of the Status and Mitigation of Impact on Arctic Charr
Appendix L	Socioeconomics and Tourism

List of Figures

FEA/FC4/000	Scheme Arrangement with Grid References
FEA/FC4/001	Location Plan
FEA/FC4/002	Scheme Layout
FEA/FC4/003	Scheme Layout (Aerial)
FEA/FC4/004	Catchment Plan
FEA/FC4/005	Project Schematic
FEA/FC4/200	Lower Quoich Reservoir Plan
FEA/FC4/205	Lower Reservoir Temporary Works Proposal Sheet 1
FEA/FC4/206	Lower Reservoir Temporary Works Proposal Sheet 2
FEA/FC4/250	Upper Reservoir Plan
FEA/FC4/252	Upper Reservoir Watercourse Details
FEA/FC4/255	Loch Fearna Temporary Drawdown Proposal
FEA/FC4/320	Fearna CFRD Dam - Plan and Elevation
FEA/FC4/370	Coire Dubh CFRD Dam – Plan and Elevation
FEA/FC4/436	Powerhouse Typical Cross Section
FEA/FC4/438	Powerhouse sections – Shafts 1 to 3
FEA/FC4/439	Powerhouse sections – Shafts 4 to 6
FEA/FC4/600	Upper Control Works GA
FEA/FC4/700	Powerhouse and Lower Control Works GA
FEA/FC4/820	River Kingie Bridge GA
FEA/FC4/830	Gearr Garry Bridge GA
FEA/FC4/941	Site Compound SC1 Plan
FEA/FC4/942	Site Compound SC2 Plan
FEA/FC4/943	Site Compound SC3 Plan
FEA/FC4/841-853	Southern Access Route Upgrades (Sheets 1-13)
FEA/FC4/871-879	Southern Access Route - River Kingie to C1144 (Sheets 1-9)
FEA/FC4/880	SAR Bund Detail at Loch an Staic
FEA/FC4/882	SAR Widening and passing place details
FEA/FC4/885-890	C1144 Road Widening Plan and Long Section (Sheets 1-5)
FEA/FC4/893-894	C1144 Road Widening Details (Sheets 1-2)
FEA/FC4/900	Powerhouse Access Track
FEA/FC4/910-921	Access Track from C1144 to Upper Reservoir (Sheets 1-12)
FEA/FC4/924-925	Access Track from C1144 to Upper Reservoir Sections (Sheets 1-2)
FEA/FC4/930/931	Access Tracks Typical Cross Sections (Sheets 1-2)

EIAR References (Obtainable at https://fearnastorage.co.uk/documents/)

Landscape and Visual
Chapter 7 – Chapter Text
Figures
Figure 7.1a: Zone of Theoretical Visibility (ZTV) of Proposed Dams
Figure 7.1b: ZTV of Proposed Dams and Powerhouse
Figure 7.1c: ZTV of Proposed Access Track to Upper Reservoir
Figure 7.2: Visualisation Locations
Figure 7.3: Designated and Protected Landscapes

Terrestrial Ecology
Chapter 8 - Chapter Text
Figures
Figure 8.1.1 - Quadrat Location Plan (Volume 2)
Figure 8.1.2 - NVC Survey Plan (Volume 2)
Figure 8.1.3 - UKHab Survey Plan (Volume 2)
Figure 8.1.4 - Habitat Designation Plan (Volume 2)
Figure 8.1.5 - GWDTE Plan (Volume 2)
Figure 8.7.1 - Habitat Compensation and Biodiversity Enhancement Opportunities Plan
Appendices
Appendix 8.1a: PSH National Vegetation Classification Survey Report
Appendix 8.1b: SAR National Vegetation Classification Survey Report
Appendix 8.2a: PSH Protected Species Survey Report
Appendix 8.2.1a: PSH **CONFIDENTIAL** Badger Annex
Appendix 8.2b: PSH Protected Species Survey Report
Appendix 8.3: Otter Survey and Monitoring Report
Appendix 8.4: Invertebrate Survey Report
Appendix 8.5: Odonata Baseline Assessment Report
Appendix 8.6: Not Used
Appendix 8.7: Outline Biodiversity Enhancement and Management Plan
Appendix 8.7.1: Peatland Restoration Assessment Report
Appendix 8.7.1.1: Deer Management Assessment
Appendix 8.7.1.2: Drone Survey for Assessment of Peat Reinstatement and Restoration

Ornithology
Chapter 10 - Chapter Text
Figures
Figure 10.1.2 - **CONFIDENTIAL** -Protected Species Near Development
Figure 10.2.2 - SPA and SSSI Near Development
Appendices
Appendix 10.1 - Ornithology **CONFIDENTIAL** Annex
Appendix 10.2 - Field Survey Methodology
Appendix 10.1.1 - **CONFIDENTIAL** 2022 Breeding Bird Survey Ornithology Report March 2023
Appendix 10.1.2 - **CONFIDENTIAL** 2023 Breeding Bird Survey Ornithology Report July 2023
Appendix 10.1.3 – **CONFIDENTIAL** 2023-24 Winter Bird Survey Ornithology Report March 2024
Appendix 10.1.4 – **CONFIDENTIAL** 2024 Breeding Bird Survey Ornithology Report November 2024

1 Introduction and Need for the Project

1.1 Background Information

1.1.1 Fearna PSH Ltd. (hereafter referred to as "the Authorised Person") is proposing to construct the Fearna Pumped Storage scheme, located approximately 25km west of Invergarry, as shown in **FEA/FC4/001 – Location Plan**. The proposals, for which a Water Environment (Controlled Activities) (Scotland) Regulations 2011 Licence (or CAR Licence) is being sought by the Authorised Person, are referred to in this report as 'the Proposed Development'.

1.1.2 The application for a CAR Licence is being prepared on behalf of the Authorised Person by Gilkes Energy Ltd, (hereafter referred to as "the Applicant") with support from a number of specialist consultants.

1.1.3 Consent under Section 36 of the Electricity Act 1989[1] has also been sought by the Authorised Person and the documents associated with this application are available here: https://www.energyconsents.scot/ApplicationDetails.aspx?cr=ECU00005061

1.1.4 The function of the Proposed Development would be to create a large-scale long duration electricity storage (LDES) scheme with up to 1,800MW generation capacity to store and release energy to or from the electricity transmission system. The Proposed Development would help to balance supply and demand for grid power at a national scale. The electricity storage capacity of the Proposed Development will be up to 36 gigawatt hours (GWhr), which equates to 20 hours of generation at 1,800 MW. This would make it the largest energy storage facility in the UK, providing a very significant contribution towards meeting the Scottish Government's commitment to pumped storage hydro, as set out in the Scottish Energy Strategy[2] .

1.2 The Authorised Person

1.2.1 The Authorised Person, Fearna PSH Ltd, is joint venture between a consortium led by the Developer, Gilkes Energy Ltd (GEL) and Scottish and Southern Energy Renewables (SSER).

1.3 The Applicant

1.3.1 The Applicant, Gilkes Energy Ltd (GEL), specialises in the development of hydro power projects in the UK, including PSH, and comprises a multi-disciplined development team which includes engineering, consenting, project management, operations, commercial, financial and legal expertise. GEL is supported by an industry-leading team of specialist technical consultants.

1.4 The Need for the Project

1.4.1 As the UK transitions away from a system dominated by large on-demand fossil fuelled thermal generation to one dominated by intermittent renewables it becomes

[1] The Electricity Act 1989. Available at: https://www.legislation.gov.uk/ukpga/1989/29/contents [Last Accessed April 2025].
[2] Scottish Government, 2017. The Scottish Energy Strategy. Available at: https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/ [Last Accessed April 2025].

increasingly challenging to balance the electricity network. Weather patterns, especially wind, rather than the daily changes in demand, become the dominant factor. To balance longer consecutive periods of low wind as well as low winter solar output (which can last many hours, or even days), Long Duration Electricity Storage (LDES) is required.

1.4.2 LDES is typically understood to mean any technology that can store energy or release electricity for a continuous duration of 8 hours or more. This length of continuous generation cannot be delivered by short duration battery storage. Indeed, analysis by the Authorised Person and other industry specialists suggests at least 12 hours of storage is required in order to provide optimum balancing services to the grid.

1.4.3 Other energy storage technologies that have been suggested include: hydrogen, liquid air storage and thermal storage but many of these are yet to be developed at any feasible economic scale. PSH is a long established, clean, large scale, LDES technology which has been successfully deployed in the UK for decades and it is being increasingly used for grid scale energy storage in the push to net zero around the world. PSH comprises around 94% of current global energy storage capacity (International Hydropower Association).

1.4.4 PSH can absorb excess energy on the electricity network and use it to pump water from a lower to an upper reservoir, storing this energy until times of high demand. At these times of high demand, the water stored in the upper reservoir is discharged through turbines, converting the stored energy back into electricity.

1.4.5 PSH installations are highly flexible and can deliver large quantities of power very quickly as they have the ability to rapidly start and stop. They also offer key ancillary services to the grid, including Black Start in the event of major blackouts, and inertia, which controls the stability of the grid.

1.4.6 By storing energy from renewable sources and then releasing it at periods of high demand, PSH can reduce our reliance on expensive carbon emitting gas generation which currently supports the electricity network. The Proposed Development can store up to 36GWh of energy, meaning it could save around approximately 930,000 tonnes of CO2 emissions a year, which would be a large step towards meeting Scotland's climate change target of net zero by 2045. In April 2024 the Scottish Government accepted that their flagship target of reducing greenhouse gas emissions by 75% by 2030 could not be achieved. This only highlights further the challenge ahead to reach net zero by 2045.

1.4.7 In summary, significant additional electrical energy storage and dispatchable power capacity is required (LDES), to make a meaningful difference to the UK energy system as it moves towards net zero. The Proposed Development delivers on both of these requirements confirming that there is both a need for the project and that it is a scheme of national significance.

1.4.8 Energy Policy Context

Overview

1.4.9 This section of the CAR Licence Report provides an overview of energy legislation and policy considered to be of most relevance to the Proposed Development. This is not an exhaustive overview of all relevant policies and plans relevant to this subject area, and,

given the legislative basis and statutory nature of the net-zero targets (discussed further below) only the most salient pieces of legislation and policies are discussed here.

The Legislative Framework

UK Legislation

Climate Change Act 2008

1.4.10 The Climate Change Act 2008[3] became law on 26 November 2008 and introduced a legally binding target for the UK to reduce greenhouse gas (GHG) emissions by at least 80% by 2050, relative to 1990 levels. Efforts to reduce GHG emissions in Scotland contribute to achievement of UK wide targets, as well as meeting Scotland specific targets as discussed below.

The Climate Change Act 2008 (2050 Target Amendment) Order 2019

1.4.11 The UK Government amended the Climate Change Act 2008 in June 2019 to increase the GHG reduction targets for the UK, reflecting the recommendations set out in the Committee on Climate Change (CCC) Report from May 2019 'Net Zero - The UK's contribution to stopping global warming'[4]. The Climate Change Act 2008 (2050 Target Amendment) Order 2019[5] amended the 2008 Act by passing into law the target for UK GHG emissions to be at least 100% lower than the 1990 baseline by 2050 (net zero by 2050), an increase on the previous target for an 80% reduction by the same date.

Energy Act 2023

1.4.12 The Energy Act 2023 received Royal Assent on 26 October 2023[6]. Originally introduced as the Energy Security Bill in 2022, it seeks to build on the commitment set out in the April 2022 British Energy Security Strategy[7] to reduce the UK's dependence on volatile fossil fuel markets, by improving domestic energy production and make the UK more self-sufficient when it comes to the energy it uses.

1.4.13 Following the introduction of the Act into law, the then Energy Security Secretary Claire Coutinho commented that 'The Energy Act is the largest piece of energy legislation in a generation. It will boost investment in clean energy technologies and support thousands of skilled jobs across the country. It lays the foundations for greater UK energy independence, making us more secure against tyrants like Putin, and helps us to power Britain from Britain'.

Scottish Legislation

Climate Change (Scotland) Act 2009

1.4.14 The Climate Change (Scotland) Act 2009 created the statutory framework for GHG emission reductions in Scotland by setting a target for net Scottish emissions for the year 2050 to be at least 80% lower than the 1990 baseline level. An interim target of a 42% reduction by 2020 was also set out.

[3] https://www.legislation.gov.uk/ukpga/2008/27/contents
[4] https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/
[5] https://www.legislation.gov.uk/ukdsi/2019/9780111187654
[6] https://www.legislation.gov.uk/ukpga/2023/52/contents
[7] https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy

1.4.15 The 2009 Act also established the Public Bodies Climate Change Duties which came into force on 1 January 2011. It requires that Public Bodies, which includes the Scottish Ministers as decision-makers, exercise their functions:

- in a way best calculated to contribute to deliver the Act's emissions reduction targets;
- in a way best calculated to deliver any statutory adaptation programme; and
- in a way that it considers most sustainable.

1.4.16 In 2019 the Scottish Government amended the 2009 Act, to set a new target for net zero GHG emissions in Scotland, as discussed below.

Climate Change (Emissions Reduction Targets) (Scotland) Act (2019)

1.4.17 The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 amends the Climate Change (Scotland) Act 2009, by introducing even more ambitious GHG reduction targets than those contained in the 2009 Act. It commits Scotland to becoming a net zero society by 2045 (five years earlier than the rest of the UK).

Climate Change (Emissions Reduction Targets) (Scotland) Act (2024)

1.4.18 The Climate Change (Emissions Reduction Targets) (Scotland) Act (2024)[8] received Royal Assent on 22 November 2024. This 2024 Act replaces the annual and interim GHG reduction targets set out in the 2009 Act with carbon budgets, covering 5-year periods between 2026 and 2045 setting the amount of GHG emissions allowed during each period.

Progress towards Net Zero

1.4.19 In April 2024, the Scottish Government abandoned its target of achieving a 75% reduction in GHG emissions by 2030, recognising that the target is 'out of reach'. The Scottish Government did however note its 'unwavering commitment' to reaching net zero by 2045, a target that remains embedded in statute.

1.4.20 At the same time as announcing that the 2030 GHG emissions reduction target had been abandoned, the Scottish Government also confirmed that it would drop the legally binding annual targets on reducing emissions, to be replaced by the aforementioned 5-yearly carbon budgets which have yet to be set. For context, the most recent annual targets in the lead up to 2045 are set out in Table 1 below.

1.4.21 In a statement to the Scottish Parliament on 19 June 2024[9] the Net Zero and Energy Cabinet Secretary confirmed that GHG emissions reduced by 50% over the period 1990 to 2022, against a target of 53.8% - therefore the 2022 target was missed. It is understood that the CCC will advise the Scottish Government on its carbon budgets in May 2025[10].

[8] https://www.legislation.gov.uk/asp/2024/15/contents?section-1-3
[9] https://www.parliament.scot/chamber-and-committees/official-report/search-what-was-said-in-parliament/meeting-of-parliament-19-06-2024?meeting=15945&iob=136097
[10] https://www.theccc.org.uk/news/coming-up/

Table 1 - GHG Reduction Targets by Year

Year	*Greenhouse Gas Reduction Targets (as a percentage of 1990 baseline levels)*	*Year (continued)*	*Greenhouse Gas Reduction Targets (as a percentage of 1990 baseline levels)*
2020 (interim target)	48.5%	2033	79.5%
2021	51.1%	2034	81%
2022	53.8%	2035	82.5%
2023	56.4%	2036	84%
2024	59.1%	2037	85.5%
2025	61.7%	2038	87%
2026	64.4%	2039	88.5%
2027	67.0%	**2040 (interim target)**	90%
2028	69.7%	2041	92%
2029	72.3%	2042	94%
2030 (interim target)	75%	2043	96%
2031	76.5%	2044	98%
2032	**78%**	**2045**	**100% (net zero emissions)**

1.4.22 The June 2024 announcement to the Scottish Parliament about missing the 2022 target and the earlier decision to abandon the 2030 interim target shows how much work still requires to be done to achieve the long-term goal of net zero GHG emissions by 2045. There is more to do in less time: GHG emissions must now fall at an even sharper rate than envisaged when the 2045 net zero target was first set. The Proposed Development can make a National Development (see later discussion on NPF4) level contribution to this goal and will make a significant and positive contribution to attainment of the 2045 target.

International

United Nations (UN) Emissions Gap Report 2024 – No more hot air … please!

1.4.23 For more than a decade the UN Gap Reports have compared where GHG emissions are heading, against where they need to be, and highlights ways to close the gap. The latest Gap Report, No more hot air … please!, was published on 24 October 2024[11].

[11] https://www.unep.org/resources/emissions-gap-report-2024

1.4.24 The 2024 Gap Report notes in the Foreword that GHG emissions reached a new high in 2023. This context coupled with the promises made to date put us '*on track for best-case global warming of 2.6 degrees this century and necessitating future costly and large-scale removal of carbon dioxide from the atmosphere to bring down the overshoot*.'

1.4.25 The Report notes in the Executive Summary that:

'*The magnitude of the challenge is indisputable. At the same time, there are abundant opportunities for accelerating mitigation action alongside achieving pressing development needs and Sustainable Development Goals*.'

It also notes that:-

'*As greenhouse gas emissions rose to a new high of 57.1 gigatons of carbon dioxide equivalent in 2023, the cuts required from today are larger; 7.5 per cent must be shaved off emissions every year until 2035 for 1.5°C. Current promises are nowhere near these levels, putting us on track for best-case global warming of 2.6°C this century and necessitating future costly and large-scale removal of carbon dioxide from the atmosphere to bring down the overshoot'*.

1.4.26 As a result, the Report notes that unprecedented action is now needed by all countries and this 'will require overcoming formidable policy, governance, institutional and technical barriers as well as an unprecedented increase in the support provided to developing countries along with a redesigning of the international financial architecture.

UK Energy Policy

CCC - Progress in Reducing Emissions – 2024 Progress Report to Parliament

1.4.27 The 2024 Progress Report to the UK Parliament[12] was published in July 2024 and considers the global picture with regards to emissions reductions and adaptation to climate change. It discusses the UK's role in a global context before discussing a range of sectors such as transport, building, manufacturing, electricity supply, fuel supply, aviation and shipping etc. Each sector is looked at in terms of emission trends and drivers, indicators of progress, next steps and major risks.

1.4.28 In the Executive Summary, it is outlined that the UK has 'a successful track record of emissions reductions'. However, 'despite some progress, the previous Government signalled a slowing of pace and reversed or delayed key policies'. The new Government needs to 'act fast' to ensure the UK remains on track to meet its current commitments.

1.4.29 The report notes that we've seen the wettest 18 months on record in England. The impacts on farmland have been extensive with areas submerged for extended periods, leading to the loss of crops and animals. Livelihoods have also been disrupted and lives lost in the UK and overseas as a direct consequence of climate impacts, which are becoming more severe.

1.4.30 The report sets out that the cost of key low-carbon technologies is continuing to fall, creating an opportunity for the UK to boost investment, reclaim global climate

[12] https://www.theccc.org.uk/wp-content/uploads/2024/07/Progress-in-reducing-emissions-2024-Report-to-Parliament-Web.pdf

leadership and enhance energy security by accelerating take-up. British-based renewable energy is the cheapest and fastest way to reduce vulnerability to volatile global fossil fuel markets. The faster we get off fossil fuels, the more secure we become.

1.4.31 On Planning, a key priority area is to remove planning barriers for renewable energy development. In Scotland, NPF4 has set a positive policy framework to achieve this, which is discussed in Section 5.

The 29th UNFCCC conference of the parties (COP29) – Baku – November 2024

1.4.32 On 12 November 2024, at the 29th UNFCCC conference of the parties (COP29) in Baku, the UK Prime Minister announced the UK's 2035 Nationally Determined Contribution (NDC) under the Paris Agreement. This commits the UK to reducing economy-wide greenhouse gas emissions by at least 81% by 2035, compared to 1990 levels, excluding emissions from international aviation and shipping.

1.4.33 The 2035 NDC is based on advice from the independent CCC. It is a progression on the UK's previous NDC pledge to reduce emissions by at least 68% by 2030. It was informed by the outcomes of the Global Stocktake from COP28 and is aligned with limiting global warming to 1.5 °C. It is aligned with the level of ambition in Carbon Budget 6 (2033-37) on the pathway to net zero by 2050.

1.4.34 On 30 January 2025, the UK submitted its information to facilitate clarity, transparency and understanding (ICTU) of its ambitious 2035 NDC[13]. A copy of the ICTU will be laid in the Houses of Parliament.

Clean Power 2030 Action Plan; A new era of clean electricity

1.4.35 The Clean Power 2030 Action Plan was published by the UK Government in December 2024[14] following an earlier report by the National Energy System Operator (NESO) in 2024 to provide advice on achieving clean power for Great Britain by 2030. The NESO report[15] considered a wide range of issues relevant to reaching clean power by 2030 such as the planning and consenting regimes, the roles that different technologies are to play in a future energy system, grid upgrade and connections, the costs and benefits of clean power and identified two primary pathways to clean power by 2030, namely 'New Dispatch' and 'Further Flex and Renewables'.

1.4.36 That report considers that it is possible to build, connect and operate a clean power system for Great Britain by 2030 while maintaining security of supply. The report notes on page 29 that there will be period over the year, mostly winter and autumn, where weather conditions mean that renewables and firm generation alone will not be able to meet electricity demand. Where renewables alone are unable to meet demand for longer periods, the Action Plan notes that a suite of technologies will need to be deployed and maintained to provide longer-duration power capacity – pumped storage hydro is identified as a likely technology.

[13] https://www.gov.uk/government/publications/uks-2035-nationally-determined-contribution-ndc-emissions-reduction-target-under-the-paris-agreement
[14] https://assets.publishing.service.gov.uk/media/677bc80399c93b7286a396d6/clean-power-2030-action-plan-main-report.pdf
[15] https://www.neso.energy/document/346651/download

1.4.37 The Action Plan further notes in page 110 that long-duration flexible technologies can adjust their output quickly to match supply with demand and can provide a reliable source of electricity for managing daily and seasonal demand peaks and longer periods of low renewable output. Currently, this flexibility is provided by unabated gas and pumped storage hydro, currently the only mature technologies capable of providing this flexibility. The Action Plan notes that between 40-50 GW of dispatchable long-duration flexible capacity could be needed by 2030. While the majority of this is expected to come from unabated gas, the Action Plan notes that 'will also need to scale up the deployment of pumped hydro storage' (underlining added) – while also noting the Government's commitment to transitioning away from unabated gas whilst maintaining security of supply.

1.4.38 The Action Plan later notes on page 115 that LDES is a key enabler to a secure, cost-effective and low carbon energy system. The Action Plan notes that LDES can help to decarbonise the system by supplying electricity continuously from several hours to up to several days without recharge, replacing flexibility from unabated gas and helping to alleviate constraints on the grid. Pumped storage hydro, a long-established and mature technology is a form of LDES. Long build times and revenue uncertainty have inhibited investment in LDES development over the last 40 years, but the Government has taken steps to address these barriers.

Scottish Energy Policy

CCC – Progress in Reducing Emissions – 2023 Report to Parliament

1.4.39 The above report to the Scottish Parliament was published in March 2024[16]. One of the key messages of the report is that Scotland missed the 2021 annual target of a 51.1% reduction in GHG emissions which is the eighth target Scotland has missed within the last 12 years. Secondly, the report noted that the acceleration required in emissions reduction to meet the 2030 target is 'now beyond what is credible'. The report also noted that 'current overall policies and plans in Scotland fall far short of what is needed' to achieve the legal emissions reduction targets.

1.4.40 In April 2024, in response to the findings of the CCC report, the Scottish Government abandoned its target of achieving a 75% reduction in emissions by 2030, recognising that the target is 'out of reach'. The Scottish Government did however note its 'unwavering commitment' to reaching net zero by 2045, a target that remains embedded in statute.

Serving Scotland – Programme for Government 2024-2025

1.4.41 The Programme for Government was published in September 2024[17] and therefore represents the most recent statement of the Scottish Government's priorities on a range of issues. While the Programme for Government is not an energy policy specific publication, it does set out important statements about how the Scottish Government

[16] https://www.theccc.org.uk/publication/progress-in-reducing-emissions-in-scotland-2023-report-to-parliament/
[17] https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2024/09/programme-government-2024-25-serving-scotland/documents/programme-government-2024-25-serving-scotland/programme-government-2024-25-serving-scotland/govscot%3Adocument/programme-government-2024-25-serving-scotland.pdf

intends to address various matters relating to the climate emergency, nature crisis and renewable energy, amongst other issues.

1.4.42 The First Minister's Foreword notes that the Programme for Government will focus on four key priorities with one being 'tackling the climate crisis emergency'. Section 3 outlines:

'The twin crises of climate change and biodiversity loss represent the existential threat of our times, underlined by recent confirmation that the global temperature has pushed past the internationally agreed 1.5 degrees Celsius warming threshold for a 12-month period. We must reduce emissions and our vulnerability to the future impacts of climate change and restore our natural environment.'

1.4.43 This theme is revisited throughout the document and mirrors the foreword to NPF4 (discussed in Section 5) which puts the twin global climate and nature crisis at the heart of the future vision for Scotland.

1.4.44 It is clearly noted that 'our potential for renewable energy generation is one of our greatest environmental and economic opportunities'. It goes on to outline that in order to support a just transition to a green economy the Scottish Government will shortly publish the Energy Strategy and Just Transition Plan. As well as doubling the ambitions for renewable energy generation, this will set out actions to deliver a clean energy pipeline and its economic benefits.

Draft Scottish Energy and Just Transition Plan (2023)

1.4.45 The Scottish Government published the Draft Energy Strategy & Just Transition Plan (hereafter referred to as the Draft Strategy) for consultation purposes in January 2023. While the Draft Strategy may be subject to change following consideration of responses to this earlier consultation exercise, brief commentary is merited here on certain aspects of its content.

1.4.46 The Ministerial Foreword describes the 2020s as a 'decisive decade' when we must deliver an energy system that meets the challenge of becoming a net zero nation by 2045. It notes the need to reduce dependency on oil and gas, as a means of combating the climate crisis and reducing our exposure to global market volatility in the energy market, which has seen energy prices increase significantly since the start of the Ukraine war in 2022. The Draft Strategy seeks to reduce energy costs in the long term and reduce the likelihood of future energy cost crises. It also seeks to achieve the transition to a net zero society in a just manner, so that the employment and economic opportunities associated with it are fully realised.

1.4.47 The overall vision is that by 2045:-

'Scotland will have a flourishing, climate friendly energy system that delivers affordable, resilient and clean energy supplies for Scotland's households, communities and business. This will deliver maximum benefit for Scotland, enabling us to achieve our wider climate and environmental ambitions, drive the development of a wellbeing economy and deliver a just transition for our workers, businesses, communities and regions'.

1.4.48 A series of actions are listed on page 24 to achieve this vision, including the need to 'significantly scale up renewable energy production, including on-and offshore wind power, renewable hydrogen, marine energy, solar and hydro' (underlining added).

1.4.49 Meeting the anticipated increase in demand for domestic electricity forms a key component of the Draft Strategy, but exporting electricity generated in Scotland is recognised as an economic opportunity.

1.4.50 Section 3.1 notes that 'increasing levels of home-grown renewable supply will make energy more affordable and ensure it is always available when we need it'. The Draft Strategy is not technology specific and there are comments, aspirations and targets for different technology types. The Draft Strategy recognises the importance of pumped hydro storage developments stating, "as we transition to a net zero energy system, renewables and other zero-carbon technologies, including pumped hydro storage, will need to provide all the services required to ensure a secure energy system." It continues noting that "PHS also continues to play a pivotal role in Scotland's energy system providing long-term storage and reserve for the electricity networks. PHS accounts for 740 MW of Scotland's 864 MW of energy storage" (page 129).

1.5 Selection of the Optimum PSH Development Site

1.5.1 PSH requires a suitable location combining several key factors:

- Suitable topography and geology to be able to create substantial upper and lower reservoirs and a waterway system to provide meaningful LDES at scale.
- Practicable access to the electricity transmission network;
- Practicable access to the site;
- Re-use of existing hydropower and other infrastructure where possible; and
- The minimum footprint and impact on the natural environment from construction and operation of the scheme.

1.5.2 Various alternative sites were considered within a nationwide screening exercise. Relatively few locations satisfy the key criteria that are listed above. The Highlands of Scotland do provide opportunities for PSH, however many potential sites were found to have existing infrastructure or other stakeholder interest in the reservoirs. Furthermore, some potential sites were located within sensitive and designated areas or they were not found to provide significant energy storage for a given footprint.

1.5.3 The 1,800MW Fearna PSH scheme is well located to satisfy the above criteria, being close to existing grid infrastructure, clear of migratory fish and other existing water interests and being located outside designated natural habitat areas.

1.5.4 The Proposed Development at Fearna provides both significant quantities of dispatchable power generation (up to 1,800MW) and stored energy (up to 36GWh). When compared with other PSH projects it scores very highly and is one of the best potential stores of grid scale energy in the UK for a relatively modest development footprint.

1.5.5 The graphic below, **Plate 1-1 UK PSH Projects Compared Plate 1-1 – UK PSH Projects Compared**, shows the power and stored energy ratings of the Proposed Development compared with the four existing operational PSH projects in the UK (grey dots), the six PSH projects that are consented but not constructed (blue dots), and the four PSH projects that are currently in the planning system (red dots)

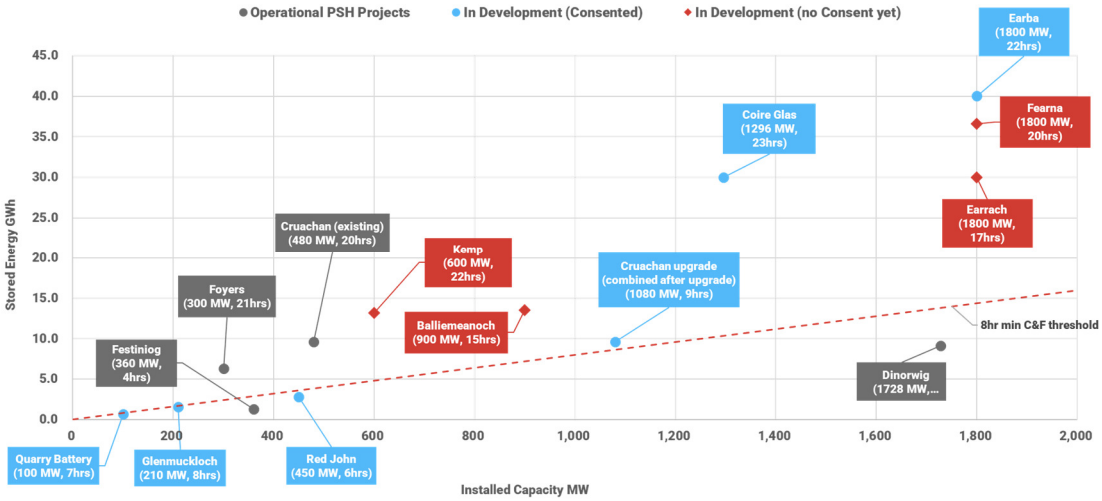

Plate 1-1 UK PSH Projects Compared

1.5.6 The scheme design has been developed to minimise its environmental footprint and its extent would be confined mainly to the footprint of the upper reservoir, the powerhouse and access tracks.

1.5.7 The scheme would re-use the majority of earthworks arisings for construction of the works including the dam structures and maintain a balance of materials within each of the upper and lower parts of the site. This would avoid impacts on local road infrastructure and also avoid long haul routes for earthworks materials within the site, a key feature of the sustainable aims for the Proposed Development.

1.5.8 A more detailed analysis of the consideration of alternatives and the evolution of the design presented in the CAR licence application is given in Chapter 3[18] of the EIA Report accompanying the Section 36 planning application.

1.5.9 In summary, the Proposed Development has been selected as one of the best located and most significantly sized PSH developments in the UK.

1.6 The Proposed Development

1.6.1 The layout of the Proposed Development is shown in drawing **FEA/FC4/002 - Scheme Layout**. The Proposed Development would operate by transferring water between a lower reservoir, the existing operational Quoich reservoir and an upper reservoir, created by enlarging the existing Loch Fearna by construction of two dams. The reservoirs would be connected to each other via the powerhouse by an underground waterway system including up to two headrace tunnels.

1.6.2 The Proposed Development would also include a significant package of habitat compensation and enhancement works which would demonstrably and significantly

[18] https://fearnastorage.co.uk/documents/

contribute to the enhancement of biodiversity in the Glen Garry area, including restoring degraded habitats and building and strengthening nature networks and the connections between them.

1.6.3 Details of the Proposed Development are included in **Chapter 3 - Scheme Description**.

1.7 Associated Works

1.7.1 A grid connection, comprising a 400 kV overhead transmission line, is required to connect the Proposed Development to the national electricity grid. For regulatory reasons, this will be subject to a separate consenting process with Scottish and Southern Electricity Networks Transmission ("SSEN Transmission") as the Applicant. It is unlikely that the grid connection works will require any significant controlled activities.

1.8 Site Context

1.8.1 The Proposed Development would be situated within the boundaries of a number of landholdings approximately 25km to the west of Invergarry. Access from the A87 to the site for construction would be taken on a route to the south of Loch Garry, the Southern Access Route (SAR), passing through generally forested areas before traversing open moorland. The final section of access to the site would be along the existing public road, the C1144, which would be widened locally. The main PSH works, comprising the upper and lower reservoirs and associated works, are situated approximately 1km to the west of the Quoich Dam.

1.8.2 The main PSH site comprises south and southwest-facing slopes and corries of upland blanket mire, heathland, and flush habitat; burns with associated riparian woodland; acid grassland, bracken, mire, and heath habitats in the lower-lying ground and a rock / shingle beach along the shoreline of Loch Quoich. M15 wet heath is the most widespread community within the survey area, followed by M17 blanket bog, and M25 mire. No woodland would be affected by the main PSH works; however the Southern Access Route (SAR) would impact on some native and commercial woodland. No ancient woodland would be affected by the main PSH works.

1.8.3 The site is used for highland sports, commercial forestry, hydroelectric generation and recreation. The Applicant is working closely with landowners to ensure any potential adverse effects on their existing interests are minimised.

1.8.4 The site is located entirely within the upper catchment of the River Garry. Loch Fearna outfalls via the Allt Fearna to Loch Quoich. Loch Quoich was dammed in the 1950s at both its east and west ends to create the storage for the Quoich Hydro project. Loch Quoich operates on a 26m vertical range, therefore is already subject to significant modification by hydropower infrastructure including dams, a reservoir with fluctuating water levels and associated drawdown scarring, an intake tower, control building and a power station downstream.

1.9 Structure of the Fearna CAR Licence Submission

1.9.1 The following information sets out the Structure of the CAR Licence submission:

- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 Licence Application Form A
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 Licence Application Form D – Surface Water Abstractions and Impoundments
- Fearna PSH CAR Licence Application Report :

Chapter 1	Introduction & Need for the Project
Chapter 2	Assessment Methodology - Assessing Significance of Impacts
Chapter 3	Scheme Description
Chapter 4	Water Management
Chapter 5	Effects on Biodiversity - Aquatic
Chapter 6	Effects on Biodiversity - Terrestrial
Chapter 7	Effects on Biodiversity - Ornithology
Chapter 8	Effects on the Economy
Chapter 9	Effect on Well Being – Health and Safety
Chapter 10	Effect on Well Being – Recreation
Chapter 11	Effect on Well Being – Visual Amenity and Landscapes
Chapter 12	Economic opportunities for disadvantaged groups
Chapter 13	Effect on natural resource use/climate change
Chapter 14	Invasive Non-Native Species (INNS)
Chapter 15	Shadow (Draft) Balancing Test

Appendix A	Upper Reservoir Pollution Prevention Plan
Appendix B	Outline Construction Environmental Management Document*
Appendix C	Hydrology Study
Appendix D	Geomorphology Report - SAR
Appendix E	Geomorphology Report – PSH Area
Appendix F	River Garry Sediment Augmentation Appraisal
Appendix G	Baseline Survey of Temperatures in Loch Quoich & the Gearr Garry
Appendix H	Calculation of Temperature Effect per Cycle
Appendix I	Assessment of Temperature Variance in Loch Quoich
Appendix J	Aquatic Ecology Surveys
Appendix K	Summary of the Status and Mitigation of Impact on Arctic Charr
Appendix L	Socioeconomics and Tourism*

Figures

- Shadow Habitats Regulations Appraisal (sHRA) Report (West Inverness-shire Lochs SPA)
- A separate Non-Technical Summary

**Please note that these documents are taken directly from the Section 36 planning application EIA report and therefore will contain references to EIAR chapters and appendices, instead of CAR Report chapters.*

1.10 CAR Specialist Team

1.10.1 The Applicant recognises that the Proposed Development may give rise to some environmental effects. Specialist consultants have therefore been appointed by the Applicant to provide expert knowledge in assessing the environmental effects as follows:

- Hydrology and Water Management: Mott MacDonald Limited;
- Geomorphology: Dr Hamish Moir;
- Geology, Soils and Water: SLR Consulting Ltd;
- Aquatic Ecology:
  - Gavia Environmental Ltd;
  - [redacted], University of Glasgow;
- PSH Temperature Generation Study: Mott Macdonald Limited;
- Loch Quoich Temperature Study: SLR Consulting Ltd;
- Terrestrial Ecology: EnviroCentre Ltd;
- Peatland Restoration: ADL Nature;
- Forestry: Upland Forestry Ltd;
- Ornithology: Mike Coleman Ecology;
- Landscape and Visual: ASH Design and Assessment Ltd;
- Land Use: Gilkes Energy Ltd;
- Recreation and Access: Gilkes Energy Ltd; and
- Socioeconomics and Tourism: MKA Economics Ltd.

1.11 Supporting Documents

1.11.1 The following supporting documents will be submitted along with the CAR Licence Application Report:

- A Non-Technical Summary (NTS) – this is a summary of the CAR Licence Application Forms, Report and Appendices in non-technical language;

2 Assessment Methodology

2.1.1 The key topics that will be assessed by SEPA as part of a CAR Licence application have been assessed in accordance with the SEPA Supporting Guidance (WAT-SG-67).

2.1.2 It is understood that this guidance (WAT-SG-67) is to be followed when determining whether SEPA should authorise a controlled activity that would potentially breach environmental standards. The guidance considers the significance of both positive and negative impacts across Social, Economic and Environmental issues. The Applicant has drafted a chapter on each area across the Social, Economic and Environmental sphere. This is intended to assist with SEPA's assessment and provide all the information in a concise report.

2.1.3 In some instances, the Applicant has referred back to the Section 36 EIA report, as transferring its findings to match SEPA's criteria was considered unnecessary.

2.1.4 A Shadow Balancing test has been included within this report, following the SEPA guidance, whilst acknowledging that SEPA will need to undertake this exercise following a review of the information presented within this report and the associated application forms.

3 The Proposed Development

3.1 Introduction

3.1.1 This chapter describes the Proposed Development. The location of the Proposed Development is shown in **FEA/FC4/001 – Location Plan** and its arrangement is shown in **FEA/FC4/002 – Scheme Layout** and **FEA/FC4/003 – Scheme Layout (Aerial)**.

3.1.2 The function of the Proposed Development would be to create a nationally significant large-scale long duration electricity storage (LDES) scheme which would store energy from and release to the electricity transmission system to balance supply and demand for electric power at a national scale. This would facilitate the further deployment of intermittent renewable generation and the reduction of fossil fuel energy production.

3.1.3 The generating capacity of the scheme would be up to 1,800MW, with enough storage with the upper reservoir full to generate for approximately 20 hours at this capacity. Based on OFGEM published data on average electricity consumption, the Proposed Development could potentially provide energy to 1.3 million average homes for up to 20 hrs. The pumping capacity would be rated at up to 1,980MW, which would allow national-scale renewable generation projects to continue to operate, rather than being paid to constrain, with the energy being imported to the Proposed Development.

3.1.4 The Proposed Development would operate by transferring water between a lower reservoir, the existing Quoich reservoir, and an upper reservoir created by raising the level of Loch Fearna. The reservoirs would be connected by a system of underground waterways, with the turbines located in shafts within a powerhouse structure by the shore of the Quoich reservoir.

3.2 Site Description

3.2.1 The Proposed Development would be situated within the boundaries of a number of landholdings approximately 23km to the west of Invergarry. Access from the A87 to the site for construction would be taken on a route to the south of Loch Garry, the “Southern Access Route” (SAR), passing through mostly commercially forested areas before traversing open moorland. The final section of access to the site would be along the existing public road, the C1144, which would be widened locally.

3.2.2 The main PSH works, comprising the upper and lower reservoirs and associated works, are situated approximately 1km to the west of the existing Quoich Dam.

3.2.3 The main PSH site comprises south and southwest-facing slopes and corries of upland blanket mire, heathland, and flush habitat; burns with associated riparian woodland; acid grassland, bracken, mire, and heath habitats in the lower-lying ground and a rock shingle beach along the shoreline of Loch Quoich. M15 wet heath is the most widespread community within the survey area, followed by M17 blanket bog, and M25 mire.

3.2.4 No woodland would be affected by the main PSH works, however the Southern Access Route (SAR) would impact on some native and commercial woodland.

3.2.5 The site is currently used for highland sports, commercial forestry, hydroelectric generation and recreation. The Applicant is working closely with landowners to ensure any potential adverse effects on their existing interests are minimised.

3.2.6 The site is located entirely within the already modified upper catchment of the River Garry. Loch Fearna drains via the Allt Fearna to Loch Quoich as does the adjacent Coire Dubh via the Allt Mheil. Loch Quoich was dammed in the 1950s at both its east and west ends to create storage for the Quoich Hydro project. Loch Quoich operates on a 26m vertical range, therefore is already subject to significant modification by hydropower infrastructure including dams, a reservoir with fluctuating water levels and associated drawdown scarring, an intake tower, control building and a power station downstream.

3.3 Scheme Operation

3.3.1 The Proposed Development would be operated either in:

- 'generating' mode during periods of low supply / high demand, when electricity would be generated by releasing water from the upper reservoir (Loch Fearna) through the reversible pump turbines and into the lower reservoir (Loch Quoich), and exported to the grid; or
- 'pumping' mode, when surplus electricity generation would be imported from the grid to power the reversible pump turbines to pump water from the lower to the upper reservoir, to be stored to allow generation when required.

3.3.2 The Proposed Development would utilise the storage reservoir of the existing Quoich hydro scheme as its lower reservoir. Loch Quoich is currently one of the largest storage reservoirs in the UK, storing approximately 360Mm^3. The Proposed Development would store approximately 45Mm^3, which is around 11% of the available storage of Loch Quoich.

3.3.3 The 26m operational range of Loch Quoich would remain unchanged from its current maximum and minimum levels. The existing Quoich Hydro station would also continue to operate as usual.

3.3.4 The Proposed Development would operate across a 15m range of Loch Quoich, which sits fully within the existing 26m range of Quoich Hydro, with buffers retained as explained below.

3.3.5 Therefore, no modifications to the existing Quoich dams or operating regime are required to support the operation of both schemes.

3.3.6 The addition of the Proposed Development would not divert water out of the existing catchment of Loch Quoich, nor would it increase spill at Quoich Dam nor affect the current compensation flows or any other aspect of the existing SEPA CAR Licence CAR/L/1011471 V2 covering the Quoich Hydro/Garry cascade and wider Ness catchment.

3.3.7 As a result, compliance with all other environmental constraints downstream of the Quoich Dam and which lie outwith the CAR/L/1011471 V2 would be maintained. These include for instance the requirement to maintain specific loch levels in Loch Garry downstream during the summer months.

3.3.8 The Proposed Development would be constrained from pumping water when Loch Quoich is below an agreed level, with sufficient reserve to maintain compliance with CAR/L/1011471 V2 and the ongoing operation of the Quoich hydro scheme.

3.3.9 The operation of the Fearna dam would include provision for the discharge of agreed flows to the Allt Fearna. Likewise. the Coire Dubh Dam would have the facility to discharge agreed flows including those necessary to maintain generation at the Allt Mheil hydro scheme to achieve its expected annual output.

3.4 Carbon Balance

3.4.1 The benefits of PSH in relation to reduced carbon emissions include:

- reduction of electrical grid carbon emissions by displacing fossil fuel generation; and
- increasing efficiency of the electrical grid by reducing wind power curtailment during times of low demand.

3.4.2 An outline carbon balance assessment has been carried out for the Proposed Development in accordance with UK Government, Scottish Government at SEPA guidance. This is summarised in **Table 3-1 – Carbon Balance Assessment** below. The assessment has identified a Greenhouse Gas (GHG) impact of 1,951,112 tCO2e for the development of the PSH (including materials extraction), and an annual benefit in avoided CO2 emissions of 931,500 tCO2e, giving a carbon payback period of approximately 2 years.

Table 3-1 Carbon Balance Assessment

Item	Description	Value	Units	Source
Greenhouse Gas (GHG - Carbon) Potential Losses Associated with Development				
1	GHG Emissions from construction and development.	1,744,562	tCO2e	Scottish Government Windfarm Carbon Assessment Tool – Version 2.14
2	GHG Emissions from volume of materials extracted during construction.	206,550	tCO2e	EIA Chapter 3: Consideration of Alternatives and Design Evolution
Greenhouse Gas (GHG - Carbon) Potential Savings Associated with Development				
3	UK Grid mix emission factor	0.207	(t CO2 MWh-1)	Scottish Government Windfarm Carbon Assessment Tool – Version 2.14
4	Annual generation from the Fearna PHS. Assumes all operations are carried out using power generated by renewable sources i.e Wind Power.	4,500	GWh	Gilkes Energy Ltd.
5	Annual generation from the Fearna PHS.	4,500,000	MWh	Converted from No.4 above.
6	GHG Emissions avoided.	931,500	tCO2e/ year	Annual Fearna output of 1,000,000 MWh x UK Grid Mix Emission Factor.

3.5 Scheme Description

3.5.1 The principal permanent components of the Proposed Development would be:

Loch Fearna – the upper reservoir;

The underground waterway system;

Loch Quoich – the lower reservoir;

The powerhouse and switchyard;

Access tracks and footpaths;

Temporary construction facilities and borrow pits; and

Areas of habitat compensation and enhancement.

Loch Fearna (Upper Reservoir)

Fearna and Coire Dubh Dams

3.5.2 Two rockfill dams (referred to as Fearna Dam and Coire Dubh Dam) would be constructed to allow the reservoir to store water between the levels of 540m AOD and 600m AOD. This would provide storage of approximately 40 Mm3 of water. The dams

would be of similar appearance and construction to the existing Quoich Dam. The upper reservoir and its dams are shown in **FEA/FC4/250 – Upper Reservoir Plan**, **FEA/FC4/300 – Fearna Dam GA** and **FEA/FC4/350 – Coire Dubh Dam GA**.

3.5.3 The dams would be constructed from rock which has been excavated from borrow pits located within the reservoir inundated area. The faces of the dams would be at an approximately 1:1.5 gradient and the water would be retained by an impermeable upstream face or dam core. The downstream face would be rockfill.

3.5.4 The dams would have a road across the crest to allow maintenance access, together with other facilities including a bottom outlet valve house for passing water through the dam as required, and facilities for the release of compensation flows to the watercourses downstream. Public access would be provided along the Fearna dam access road as part of the proposed diversion of the existing walking route from Spidean Mialach.

3.5.5 There would be a concrete-lined spillway down the west side of the Coire Dubh dam to accommodate the discharge of flood flows in the unlikely event that these occurred when the reservoir was already full and the water level could not be reduced through the turbines.

3.5.6 Small access tracks would service the spillway, valve houses and along the toes of the dams for maintenance.

Upper Control Works

3.5.7 The upper control works would be located within the reservoir and would feed water to/from the underground pressure tunnels. This is shown in **FEA/FC4/600 & 610 – Upper Control Works GA**.

3.5.8 The upper control works would comprise two reinforced concrete cylindrical towers, located over each of the vertical tunnel shafts. The towers would be connected by gantries to the Fearna dam and to each other. This would allow for pedestrian and vehicular access for operation and maintenance of the facilities within the upper control works. No public access would be provided to these structures.

3.5.9 Each tower would incorporate screens below the bottom operational water level of the reservoir to prevent debris from entering the underground waterway system. In addition, gates would be provided to isolate the reservoir from the tunnels during plant maintenance.

Dam Construction

3.5.10 The construction of the Fearna and Coire Dubh dams would require the following steps:

- Stripping of peat and removal of superficial material to expose the bedrock;
- Preparation of the bedrock to create a solid formation for the dam to be constructed on;
- Construction of concrete works at the base of the dam;
- Stripping of borrow pits and excavation of rock, which would then be processed to the required grading for dam construction;

- Placing and compaction of the rock within the dam to the required level (possibly with an impermeable core);
- Construction of the concrete spillway, parapet walls, valve houses and other ancillary works;
- Installation of the impermeable upstream layer (unless an impermeable core has been used);
- Construction of a wave wall, dam crest roadway, spillway, and valve house;
- Installation of hydraulic isolation gates, telemetry and communications; and
- Testing, commissioning and certification by Reservoir Engineers.

3.5.11 In is anticipated that Loch Fearna would require to be temporarily drawn down from its natural level of around +538mAOD to +530mAOD to allow the construction of the Fearna dam. This would be achieved by pumping water from the loch to the Allt Fearna. The lower level would be maintained by pumping to a temporary outfall to the diversion at a lower level which is located outwith the construction works footprint.

3.5.12 The catchments which would be modified by the Fearna and Coire Dubh dams are small, at approximately 1.3km^2 each. Natural runoff from the Fearna and Coire Dubh catchments would be temporarily diverted through or around the dam works as required in culverts or open channel. Once the permanent structures in the base of the dams are complete to allow the catchment flows to be passed through, these would be utilised.

3.5.13 To manage sediment, the natural runoff from the catchments would be kept separate from runoff from the exposed areas of the construction site. This would prevent the mixing of clean runoff and silty water from the construction site and therefore minimise the volume of water that requires silt management measures.

3.5.14 Silty water would be controlled and managed in accordance with best practice and using natural measures where possible to filter silt and return clean water to catchment downstream of the works. Mechanical measures would also be utilised where appropriate. Details of the proposed silt control measures are given in **Appendix A - Upper Reservoir Pollution Prevention Plan**.

Underground Tunnel System

3.5.15 Water would transfer between Loch Fearna and Loch Quoich via an underground waterway system comprising:

- two headrace tunnels connecting the Fearna Reservoir to the powerhouse;
- an access tunnel from the powerhouse ground level area to the headrace tunnels and powerhouse shafts lower level; and
- six tailrace tunnels, one between each powerhouse shaft and Loch Quoich.

Headrace Tunnels

3.5.16 Water would transfer between Loch Fearna and the powerhouse via two underground pressure tunnels, approximately 9m in diameter, constructed through bedrock. The

tunnels would drop vertically below the upper control works before continuing at a gradient of approximately 1:10 and then horizontal towards the powerhouse. The tunnel arrangement is shown in **FEA/FC4/500 – Tunnel Layout Plan**.

3.5.17 As they approach the powerhouse, each tunnel would split into three branches to connect the two tunnels to the six powerhouse shafts.

3.5.18 Surge shafts would not be required on this scheme and therefore all of the tunnel infrastructure would be below ground.

3.5.19 The pressure tunnels would be lined with concrete and additionally with steel approaching the powerhouse due to the high water pressures and to maintain watertightness of the system.

Access Tunnel System

3.5.20 An access tunnel system would be required to provide access to the pressure tunnels and the lower level of the powerhouse shafts for construction, operation and maintenance purposes. The tunnel arrangement is shown in **FEA/FC4/500 – Tunnel Layout Plan**.

3.5.21 The access tunnel system would have support and lining as required for structural and operational safety reasons.

3.5.22 The entrance adit(s) to the access tunnel system would be located within the disused former quarry adjacent to the proposed powerhouse site. The exact position and number of adits from the disused quarry would be developed at the detailed design stage. These would incorporate concrete portal structures with steel security gates.

Tailrace Tunnel System

3.5.23 The powerhouse would be connected to the lower control works in Loch Quoich by six tailrace tunnels, one from each powerhouse shaft.

3.5.24 The tunnels would be concrete lined and incorporate hydraulic gates for isolation purposes.

Loch Quoich (Lower Reservoir)

Reservoir

3.5.25 Loch Quoich is currently used as a storage reservoir for the operational 19MW Quoich hydro scheme and provides approximately 360 Mm3 of water storage for hydro generation. The total volume of Loch Quoich when full is in the region of 560Mm3. The Proposed Development would utilise some of this storage but without affecting the existing operational arrangements for the Quoich hydro scheme. No modifications are required to the existing Quoich dam nor to any of its associated structures and facilities.

3.5.26 A concrete slipway would be constructed to the east of the powerhouse compound area connecting this to the low water level within the reservoir. This would facilitate access for boats required for maintenance of the lower control works and the existing Quoich hydro infrastructure, as well as improving boat access for the estates which use boats on Loch Quoich for estate management purposes.

Lower Control Works

3.5.27 Up to six lower inlet/outlet structures, each serving the pump-turbine units, would be constructed on the banks of Loch Quoich adjacent to the powerhouse, to allow water to be abstracted or released as required. The arrangement of the lower control works is shown in **FEA/FC4/200 – Lower Reservoir Plan, FEA/FC4/205 – Lower Reservoir Temporary Works Proposal and FEA/FC4/705 – Lower Control Works GA**.

3.5.28 The inlet/outlet structures would be screened to prevent fish and debris entering the underground waterways and hydraulic gates would enable the tunnels to be isolated from the reservoir for inspection and maintenance purposes.

3.5.29 The lower control works would be located below the reservoir lower operating level, requiring maintenance works to be carried out by boat and divers.

3.5.30 The lower control works construction methodology has been developed such that there would be no requirement for any drawdown of the levels of Loch Quoich or discharges of flows to the Gearr Garry outside those consented in the current CAR licence covering the existing Garry Hydro Cascade, nor any alteration to any other operating regimes agreed between other interested parties that may be in place to cover levels and flows in Loch Garry.

Powerhouse and Switchyard

3.5.31 An indicative arrangement of the powerhouse is shown in plan in **FEA/FC4/200 – Lower Reservoir Plan** and in section in **FEA/FC4/Powerhouse GA Sheet 16- Typical Cross Section**.

3.5.32 The powerhouse and switchyard would be located on the shores of Loch Quoich, partially within a disused former quarry which was created in the 1950s to win rock for the Quoich dam. A platform would be formed at around 205m AOD, which is above the maximum flood level for Loch Quoich of 203m AOD. This would entail raising the level of the existing quarry floor, as well as excavating a bench in the slope above Loch Quoich to accommodate the main powerhouse building. The material for increasing the quarry floor level would be won from the excavation for the powerhouse area and other rock arisings as required. The old quarry area would be protected from views from the public road by Quoich dam and from the dam itself by a landscaped bund to the east side of the powerhouse and switchyard compound area, formed sympathetically with the natural surroundings.

Powerhouse

3.5.33 The powerhouse would comprise vertical shafts approximately 90m deep which would house the pump-turbine units and ancillary equipment, with a superstructure above.

3.5.34 The powerhouse shafts are required to be sufficiently deep to allow the pump-turbine units to function across the full operational level range of Loch Quoich whilst giving a minimum depth of water over the pump-turbines to allow them to operate properly. The distance between the shafts is governed by the predicted geological stability of adjacent shafts during construction. The current distance is a conservative value, which may reduce once detailed ground investigation works have been carried out, in which case

the powerhouse length may be able to be reduced at its west end from that shown in the figures.

Switchyard

3.5.35 The Developer has accepted Grid Connection Offers from National Energy System operator (NESO) for the full export and import capacity required. Electrical works associated with connecting the project to the National Grid would also be provided adjacent to the powerhouse within a switchyard sited within the disused quarry. This switchyard would provide the interface between the Proposed Development and the transmission network, with switchgear to allow the isolation of the site from the network during maintenance and faults. Whilst the detailed design of the switchyard and associated infrastructure has yet to be developed by the Transmission Owner, sufficient information is available to define the likely maximum dimensions of the area, and these have been used in this application.

Site Access Tracks and Footpaths

3.5.36 Access tracks would be provided for the construction of the Proposed Development and for operational, maintenance, and emergency access.

3.5.37 The Proposed Development would be accessed for construction and major maintenance from the A87 trunk road at Whitebridge, north of Invergarry and via the Southern Access Route (SAR), described below. Existing tracks would be utilised wherever possible, subject to upgrading to the standard necessary for the expected construction traffic.

3.5.38 Safe access for recreational users would be maintained throughout the construction and operation of the Proposed Development. Where existing routes would be altered new structures, alternative routes would be provided, with these in place before the original routes were affected by construction. Details of these arrangements are included in **Chapter 14 – Recreation and Access**.

3.5.39 The overall layout of the existing and proposed assess tracks and footpaths is shown in the following figures:

Figure 14.1 - Existing Access Routes and Footpaths SAR

Figure 14.3 - Existing Access Routes and Footpaths PSH Area

Figure 14.11 - Access Routes and Footpaths During Construction PSH Area

Figure 14.12 - Access Routes and Footpaths During Operation PSH Area

Figure 14.13 - Access Routes and Footpaths During Construction SAR

3.5.40 Access would be provided for the main construction of the Proposed Development as follows:

- Access to the PSH site from the A87 would be by the “Southern Access Route” (SAR), a combination of existing and new tracks through the Glen Garry Forest, joining the minor public road between the A87 and Kinloch Hourn, the C1144, approximately 1.5km from the powerhouse site; including widening of the C1144 for

a length of approximately 2.3km to create a two-lane carriageway for public and construction access as far as the access track to the upper reservoir;

- Access by a new track to the powerhouse in the site of a disused former quarry;
- Access to the upper reservoir works by a new track; and
- Only the case of an unforeseen circumstances which may cause the SAR to be temporarily inaccessible, temporary access for light vehicles and standard HGVs by the C1144.

3.5.41 Details of the proposed access routes are outlined in the following paragraphs.

Southern Access Route (SAR)

3.5.42 The SAR is shown in the following figures:

FEA/FC4/001 – Location Plan

FEA/FC4/841-853 - Southern Access Route Upgrades (Sheets 1-13)

FEA/FC4/871-879 - Southern Access Route - River Kingie to C1144 (Sheets 1-9)

FEA/FC4/882 – SAR Widening and passing place details

FEA/FC4/882 – SAR Bund detail at Loch an Staic

FEA/FC4/820 – River Kingie Bridge GA

FEA/FC4/830 – Gearr Garry Bridge GA

FEA/FC4/885/890 - C1144 Road Widening Plan and Long Section (Sheets 1-5)

FEA/FC4/893-894 – C1144 Road Widening Details (Sheets 1-2)

FEA/FC4/930-931 – Access Tracks Typical Cross Sections (Sheets 1-2)

3.5.43 The existing forestry junction off the A87 and bridge over the River Garry are unsuitable for the traffic which would need to access the Fearna PSH site via the SAR. For this reason, a new junction and bridge are proposed, linking to the existing track behind the recreational car park at Whitebridge. The existing car park and its access would be retained for recreational users.

3.5.44 The new bridge over the River Garry would be designed to pass a 1:1000 year plus climate change allowance flood.

3.5.45 The new junction, bridge and first section of the SAR would also be used for the construction and operation of the Coire Glas PSH. It is probable that this part of the SAR would already have been constructed by the Coire Glas development prior to the start of construction of the Proposed Development. If not, it would be constructed as part of the Proposed Development.

3.5.46 The SAR would utilise existing forest tracks through the Glen Garry Forest as far as the existing bridge over the River Kingie. The existing tracks are single track with passing places. The tracks would be upgraded as follows:

- Existing passing places would be extended, and additional passing places would be constructed to provide facilities for passing at approximately 200m intervals, with adequate sightlines between passing places. The passing places would be a mixture of 15m and 30m long;
- Local realignment would be carried out at a small number of locations to make the track suitable for the largest loads that would deliver equipment to the Proposed Development and to improve visibility;
- The existing forest roads between the main site compound SC1 and the River Kingie crossing would be widened to allow for two-way traffic, after which a new two-way access track would be constructed to meet the C1144. This would provide full two-lane connectivity between the main site compound and the construction site;
- Scrub and small trees would be cleared from the road verges to improve forward visibility and drainage;
- Drainage and surfacing would be maintained as necessary; and
- The upgrading works would be designed in a way which minimises or potentially eliminates the need to remove any mature Caledonian pine trees. The feasibility of such a design has already been developed with Forestry and Land Scotland (FLS), which owns the land covered by the Caledonian Pine restoration area.

3.5.47 Where the existing track crosses the River Kingie and heads west, a new bridge would be constructed immediately to the north of the existing one connecting to a section of new track, initially to the west of the River Kingie, then to the south of the Gearr Garry. This track would be similar in construction to the existing forest tracks within the FLS Glen Garry Forest however would be 8m wide to provide a two-lane carriageway. At the end of the existing forestry plantation the track would contour across the sloping open hillside as far as a new bridge crossing over the Gearr Garry (at the site of an existing ford), before crossing an area of level moorland to join the C1144.

3.5.48 The new bridges over the River Kingie and the Gearr Garry would be designed to pass a 1:1000 year flood, plus allowance for climate change.

3.5.49 From where the SAR joins the C1144 as far as where the Upper Reservoir Track branches off it, a length of 2.3km, the C1144 would be widened by approximately 4m to make it into a two-way road suitable for construction and operational access to the Proposed Development, as well as maintaining safe access for other road users. Parts of this widening may already have been completed as part of the C1144 road improvements being provided by SSEN's Skye Transmission Reinforcement Project.

Powerhouse Access Track

3.5.50 Access to the lower works including the powerhouse site and the construction area within the disused former quarry is proposed via a new junction and access track off the C1144 public road. This is shown in **FEA/FC4/900 Powerhouse Access Track**.

Upper Reservoir Access Tracks

3.5.51 A new access track would run from the C1144 up to the upper reservoir. This is shown on drawings **FEA/FC4/910-921 – Access Track from C1144 to Upper Reservoir (Sheets 1-**

12) and **FEA/FC4/924-925 – Access Track from C1144 to Upper Reservoir Sections (Shts 1-2).** Following completion of construction, this track would be reduced in width where possible from 8m wide to 6m wide with passing places, to form an operational access track.

3.5.52 Bridges would be constructed to cross the Allt Fearna, the Allt Mheill, and the Coire Dubh and Fearna dams spillway channels.

Access to Loch Quoich for Boats

3.5.53 Upgraded facilities for safely getting boats into and out of Loch Quoich, and for mooring them in the more rapidly fluctuating reservoir levels created by the operation of the Proposed Development would be provided to the east of the powerhouse area, where the existing slipway facility is located.

Additional Temporary Construction Tracks

3.5.54 During construction, temporary construction tracks would be required within the Fearna and Quoich reservoirs' inundated areas to allow the excavation and movement of material and general construction access. On completion of the construction, the temporary tracks would be reprofiled to a natural landform and ultimately submerged.

Public Access

3.5.55 The footpath which forms part of the route to the Munros Spidean Mialach and Gleouraich would be affected by the creation of the site access track and upper reservoir. Temporary and permanent diversion of this path would be required. This is covered in **Chapter 10 – Effects on Recreation**.

Areas of Habitat Compensation and Enhancement

3.5.56 The Proposed Development would include a significant package of habitat compensation and enhancement works, both within the site and adjacent landholdings. These would include:

- peatland restoration;
- native tree planting (including riparian planting); and
- removal of non-native flora including rhododendron and exotic tree species within areas of Caledonian pine forest.

3.5.57 These proposals would demonstrably contribute significantly to the enhancement of biodiversity, including restoring degraded habitats and building and strengthening nature networks and the connections between them. Details of the proposed habitat compensation and enhancement works are outlined in the Section 36 planning application EIAR at **Chapter 8 – Terrestrial Ecology** and **Appendix 8.7 - Outline Biodiversity Enhancement and Management Plan**[19].

Mass Balance Strategy

3.5.58 The Proposed Development aims to manage excavated rock and other soil materials to achieve a mass balance, whereby all excavated material would be re-used beneficially

[19] https://fearnastorage.co.uk/documents/

on site rather than exported. This would minimise the environmental impact of the Proposed Development by avoiding the need to transport bulk materials to the site wherever possible and by minimising the generation of any waste material that would need to be taken off site for disposal. The site presents favourable conditions to achieve this balance, with large volumes of rock available at or near surface and a net requirement to excavate rock, rather than creating a surplus.

3.5.59 An indicative Mass Balance Strategy and Borrow Pit Plan has been developed, which provides information on the anticipated volume, source, usage, temporary storage and handling of material generated and used during the construction of the works. This document, **Appendix 2.3 – Mass Balance Strategy and Borrow Pit Plan**[20] to the Section 36 planning application EIA report, provides further details.

Borrow Pits

3.5.60 The Proposed Development site presents excellent potential for borrow pits and preliminary calculations suggest that there are sufficient volumes of suitable rock available to construct the Proposed Development without the import of any rock or aggregate.

3.5.61 The proposed borrow pits are generally adjacent to the works areas, such as adjacent to the dams and alongside the access tracks. The exact location of borrow pits would be micro-sited depending upon site surveys with respect to availability of suitable material and proximity to where it is required, as well as any environmental sensitivities.

3.5.62 The following borrow pits are proposed:

- Extension of the Forestry and Land Scotland (FLS) Poulary East Quarry adjacent to the SAR;
- Use of existing processed stone stockpiles along the SAR;
- Borrow pits in the Glen Kingie Forest Estate and Kingie Estate, adjacent to the SAR;
- Winning of material from the main site compound adjacent to the SAR during the site preparation works;
- The powerhouse and lower control works excavation;
- Fearna reservoir Borrow Pit 1;
- Fearna reservoir Borrow Pit 2; and
- Fearna reservoir Borrow Pit 3.

Construction Stage Water Abstractions and Drawdown of Loch Quoich

3.5.63 During the construction stage of the project, temporary abstraction points would be required to supply water for the following activities:

[20] https://fearnastorage.co.uk/documents/

- Welfare facilities at the construction site compounds located at all the main works areas;
- Concrete production;
- Rock processing;
- Drilling;
- Piling;
- Grouting;
- Dust suppression; and
- Wheel washing.

3.5.64 Water for the above activities would be required for the full duration of the construction programme, albeit at varying abstraction rates.

3.5.65 Dewatering may be required in parts of the site, the extent of which would be a function of the local ground conditions. It is possible that dewatering techniques would be required at the dams and the upper and lower control works construction areas.

3.5.66 The details of all abstraction and dewatering required during the construction phase would be set out in the Principal Contractor's methodology, which would be submitted to SEPA as part of the requirements of the construction license required under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 covering the Construction Works.

Site Drainage

3.5.67 At the detailed design stage, a Drainage Impact Assessment (DIA) would be provided. The DIA would include details relating to any existing drainage and the management of surface water drainage, which would be designed in line with general Sustainable Drainage Systems (SUDS) principles. Mitigation measures to manage the residual risk of overland flow/pluvial flooding would be included in the DIA.

3.5.68 Natural flood management techniques would also be applied to reduce the rate of runoff where possible. Tracks would not act as preferential pathways for runoff and efforts would be made to retain any existing drainage network. Appropriate drainage would be provided to restrict runoff to pre-development rates and to minimise erosion to existing watercourses. The DIA would ensure that post development runoff rate is no greater than pre-development runoff rate (i.e. greenfield runoff) for all return periods up to the 1 in 200 year event including an allowance for climate change.

3.5.69 Runoff from all events up to and including the 1 in 200 year plus climate change event would be managed within the site boundary, with no flooding to critical roads or buildings.

Construction Compounds

3.5.70 A number of site compounds would be required to accommodate the construction site establishment and lay down areas, as well as a workers' residential camp. The locations

of these compounds are shown in **FEA/FC4/001 Location Plan** and **FEA/FC4/002 – Scheme Layout**.

3.5.71 The following primary construction compounds are proposed:

- The main site compound and workers' accommodation camp, adjacent to the SAR SC1);
- A compound at the powerhouse area (SC2); and
- A compound at the Fearna reservoir area (SC3).

3.5.72 The following secondary construction compounds are proposed:

- Near White Bridge at the east end of the SAR;
- Poulary quarry;
- Kingie bridge; and
- Gearr Garry bridge.

3.5.73 The movement of labour, materials and equipment to and from all of the compounds would be managed by the Principal Contractor.

3.5.74 Site compounds would generally be constructed by the following process and in accordance with **Appendix B – Outline CEMD**:

- Strip topsoil and peat and temporary store the material;
- Cut/fill exercise to create level working platforms using the in-situ material;
- Excavation of rock (if required) and crushing / screening to create capping material;
- Capping of formation with crushed rock and compacted;
- Installation of drainage, lighting and other services;
- Construction of screening bunds using site won material and placement of stored peat/turves on bunds and exposed earthworks slopes wherever possible; and
- Delivery and installation of site offices, accommodation, temporary buildings and facilities.

3.5.75 All compounds would be fully reinstated following the completion of construction except for the powerhouse area compound (SC2). This area would partly become the HV switchyard, with the remainder retained for use during operation of the scheme and to facilitate occasional major maintenance or refurbishment activities., Compound SC3 within the Fearna reservoir compound would be within the permanently inundated area of the reservoir so surface restoration would not be carried out.

3.5.76 Brief details of the primary compounds are given below.

Main Site Compound and Accommodation Camp SC1

3.5.77 A main site compound would be located towards the western end of the preferred SAR. Its location is shown in **FES/FC4/001 – Location Plan** and details are in **FEA/FC4/941 - Site Compound SC1 Plan**.

Powerhouse Site Primary Compound SC2

3.5.78 A site compound is proposed within the disused former quarry area adjacent to the proposed powerhouse site. The compound would be within the powerhouse platform described above. Refer to **FEA/FC4/946 – Site Compound SC2 Plan** for indicative details of the proposed compound.

Fearna Reservoir Primary Compound SC3

3.5.79 Compound areas would be created at the upper reservoir area, within the area which would be inundated by the reservoir after construction is complete. The compound arrangements would be finalised by the Principal Contractor for the construction works and may be subject to alteration to suit the borrow pit excavation programme. Refer to **FEA/FC4/950 – Site Compound SC3 Plan** for indicative details of the proposed compounds.

3.6 Site Traffic

3.6.1 Construction traffic to the Proposed Development would take access from the A87 over a new bridge over the River Garry to the north of the existing White Bridge. This is the start of the Southern Access Route (SAR), which would comprise approximately 27km of access road, 23km of which is existing forest timber haul roads and with 4km of new track required. The existing forest roads would be upgraded with additional passing places between the A87 and Site Compound SC1. To the west of SC1, the existing forest road would be dualled, to cater for the anticipated volume of construction traffic.

3.6.2 All existing forest road drainage would be modified and/or improved where required.

3.6.3 The 4km of new dual-width track would be constructed between the River Kingie, over the Gearr Garry and linking to the C1144 just to the east of Quoich Dam.

3.6.4 Three new bridge crossings would be required over i) the River Garry north of White Bridge, ii) the River Kingie, adjacent to the existing bridge which is sub-standard and iii) over the Gearr Garry at an existing ford point downstream of Quoich Dam.

3.6.5 An estimate of construction traffic generation and the potential effects of this on the local road network, is included in the EIA report for the Section 36 planning application at **Chapter 15: Transport and Access**[21].

3.6.6 During operation, the Proposed Development would be manned from the administration area inside the powerhouse. It is estimated that an average of 10 to 15 staff would require daily access to the site. These personnel would access the site using the C1144. Vehicles that can comply with any weight restrictions on the C1144 would use this route during routine maintenance. Heavier vehicles and abnormal loads would use the SAR.

[21] https://fearnastorage.co.uk/documents/

3.7 Construction Programme and Working Hours

3.7.1 An outline project programme has been prepared for the Proposed Development and is attached at **Plate 3-1** below.

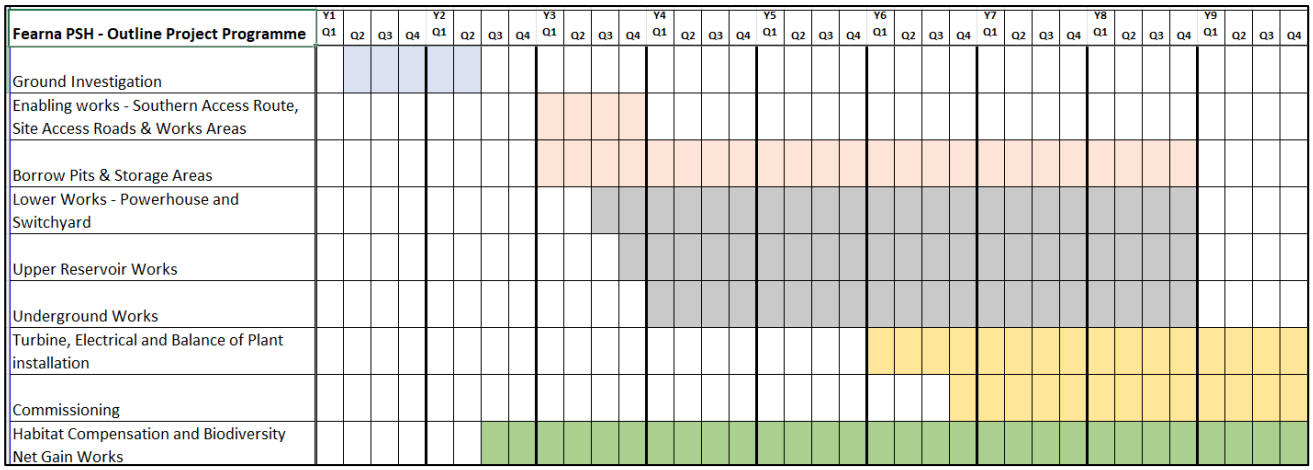

Plate 3-1 – Outline Project Programme

3.7.2 It is anticipated that the construction and commissioning period would last approximately seven years and the workforce could reach approximately 500 on average and possibly higher for some periods at the peak of the construction phase. The number of construction workers on-site would vary depending on the stage of the works, generally ramping up from a small number at the beginning of construction and tailing off during the commissioning and demobilisation.

3.7.3 Normal construction shifts would generally apply for the surface works, but these could be subject to some variation to suit the construction activities, weather conditions and time of year. The underground operations would continue 24 hours a day, seven days a week.

3.7.4 Although it would be far enough away from any noise sensitive receptors so as not to cause any nuisance, any surface blasting on site would normally only take place between the hours of 07:00 to 19:00 on any given day, unless otherwise approved in advance in writing by the Planning Authority.

3.7.5 Any works that would continue to take place during the hours of darkness would have management measures in place to ensure that any noise and lighting is mitigated for receptors above ground. The final CEMD, to be prepared by the appointed Principal Contractor, would include a Construction Noise and Vibration Management Plan (CNVMP) for construction activities, including blasting activities. This plan would also include measures that would be implemented during construction to ensure local receptors are not adversely affected by noise and measures for community liaison to advise on the timing and duration of blasting activities. The final CNVMP would be submitted to the Planning Authority for approval prior to the commencement of the Proposed Development. An outline noise Management Plan is provided in the Section 36 planning application EIA report at **Appendix 16.3 – Draft Construction Noise and**

Vibration Management Plan (CNVMP)[22]. Further information on Noise is provided in the S36 EIAR at **Chapter 18: Noise and Vibration**.

3.8 Construction Environmental Management

Construction Environmental Management Processes

3.8.1 Construction mitigation and environmental protection measures would be managed through a suite of documents under the umbrella of a Construction Environmental Management Document (CEMD). An outline CEMD is attached at **Appendix B – Outline Construction Environmental Management Document**.

3.8.2 The Construction Environmental Management Document (CEMD) would apply to all construction activities and be implemented via the Contractors' Construction Method Statements. In particular, the CEMD would specify conditions relating to protection of habitats and species, pollution prevention and the means by which site monitoring would occur. The final site-specific CEMD would be drawn up by the Applicant, in consultation with the Highland Council (THC), Scottish Environment Protection Agency (SEPA), and NatureScot, once planning permission had been obtained and the main contractor appointed.

3.8.3 The CEMD would include the following:

- Pollution Prevention Plan;
- Mass Balance Strategy;
- Borrow Pit Management Plans;
- Spoil Management Plans;
- Site Monitoring Plan;
- Waste Management Plan;
- Incident Response Plan;
- Drainage Impact Assessment;
- Drainage Management Plan;
- Biodiversity Enhancement and Management Plan;
- Ecological Management Plan;
- Species Protection Plans (SPPs);
- Tree Protection Plan (TPP);
- Surface Water Quality Monitoring Programme (SWQMP);
- Dust Mitigation Plan;
- Peat Management Plan & Soil Management Plan (PMP & SMP);

[22] https://fearnastorage.co.uk/documents/

- Peat Hazard Emergency Plan;
- GWDTE Assessments and Exclusion Plan;
- A Schedule of Watercourse Crossings;
- Access Management Plan;
- Construction Traffic Management Plan (CTMP);
- Abnormal Indivisible Load - Transport Management Plan;
- Construction Staff Travel Plan;
- Construction Noise and Vibration Management Plan; and
- Reinstatement Plan.
- Ecological Clerk of Works

3.8.4 Construction would be supervised and monitored by specialist advisers including Ecological Clerks of Works (ECoWs) to ensure that sensitive ecological habitats and species are adequately protected in accordance with the methodologies in the CEMD and associated documents.

Micro-siting

3.8.5 There may be a requirement to micro-site elements of the Proposed Development from the positions shown on **FEA/FC4/002 – Scheme Layout**, as a result of additional constraints encountered during site works. Any micro-siting would require agreement of the specialist advisors (e.g. the ECoW) as appropriate.

Community Mitigation Liaison Group

3.8.6 The implementation of mitigation can often involve a number of parties other than the developer. It is proposed that a local liaison groups involving the local community would be established to liaise on the phasing of construction works – abnormal load deliveries, construction works to the road network, borrow pit blasting, etc. Glengarry Community Council has already established the "Glengarry Community Led Liaison Group" with the remit to study in detail the cumulative/combined impact of all the ongoing infrastructure projects in the wider Glengarry area. It is proposed to engage with this group for the purposes of this liaison, unless the group disbands, or a more specific liaison group is established through the Glengarry Community Council.

Site Environmental Management

3.8.7 The Principal Contractor would have overall responsibility for environmental management on the Site. The services of specialist advisors, such as the project ECoW, would be retained as appropriate to be called on as required to advise on specific issues. The Main Contractor and the Authorised Person would ensure construction activities are carried out in accordance with the mitigation measures outlined in this EIA Report and those detailed in the approved CEMD.

3.8.8 Contractors would be required to adhere to the following in order to reduce or mitigate the environmental effect of the construction process:

- The requirements set out in this EIAR;
- the conditions of any consent granted; and
- relevant environmental regulations.

3.8.9 A copy of any conditions of consent and the CEMD would be incorporated into tender and contract documents and form part of the contract between the Authorised Person and the Main Contractor. The selection criteria for the Main Contractor would include their record in dealing proactively with environmental issues, and provision of evidence that they incorporate all environmental requirements into their method statements and thereafter implement these on site.

Storage of Hazardous Substances

3.8.10 It is not anticipated that any flammable, toxic or explosive chemicals detailed in The Town and Country Planning (Hazardous Substances) (Scotland) Regulations 2015 would be stored on site in quantities such that a Hazardous Substances Consent would be required under section 2 of the Planning (Hazardous Substances) (Scotland)Act 1997, except potentially the storage of explosives for tunnel blasting, which may exceed the quantity threshold in the Act. Explosives would be stored on site in accordance with the Act for Explosive Materials 2014. The type and quantities of explosives stored on site are unknown at this stage as they would depend on the Contractor's methodology, but if the planned quantity of chemicals triggered the requirement for a Hazardous Substances Consent, then this would be sought prior to their storage in a quantity exceeding the threshold. If any other hazardous substances could exceed the quantity threshold requiring consent, consent would similarly be sought.

Site Reinstatement

3.8.11 Reinstatement would be undertaken as soon as practical following the construction works in each area and in accordance with best practice. The expertise of the contractor undertaking the reinstatement works is key to their success, who should be appropriately experienced in upland works and peat management.

3.8.12 Site tracks and some hardstanding areas would be retained for use during maintenance operations, although the upper reservoir access track would be reinstated to 6 m with passing places. The track edges would as far as possible be blended to the adjacent contours, with natural vegetation being allowed to re-establish.

3.8.13 All construction equipment and other temporary infrastructure would be removed from site and the temporary storage areas would be reinstated.

3.9 Land Take

3.9.1 It is estimated that the maximum permanent development footprint of the Proposed Development would be approximately 135ha. During the construction period it is estimated that a further 20ha would be temporarily required which would be reinstated following completion of the construction works.

3.10 Lighting

Construction Lighting

3.10.1 For safety reasons, temporary lighting would be required for all external construction activities during hours of darkness and low natural light. Lighting would also be required at the construction compounds. This lighting would be designed to minimise illumination, glare or light spillage to nearby receptors.

3.10.2 The Defence Infrastructure Organisation, part of the MoD, have advised that the Proposed Development falls within part of the UK Military Low flying System designated Tactical Training Area 14T (TTA 14T), an area within which fixed wing aircraft may operate as low as 100 feet or 30.5 metres above ground level to conduct low level flight training. The introduction of a new building or structure with a height above ground of 15m or greater in this location, along with the significant changes to the surrounding landscape and increase in water levels has the potential to introduce a physical obstruction to low flying aircraft operating in the area. To address the impact up on low flying given the location and scale of the development, the MOD would require that conditions were added to any consent issued requiring that the development is fitted with aviation safety lighting, and that sufficient data is submitted to ensure that structures can be accurately charted to allow deconfliction.

3.10.3 If aviation safety lighting is required by the MoD for the final design of the dams and powerhouse, this would be infrared lighting, which, as it is invisible to mammals and birds, would have no effect on the landscape and visual or ecological impacts of the Proposed Development.

3.10.4 The final CEMD, to be prepared by the appointed Principal Contractor, would include a detailed description of lighting requirements for construction activities and measures that would be implemented during construction to minimise illumination, glare or light spillage out with the Site boundary.

Operational Lighting

3.10.5 Once operational, external lighting would only be provided at key areas, such as the powerhouse and switchyard but would only be used during essential operational and maintenance activities, for example if a switching operation was necessary in the external switchyard. No lighting would be operated by PIRs. Prior to the commencement of Proposed Development, final design details for the external lighting during operation would be agreed with the Planning Authority.

3.10.6 The powerhouse surface building would be designed with automatic blinds on all glazed windows and doors, with these closed between dusk and dawn.

3.10.7 If aviation safety lighting is required by the MoD for the final design of the dams and powerhouse, this would be infrared lighting, which, as it is invisible to mammals and birds, would have no effect on the landscape and visual or ecological impacts of the Proposed Development.

3.11 Project Operation and Maintenance

3.11.1 The Proposed Development would likely be manned twenty-four hours a day, with most operations being controlled from the control building within the powerhouse or remotely. Regular visits would be made to inspect and maintain the scheme components as follows:

- Daily visits to the powerhouse, intake and tailrace screens for routine operation and maintenance;
- Weekly visits to the dams, for routine operation and maintenance; non-routine and scheduled major maintenance tasks would be carried out at longer intervals as required. These tasks could potentially extend to several weeks/months;
- Periodic inspection of the underground tunnel works and dam structures; and
- As-required maintenance of the access tracks and other infrastructure.

3.12 Project Decommissioning

3.12.1 With proper maintenance, the Proposed Development should remain functional indefinitely and as such an assessment of decommissioning effects has not been provided as part of the EIA Report. If the Proposed Development ceases operation, decommissioning would take place and the site would be restored as follows:

- Moveable infrastructure would be removed;
- Underground tunnels would be sealed off;
- Generation plant would be removed;
- Where removal of infrastructure, for example the dams, would result in more damage than leaving in place, they would be left in-situ but left to safely pass flows downstream; and
- Disturbed ground would be reinstated.

3.12.2 Full details of the decommissioning plan would be agreed with the appropriate authorities and landowners prior to any decommissioning works commencing.

4 Water Management

4.1 Chapter Introduction

4.1.1 The Proposed Development comprises a pumped storage hydroelectric scheme to transfer water between the pre-existing lower reservoir, Loch Quoich and a new upper reservoir created by the construction of two dams at Loch Fearna and Coire Dubh. Details of the Proposed Development including plans and detailed drawings are included in the figures appended to Chapter 3: The Proposed Development.

4.1.2 The Proposed Development includes building a construction access route and temporary site compound along the southern side of Glen Garry, named the Southern Access Route [SAR]. This route would link the Proposed Development site with the A87 and comprise approximately 23km of upgraded existing forest roads, 4km of new track and the widening of 2.5km of the C1144 public road in the area around Quoich Dam. New bridge crossings would be required over the River Garry and the Gearr Garry, with the existing Kingie Bridge requiring replacement

4.1.3 This chapter considers the potential effects, including cumulative effects, of the Proposed Development on water resources during construction and operation. This chapter presents a summary of the baseline water management conditions and a review of the water management strategy for the Proposed Development.

4.1.4 Where likely significant effects are predicted during construction and operation, appropriate mitigation measures are proposed, and the significant predicted residual effects are assessed. If the project were to be decommissioned, it is anticipated that the potential effects on water management would be less than the construction impacts. As such, a separate assessment of potential decommissioning effects on water management is not included in this Chapter.

4.1.5 The water management assessment has been carried out by Gilkes Energy Ltd with hydrological input by Mott MacDonald Ltd, flow gauging from previous hydropower developments, geomorphology assessment by [redacted] MSc PhD, and water temperature survey and assessment by Gavia Environmental Consultants, Mott Macdonald Ltd and SLR Consulting.

4.2 Existing Water Bodies

Existing Baseline – Loch Quoich

4.2.1 The catchment areas and layout of the existing lochs and proposed reservoirs are shown below in Plate 4-1 Catchment and Reservoir Plan.

4.2.2 The catchment of the Upper Reservoir sits fully within the catchment of Loch Quoich, with all watercourses within the upper reservoir discharging directly into Loch Quoich.

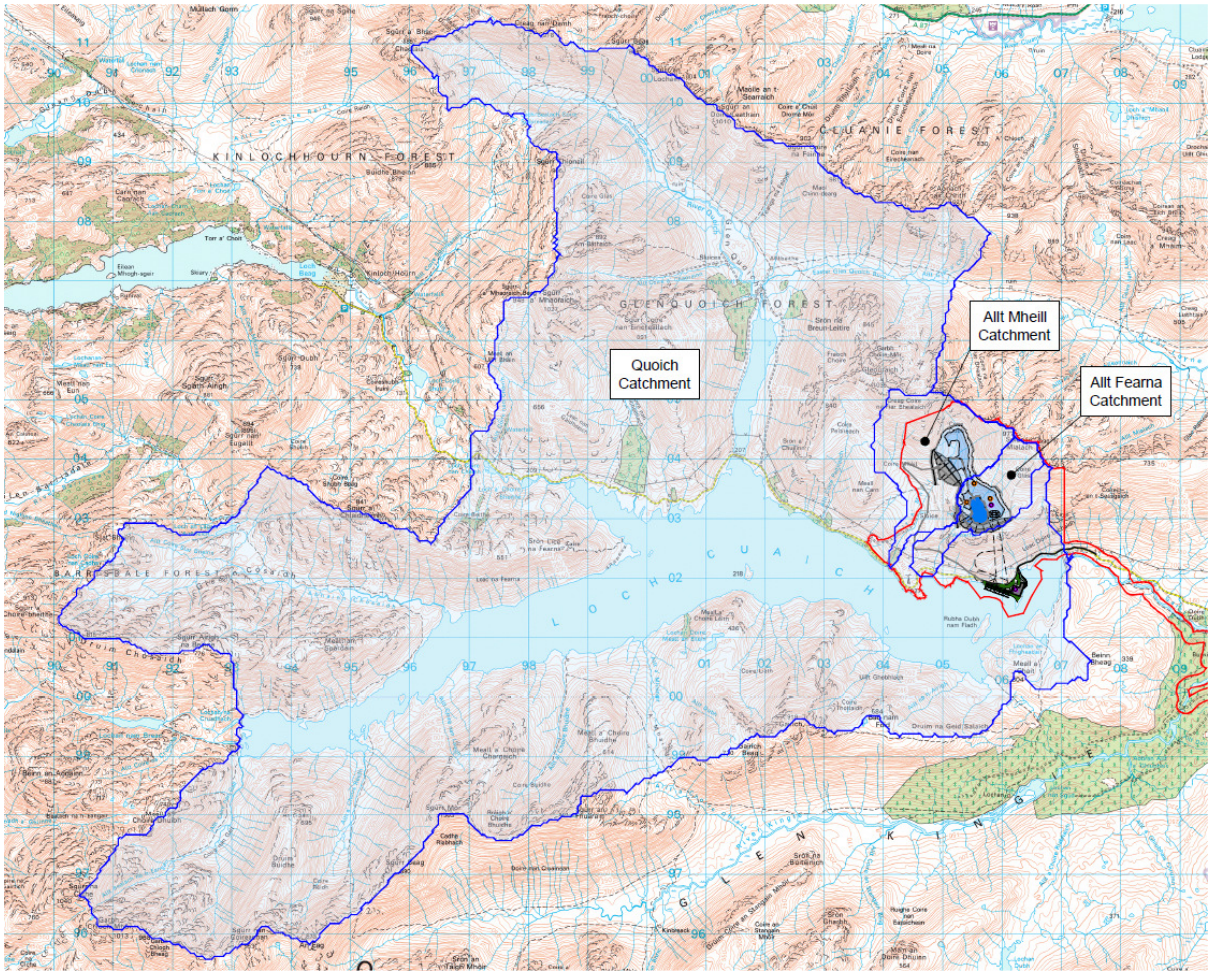

Plate 4-1 Catchment and Reservoir Plan

4.2.3 Loch Quoich was dammed in the 1950s to create storage for the Quoich Hydro Station. Quoich lies upstream of the Invergarry Dam and hydro station, with both schemes known as the Garry Cascade. The Garry Cascade in turn sits within the Great Glen Cluster of hydro stations built by the North of Scotland Hydroelectric Board (NOSHEB) within the Ness Catchment. All schemes are covered by the SEPA CAR Licence CAR/L/1011471 V2.

4.2.4 The main Quoich dam lies at the east of the Loch along with the intake to the hydro tunnel and compensation arrangements. Two smaller dams, Cruadhach 1 and 2 are located at the far west end of the Loch. Loch Quoich would spill via the Quoich Dam, with the spillway level surveyed at +201.38mAOD.

4.2.5 The catchment area at the Quoich Dam is 130km^2. The hydro reservoir operates on a maximum licenced range of 26m, between +201.38mAOD and +175.38mAOD. This creates the largest reservoir by volume stored in the UK, with a maximum of 362Mm^3 stored.

4.2.6 Within the operational range, additional rules apply to deliver the efficient operation of the Garry Cascade but also control the flows within the Garry and wider Ness catchment. Additionally, Loch Quoich provides strategic compensation flow if the remainder of the Great Glen Cluster of hydro schemes are incapable of providing their compensation flows at any given time.

4.2.7 The Quoich Hydro station maximum power output is rated at 18MW and it abstracts in the region of 20m^3/s from Loch Quoich at full power.

4.2.8 The SEPA CAR license CAR/L/1011471 V2 states that Quoich Dam must provide a daily compensation flow of 90,222m^3 to the Gearr Garry. This is equivalent to a continual flow of 1044l/s. A small hydro turbine is located on the compensation flow outlet at the downstream side of Quoich Dam, which generates approximately 300kW of electricity prior to discharging the water to the Gearr Garry.

4.2.9 The Quoich Dam is also fitted with a relief valve. There is no freshet regime at the Quoich dam, however the relief valve is opened periodically.

4.2.10 The dam spillway was designed to take a flood flow of 283m^3/s, however a dam inspection report sourced by the Applicant suggests that the Winter PMF flow of 461m^3/s could be passed by the spillway, without damage to the dam.

4.2.11 A commercial fish hatchery operated by Mowi exists on Loch Garry, downstream of Quoich Dam.

Existing Baseline – Loch Fearna

4.2.12 Loch Fearna is a high upland loch, which sits at +538mAOD. The loch outfalls via the Allt Fearna directly to Loch Quoich below. The catchment area at the outfall is approximately 1.35km^2, of which the surface area of Loch Fearna comprises 0.1km^2.

4.2.13 The bathymetric survey of the full loch shows a maximum depth of approximately 17m i.e. a minimum bed level of +521mAOD.

4.2.14 It is estimated that the natural level fluctuation in Loch Fearna is approximately 300mm.

Existing Baseline – Coire Dubh

4.2.15 Coire Dubh sits to the north west of Loch Fearna, separated by a saddle raising to approximately +580m. The elevation and position of the coire would allow it to form part of the proposed upper reservoir, by removing the saddle and using this material to create the dam structures.

4.2.16 The Coire has no waterbody within it and outflows via an unnamed tributary to the Allt Mheil burn, which then discharges to Loch Quoich approximately 1km downstream.

4.2.17 A small 500kW run-of-river hydro scheme is located on the Allt a'Mheil burn which also discharges into Loch Quoich. This scheme operates under SEPA CAR Licence CAR/L/1090786. Compensation flow is passed through the hydro intake weir.

Existing Baseline – Southern Access Route [SAR]

4.2.18 The existing site of the SAR comprises existing forest haul roads along approximately 23km of the total 27km length. The drainage and water crossings on the existing route are typical of routes of this type, with roadside ditches, culverted crossings and bridges over larger watercourses. A number of the watercourses crossed by the SAR are modified by existing run-of-river hydro schemes.

4.2.19 The location of the proposed new section of track lies between the existing Kingie Bridge and the C1144 public road. This area currently comprises a mix of commercial forestry and open hillside, with a number of minor watercourses flowing to the River Kingie and Gearr Garry.

4.2.20 Refer to the Section 36 planning application EIAR **Appendix 12.4 – Watercourse Crossings** for details of all watercourse crossings within the Proposed Development site.

Future Baseline – All Water Bodies

4.2.21 Except for potential climate change effects, no potential changes to the existing baseline are foreseen in relation to hydrology, water management, geomorphology and water temperatures.

4.3 Hydrology

Desk Studies

4.3.1 A review of available flow, level and meteorological data applicable to the site has been undertaken. This is summarised in **Appendix C– Hydrology Study**.

4.3.2 Information on the operational regime of the Garry Cascade has been shared with the Authorised Person to inform the hydrological studies.

4.3.3 Relevant extracts from the existing Ness CAR licence reference number CAR/L/1011471/V2, which includes the Garry Cascade have also been reviewed.

Field Study

4.3.4 The Proposed Development would lie partly within the catchment of an existing 500kW run-of-river hydropower station on the adjacent Allt Mheil Burn. Additionally, a hydropower scheme on the Allt Fearna watercourse was proposed but not built.

4.3.5 In support of the planning and CAR licence applications for the operational Allt Mheil and the proposed Allt Fearna hydro schemes, gauging was carried out in 2010 and 2016/2017 respectively.

Plate 4-2 – Allt Mheil Gauging Location (2010)

Plate 4-3 – Gauge on Allt Fearna in 2016

4.3.6 The river gauge data that was gathered to support the above projects was obtained by the Authorised Person from the project developers and this data was sent to SEPA for their review.

4.3.7 SEPA provided acceptance in July 2023 that the previously gathered gauge data was appropriate for the purposes of the Proposed Development and no further gauging was required.

4.3.8 No field data was gathered for the SAR assessment, as the route requires primarily the upgrade of existing forest roads and any associated drainage and any new watercourse crossings would be designed and installed in accordance with SEPA's *Construction of River Crossings Good Practice Guide*.

4.4 Geomorphology

4.4.1 A geomorphology survey and assessment has been undertaken, which includes a number of key recommendations that have been incorporated into the design and drawings.

4.4.2 The assessment covers both the main PSH site and the SAR. In addition, it includes the River Garry below the Invergarry Dam, for the purposes of assessing the potential for sediment augmentation to be provided as a habitat enhancement for the benefit of Atlantic salmon and other aquatic species. The geomorphology survey and assessment is attached in the following documents:

- Appendix D – Geomorphology Report A – Southern Access Route (SAR);
- Appendix E - Geomorphology Report B – PSH Area; and
- Appendix F – Report C - River Garry Sediment Augmentation Appraisal.

Southern Access Route

4.4.3 The reporting is based on a visual assessment of the current flow capacity of culverts/ bridges along the SAR; more detailed numerical calculations of flow conveyance and sediment transport could be undertaken, as necessary. Importantly, consideration of the potential reduction in the capacity of culverts/ bridge apertures due to sediment accumulation (possibly increasing in the future due to climate change and land-use management, e.g. forestry) was included in the assessment. Based on this assessment, five stream crossings are identified where it is advised that the current culvert requires to be upgraded (ideally changed to a box culvert or a single span bridge, to minimise impact to fluvial/ sediment transport processes and to allow a natural substrate bed through the structure).

4.4.4 There are 15 other crossings where, given that the SAR is to be upgraded in places, that improvements to culverts and bridges should be considered. There are also 5 current crossings that are likely compromised by imposed flow and sediment transport regime and modification to the structure is advised, identified on the basis of their apparently high sediment transport regime. The significant sediment supply in these streams probably relates to local geology (e.g. overlying glacial/ fluvio-glacial sediment deposits) and possibly land management activities (e.g. forestry practice) in this region of the wider Garry catchment; culvert re-design needs to account for these factors.

PSH Area

4.4.5 The proposed Loch Fearna pumped storage scheme will expand the existing reservoir from ~10 ha to ~95 ha, raising the maximum water level by ~60 m. This expansion will intercept several small streams, most of which are stable, supply-limited systems with minimal evidence of recent erosion or instability. While localised peat erosion and one

small landslide were observed, the overall stream network is not expected to undergo significant adjustment as a result of reservoir expansion.

4.4.6 The principal risk relates to slope instability around the reservoir margins, particularly in the 590–600 m elevation band where fluctuating water levels will interact with soils, peat, and vegetation. Loss of stabilising vegetation and repeated exposure of saturated ground may trigger erosion and landslides. To mitigate these risks, engineered shoreline protection is recommended, including a graded rock apron supported by coir-based materials and native planting, with protection prioritised on the steepest slopes.

4.4.7 Downstream, both the Allt Fearna and Allt a Mheil are supply-limited channels and are unlikely to experience significant morphological change due to sediment disruption from dam construction. Nonetheless, a sediment management plan should be developed to account for minor contributions from the upper catchments.

4.4.8 Overall, the streams are stable, and impacts from reservoir expansion are expected to be minimal. The greatest concern is landslide risk, which can be effectively managed through targeted slope stabilisation and shoreline protection measures.

River Garry Sediment Augmentation

4.4.9 The ecological degradation of the River Garry is primarily the result of historic hydropower development, which has disrupted natural flow and sediment transport for over 70 years. The proposed Loch Fearna scheme presents an opportunity to offset its unavoidable impacts by restoring habitat quality in the lower River Garry, particularly salmonid spawning and fry habitats, which are currently limited.

4.4.10 The core mitigation strategy is gravel and cobble augmentation to replace lost sediment supply downstream of the Garry Dam. Two complementary approaches are proposed:

- Method A: large-scale gravel placement just downstream of the dam, to be redistributed by high flows, creating a longer-term sediment supply.

- Method B: targeted local augmentation at hydraulically suitable sites to immediately improve spawning and fry habitat, potentially reinforced with Large Wood Structures (LWS) to enhance channel roughness, retain sediment, and diversify habitats.

4.4.11 Preliminary surveys have identified feasible sites for both approaches, though final design will depend on detailed geomorphic assessment, hydrological analysis, and sediment transport modelling. Access for machinery is a practical constraint that will require early contractor input.

4.4.12 In combination, sediment augmentation and LWS implementation offer the potential to significantly enhance salmonid productivity, restore channel diversity, and deliver wider biodiversity benefits. The proposed works would provide meaningful ecological mitigation for the Loch Fearna development while addressing long-standing hydropower-related impacts on the River Garry.

4.5 Water Temperatures

4.5.1 A number of surveys and studies have been carried out to investigate the existing temperature regime of Loch Quoich and the Gearr Garry and other waterbodies downstream of it, as well as the potential effects on these temperatures from the operation of the controlled activities. These are attached as follows:

- **Appendix G** - Baseline Survey of Temperatures in Loch Quoich and the Gearr Garry, Gavia Environmental Consultancy, February 2025
- **Appendix H** - Calculation of Temperature Effect per Cycle, Mott Macdonald, May 2025
- **Appendix I** - Tuflow FV 3D Modelling Report – Assessment of Temperature Variance in Loch Quoich, SLR Consulting, August 2025

4.5.2 The results of these surveys and assessments are detailed below.

Baseline Survey of Temperatures in Loch Quoich and the Gearr Garry

4.5.3 A detailed water temperature monitoring investigation has been undertaken within Loch Quoich and the Gearr Garry over a period between August 2024 and July 2025. A total of 11No. temperature sensors were deployed across five discrete locations throughout the investigation area. The investigation was designed to provide insight into the water temperature regime in Loch Quoich and in the Gearr Garry. Additional river temperature data for the Gearr Garry, River Kingie and East Poulary was provided by the Ness District Salmon Fishery Board (NDSFB) and has been used in the investigation.

4.5.4 The monitoring indicates that the water temperature regime in Loch Quoich appears to conform to a warm monomictic lake regime, whereby the lake stratifies into a warm buoyant shallow layer overlying a stable dense colder layer during summer and autumn. This stratification, and the corresponding thermocline collapse, leads to a well-mixed water column which persists and gradually cools during the winter and spring. A single annual mixing event was observed to occur progressively and episodically over a four-week period between late October and mid-November 2024. While not directly observed, the corresponding annual re-stratification is expected to occur between April and June.

4.5.5 Notable diurnal temperature variation is evident in the uppermost surface waters, this variation is strongest in summer becoming more subdued in winter. The overall water temperature regime is observed to range between approximately 4.5 °C and 19 °C. The deeper hypolimnion layer, when present, is observed to be very stable with respect to water temperature, at approximately 7 °C. Prevailing ambient air temperature, coupled with seasonal and meteorological factors are believed to be the dominant driving mechanisms of the water temperature regime observed. A significant secondary driving mechanism is the warm monomictic lake regime which occurs due to the Loch's significant size and depth.

4.5.6 Water temperatures are significantly more variable within the Gearr Garry than in Loch Quoich. Significant diurnal variation was observed at all monitoring locations, with the largest temperature variation range observed in the spring/summer/autumn months, and relatively modest temperature variation observed during the winter months. Prevailing ambient air temperature, coupled with seasonal and meteorological factors

have been identified as the dominant driving mechanisms of the water temperature regime observed.

4.5.7 The investigation included monitoring location 5, which is 200m downstream of the outflow of the existing Quoich hydro scheme, which is conveyed approximately 4km by means of an underground concrete-lined tunnel before being used to drive a turbine-generator at Quoich Power Station. This location is downstream of the confluence of the Gearr Garry and River Kingie and is thus affected by three incoming flows: the River Kingie, the Gearr Garry and the turbine discharges, as well as by the ambient temperature.

4.5.8 When the Quoich hydro station is not generating, the temperature closely matches that of the River Kingie, which is in turn very strongly influenced by the ambient temperature. There is little moderating effect from the Gearr Garry flows, unless during very dry natural flows in which case it has a small but noticeable moderating effect. There is however a significant moderating effect on water temperature when the Quoich hydro station is generating, with the 18m3 flow being sufficient to generate temperatures 6oc warmer in winter and 8oc cooler in spring than the River Kingie flow based on the overlapping period of data currently available.

Calculation of Temperature Effect per Cycle

4.5.9 A calculation of the temperature effect per full cycle (pumping followed by generating) of the PSH has been carried out by hydro specialists at Mott Macdonald. This calculates the energy input for pumping and the energy output from turbines, which determines the heat generated due to inefficiencies, including from friction losses in the tunnel system. The calculation is conservative in that it assumes that all of this heat is transferred to the water passing through the pump turbines, whereas in fact some would be transferred to the air, and some losses would be manifest in other energy forms than heat. A further 3% factor of safety has been applied to the efficiency in the temperature increase calculation (90% efficiency assumed instead of 93% calculated).

4.5.10 The subsequent step in the calculation derives the temperature increase per cycle due to the heat generated. The value calculated is 0.063°C per full pumping / generating cycle of the PSH. This value has been used in the temperature variance study for Loch Quoich.

Assessment of Temperature Variance in Loch Quoich

4.5.11 A 3D hydrodynamic modelling study was carried out by SLR Consulting using the software TUFLOW FV to assess the potential thermal impacts of the proposed Fearna PSH on Loch Quoich. This study responds to comments by stakeholders including the Ness District Salmon Fishery Board (NDSFB) regarding potential alterations to natural thermal stratification and downstream temperature regimes, which are critical for sensitive aquatic species such as Atlantic salmon and Arctic charr.

4.5.12 The modelling assessed baseline thermal conditions and the influence of PSH operations under various discharge temperature scenarios. Simulations were

conducted for short-term (1 month, September 2024), medium-term (12 month, January to December 2022) and longer term (4 years, January 2020 to December 2023) periods. The model used the input value of 0.063°C/full cycle derived in the Mott Macdonald study, as well as a values higher and lower than this as a sensitivity analysis using 0.5% and 1% increases in temperature per cycle. A forecast long term operational flow regime for the PSH produced by the specialist power market analyst LCP Delta, which supports the economic case for the project, was used in the modelling work. This flow data represents the best available forecast of how the PSH would operate during it operational life.

4.5.13 Model validation against observed data from the baseline temperature survey carried out between 2024 and 2025 showed good agreement, particularly in bottom layers, confirming the model's reliability. Some discrepancies in short-term variability are attributed to the model's vertical resolution, which can smooth diurnal fluctuations.

4.5.14 The modelling results confirm that Loch Quoich is a thermally stratified system during summer months, with a stable thermocline that isolates cooler bottom waters from warmer surface layers. This stratification is ecologically important, supporting cold-water habitats and influencing downstream thermal regimes.

4.5.15 The introduction of PSH operations, particularly with surface-level inflows located near the dam wall, has the potential to alter this natural stratification. Although the discharge enters at the surface, the volume and proximity of the inflow to the dam outtake appear to influence the thermal structure at depth. This is likely due to localised mixing effects from the PSH inflow, which allow warmer surface water to affect the temperature of water extracted at the dam base. While the PSH may cause minor warming within Loch Quoich, the thermocline is still intact within the system during warmer periods.

4.5.16 The monthly average temperature increases at the dam outtake over the 12-month simulation period show a seasonal pattern, with lowest impacts during winter months (January-March and November-December) and peak increases during summer (July-September). The 0.063°C increase scenario consistently results in the average temperature increases, reaching up to 0.40°C at the surface and 0.57°C at the bottom in September and August respectively.

4.5.17 The modelling has shown that even modest increases in discharge temperature (e.g. 0.063°C) can result in detectable warming at the dam outtakes (that is compensation flow release through the Quoich dam and the discharge via the tunnel through the Quoich power station to the watercourse downstream of Loch Quoich). Higher temperature scenarios (1% increase) lead to more pronounced thermal impacts, including elevated bottom temperatures and increased vertical mixing.

4.5.18 The modelling study concluded that Loch Quoich exhibits strong seasonal thermal stratification under natural conditions, with a well-defined thermocline forming during warmer months. The introduction of the Fearna Pump Storage Hydro (PSH) scheme, particularly with surface-level inflows located close to the dam wall, has the potential to alter this thermal structure.

4.5.19 The 4-year simulation provides a robust framework for assessing the cumulative thermal effects of sustained PSH operations at Loch Quoich. By applying a repeated annual pump/generation schedule and simplifying outputs to daily temperature values, the

model captures long-term trends while managing computational constraints. Analysis at the loch outlet, where flows enter the Gear Garry, reveals only a marginal increase in temperature under the PSH scenario, suggesting that operational flows do not significantly disrupt the thermal regime and are unlikely to significantly alter long-term thermal conditions in the loch.

Conclusions from Water Temperature Assessments

4.5.20 The temperature monitoring investigation carried out between August 2024 and July 2025, supplemented by data recovered over recent years by the NDSFB in the Gearr Garry, River Kingie and East Poulary, has provided a good baseline for understanding the temperature effects which prevail within Loch Quoich and the Gearr Garry.

4.5.21 The results have additionally shed light on the already existing influence of the operation of the Quoich reservoir and hydro scheme on the water temperature regime of he Gearr Garry.

4.5.22 The water temperature regime of Loch Quoich have been modelled using the software package Tuflow FV 3D, both the existing baseline and with simulation of the predicted flows and calculated temperature increases that associated with the operation of the controlled activities (PSH). This has been modelled over one month, one year and 4 year periods.

4.5.23 The modelling study found that Loch Quoich naturally develops strong summer stratification, which remains largely intact under operation of the proposed Fearna PSH scheme. PSH operations may cause slight seasonal warming at the dam outtake (up to ~0.6°C in summer), but long-term effects are minor, with no significant disruption to the loch's thermal regime or downstream conditions.

4.6 Details of the Controlled Activity – Construction

Dam Construction

4.6.1 The creation of the Upper Reservoir will require the construction of two new dams; i) Fearna Dam and ii) Coire Dubh Dam. Both dams are proposed to be of Concrete-Faced Rockfill Dam (CFRD) construction, although other methods of waterproofing (e.g. asphalt faced or asphalt core) may be considered.

4.6.2 No modifications to the existing dams in Loch Quoich are required as part of the Proposed Development.

4.6.3 To construct the Fearna Dam, Loch Fearna would be drawn down from its natural level of approximately +538m to +530m by over pumping the water directly to the Allt Fearna. This would allow the construction of a temporary cofferdam along the toe of the dam and create areas for settlement lagoons within the current loch footprint. The over pumping would continue until the dam diversion works were completed.

4.6.4 During over pumping, a secondary pump system would remain on standby for redundancy and also to provide additional capacity in the event of high inflows.

4.6.5 The apparent ground conditions in the locality of the proposed dam drawdown and compensation facility are favourable, with exposed bedrock evident within the Allt Fearna and adjacent to it. The current dam design therefore shows a low-level stainless

steel pipe cast in to the bedrock, which will provide the temporary diversion of the Allt Fearna through the dam. This pipe will then become the permanent drawdown and compensation flow facility.

4.6.6 The drawdown requirement of the dam will be in excess of the Fearna catchment's natural 1:1000yr flood flow, therefore the diversion pipe will be capable of passing these flows without requiring attenuation upstream.

4.6.7 The Coire Dubh dam follows a similar design to Fearna Dam, with a cast-in low level pipe providing the temporary diversion during construction, which would then become the permanent drawdown and compensation facility.

4.6.8 With no existing water body, no over pumping is required. The Alt Mheil tributary which outflows from Coire Dubh would however continue to follow its natural course until the diversion pipe was installed adjacent, after which the burn would be diverted through the pipe. Again, this pipe would have capacity in excess of the 1:1000yr flow and no attenuation would be required.

4.6.9 An outline draft methodology for the Upper Reservoir construction works is contained in **Appendix A - Fearna Reservoir – Outline Pollution Prevention Plan**. The full methodology for the temporary dewatering and diversionary works will form part of the Construction CAR Licence to be agreed with SEPA as well as the CEMD.

4.6.10 Refer to the following drawings for details of the dam, spillway, valve house and proposed temporary diversion arrangements.

- **FEA/FC4/250 – Upper Reservoir Plan**
- **FEA/FC4/320 – Fearna CFRD Plan and Elevation**
- **FEA/FC4/370 – Coire Dubh CFRD Plan and Elevation**
- **FEA/FC4/255 Loch Fearna Temporary Drawdown Proposal**
- **FEA/FC4/950 Site Compound SC3 - Plan**

Powerhouse and Lower Control Works Construction

4.6.11 The Powerhouse would be constructed adjacent to Loch Quoich on a terrace along the northern shoreline. Excavation of material (primarily rock) to floor formation level would create a level terrace for the structure and external areas, with the rock material being used to raise the ground level of the adjacent disused quarry area to form the site compound SC2, which will ultimately become the site of the HV switchyard. It may also be used to form temporary cofferdams in Loch Quoich as described below.

4.6.12 The lower control works would require to be constructed within Loch Quoich and at sufficient depth to allow the pump turbines to function properly, whilst also accounting for the 26m operational range on the loch.

4.6.13 Loch Quoich typically follows and annual operating regime, whereby a target level at the end of March each year provides storage to be used over the summer months. A low level target at the end of September creates storage volume for higher winter inflows. Whilst the loch level data shows this general trend, significant deviations do occur, due to unseasonable weather conditions or outages at the Quoich and / or Garry hydro stations.

4.6.14 Analysis carried out by the Applicant has concluded that the temporary drawdown of Loch Quoich to facilitate the construction of the lower control works is not feasible. This is due primarily to the following factors:

- Very large catchment and storage volume of Loch Quoich;
- Relatively modest discharge potential at Quoich Dam vs the loch inflows;
- Uncertainty of availability of the drawdown measures (Quoich hydro turbine and the dam dispersal valve);
- Large operational range within Loch Quoich;
- Required elevation of the lower control structures;
- Environmental constraints within Loch Quoich and in the downstream system;
- Operational regime of the Garry Cascade and wider Ness catchment; and
- Angling conditions in the Ness catchment.

4.6.15 The proposed construction approach would therefore be to construct the lower works behind a temporary cofferdam(s) to isolate the works from the loch and which are appropriately designed to withstand as a minimum 1:200 flood events, with no proposed temporary drawdown of Loch Quoich, which would continue to operate on its current regime.

4.6.16 A degree of underwater excavation of rock material would be required, to break out the channel between the lower control works and Loch Quoich.

4.6.17 The excavation works within and adjacent to Loch Quoich would be managed under a Pollution Prevention Plan, with construction-related water removed and treated prior to returning to Loch Quoich.

4.6.18 The details of the Plan would be dependent on the construction methodology applied by the appointed contractor. It is therefore proposed that approval of the detailed methodology would form part of the Construction CAR Licence to be agreed with SEPA as well as the CEMD.

Geomorphology

4.6.19 There are 15 water crossings on the SAR where, given that the SAR is to be upgraded in places, that improvements to culverts and bridges would be considered at the detailed design stage. There are also 5 current crossings that are likely compromised by imposed flow and sediment transport regime and modification to these structures will be implemented.

4.6.20 After mitigation, including implementation of the measures detailed in the outline CEMD and watercourse and slope stability measures around the Fearna Reservoir, there would be no significant geomorphological effect from the proposed controlled activities during construction,

Water Temperatures

4.6.21 During construction phase of the works associated with the controlled activities there would be no change to the baseline temperature regime of Loch Quoich, nor the downstream watercourses and waterbodies.

4.7 Details of the Controlled Activity – Operation

Storage Volumes & Operational Range – Upper Reservoir

4.7.1 The construction of the two upper dams, Fearna and Coire Dubh would create a storage volume of approximately up to 45Mm^3. The operational range of the upper reservoir is proposed to be between +540mAOD and +600mAOD.

4.7.2 The upper dam crests would be set at +602m, to allow additional storage provision during flood events and to account for wave action within the reservoir.

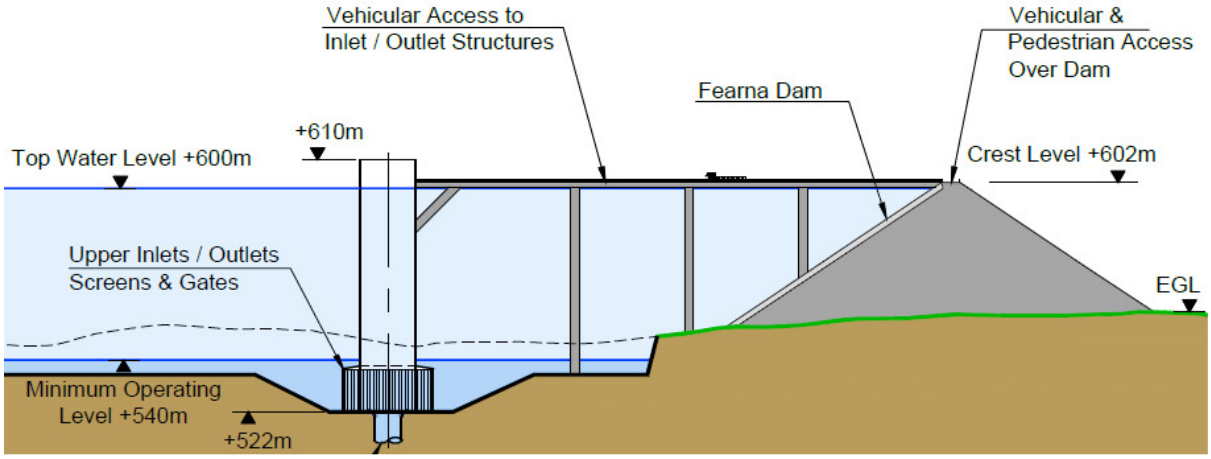

Plate 4-4 – Upper Reservoir Section with Control Structures

4.7.3 Sufficient storage would be maintained at all times to provide the required compensation flows to the Allt Mheil and Allt Fearna, as well as generation flow to the Allt Mheil hydro scheme to account for the modification to the tributary in Coire Dubh within the Allt Mheil catchment.

4.7.4 On commencement of operations, the upper reservoir would be filled using the available storage within the lower reservoir using the pump-turbines.

Rate of Change in Level – Upper Reservoir

4.7.5 At the upper reservoir, the rate of level fall when the Proposed Development is generating 1,800MW would approximately be between 2.1m and 3.2m per hour. During pumping, the rate of rise would be approximately between 1.3m and 2.45m per hour

4.7.6 For maintenance purposes, there would be two methods of drawing down the upper reservoir, by: i) running in generation mode to transfer the water to the lower reservoir; and/or ii) a drawdown facility at the foot of one or both of the dams to pass controlled flow into the downstream watercourses.

4.7.7 Once the Proposed Development is operational, the reservoir levels and rate of change in level for both the upper and lower reservoirs would be governed by the UK electricity market and may vary significantly from day to day.

Storage Volumes & Operational Range – Lower Reservoir

4.7.8 The Proposed Development would create a third demand for water from Loch Quoich. The existing demands are: i) for the supply of compensation flow to the Gearr Garry in compliance with the existing CAR Licence; ii) for generation flow for the Quoich hydro scheme; and the additional demand would be iii) to allow the operation of the Proposed Development, which would transfer water to and from the upper reservoir but remaining within the Quoich catchment.

4.7.9 No modifications to the existing lower reservoir's infrastructure and licence conditions would be required, which currently provides a storage volume of approximately 362Mm^3. The existing dams would remain under the ownership of SSE Generation under the Reservoirs Act.

4.7.10 **Plate 4-5** shows the indicative proposed operational interface of the existing Quoich Hydro station and the Proposed Development. This shows the Proposed Development operating across a 15m range within the total current licenced range of 26m.

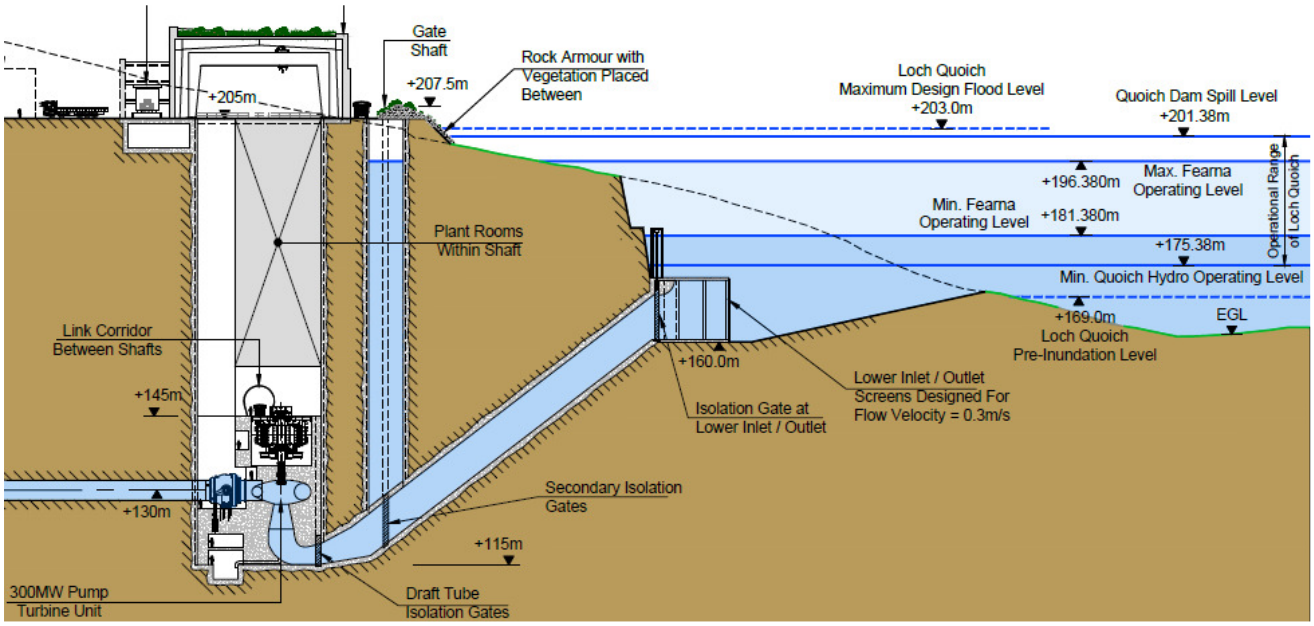

Plate 4-5 – Powerhouse section showing Quoich and Fearna PSH operating levels

4.7.11 The Fearna 'Stop Generating Level' would be set at +196.380m, which is 5m below Quoich Dam spillway level. If Loch Quoich reaches this level, Fearna PSH will not be permitted to release water from the upper reservoir into it, however it will be permitted to pump water from Loch Quoich, thereby reducing the level. At +196.380m, Loch Quoich still has approximately 90Mm^3 of storage available within it at this level and analysis shows that spill at Quoich Dam could be avoided.

4.7.12 The 'Stop Pumping Level' would be set at +181.380m, which is 6m above the minimum operating level of Loch Quoich. If Loch Quoich reaches this level, Fearna PSH would be

prevented from pumping water to the upper reservoir, however would it will be permitted to release water from Loch Fearna, thereby raising the level of Loch Quoich. At +181.380m, Loch Quoich still holds approximately 60Mm3 of water above the minimum level of +175.380m. This has been analysed and agreed with the SSE Generation that sufficient storage is retained to maintain full CAR compliance and Quoich hydro scheme operation.

Drawdown and Rate of Change in Level – Lower Reservoir

4.7.13 The maximum volume of water that would be transferred between the upper and lower reservoirs by the operation of The Proposed Development (i.e. a 'full cycle') is approximately up to 45Mm^3.

4.7.14 Discharging or abstracting 45Mm^3 from Loch Quoich would create a fluctuation in loch level of between 2.5m and 3.2m, depending on the starting level and thus surface area of Loch Quoich at the time. The average of these two values is 2.85m. This figure assumes that the other inflows and outflows to/from Loch Quoich are equal, but which in reality are constantly varying.

4.7.15 The lower reservoir currently operates within an operational range of 26m, which is utilised throughout the calendar year. As above, the Proposed Development would operate over a range of 15m within this wider range. Refer to plate 4-6 for a schematic of the recorded Loch Quoich Levels to 2020 with the Fearna PSH operation superimposed, for a visual representation of the interface between the Quoich Reservoir and Fearna PSH.

4.7.16 The typical operation of the Proposed Development would likely comprise a mix of full and part-cycles, governed by the requirements of the transmission network in terms of supply, demand and network stability.

4.7.17 Based upon an installed generation capacity of 1,800 MW, a full generation cycle would take approximately 20 hours to provide a full discharge of the upper reservoir to the lower. In reverse, a full pumping cycle would take approximately 27 hours at full power.

4.7.18 At a generation capacity of 1,800MW the rate of rise in the lower reservoir (Loch Quoich) would approximately be between 0.12m and 0.18m per hour. For a pumping cycle, the rate of drop in the reservoir would approximately be between 0.09m and 0.13m per hour.

4.7.19 Whilst these rates of fluctuation are higher than typically experienced on Loch Quoich, they remain well within the current operational range and would not present significant impacts to the current baseline conditions, which have been heavily modified by the Quoich Hydro operations since the 1950s.

FEARNA STORAGE

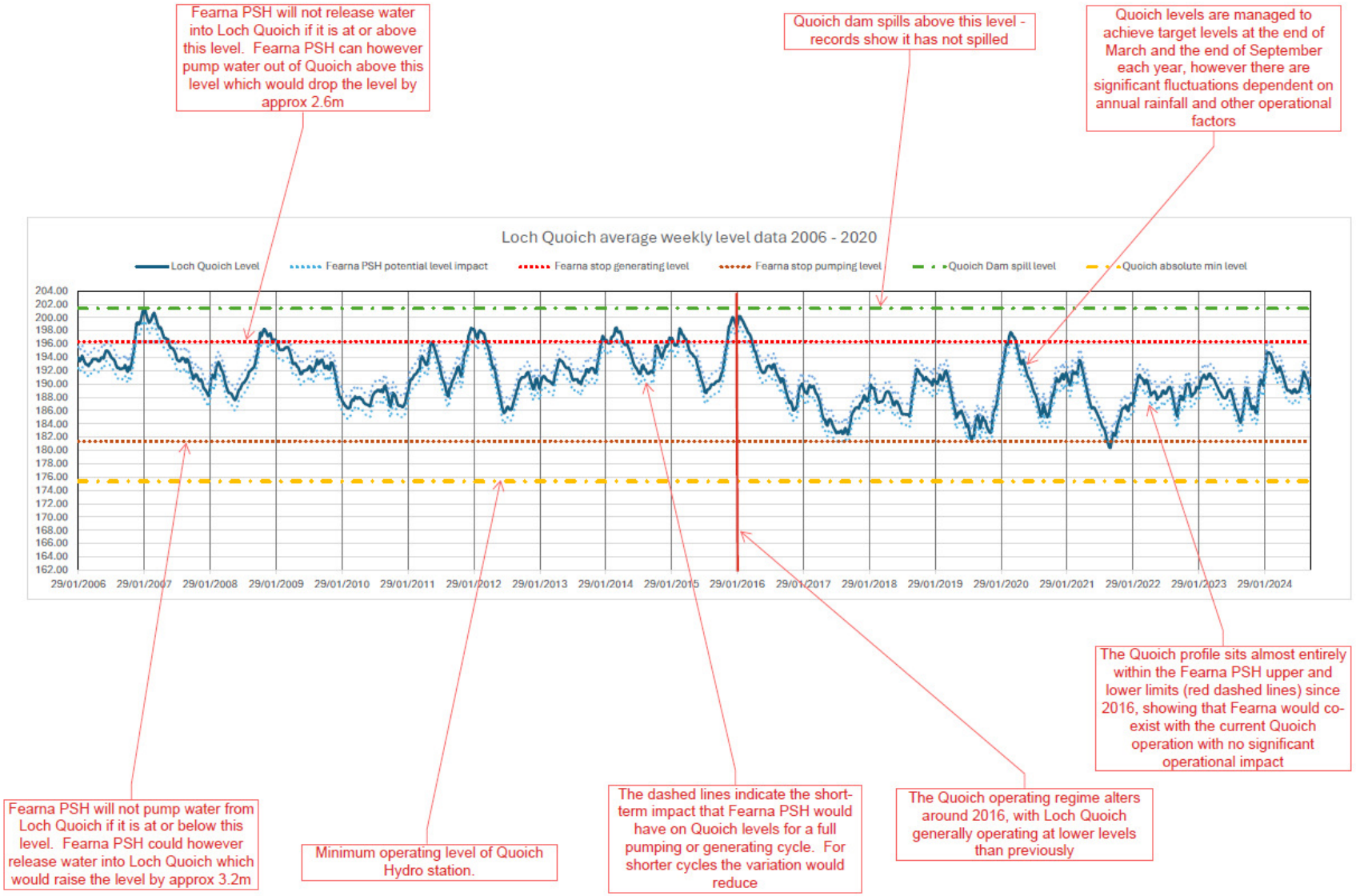

Plate 4-6 – Fearna PSH operation superimposed on recorded Quoich Levels

Proposed Abstraction and Discharge Rates and Volumes

4.7.20 The Proposed Development would both abstract and discharge water between the upper and lower reservoirs dependent upon operating mode. The maximum flow rates are shown in Table 4.1.

Table 4.1: Proposed Abstraction and Discharge Flows

Location	OS NGR	Maximum Discharge (m^3/s)	Maximum Abstraction (m^3/s)
Lower Reservoir (Quoich)	NH 058 030	600 (generating)	540 (pumping)
Upper Reservoir (Fearna)	NH 057 017	540 (pumping)	600 (generating)

4.7.21 The flow rates would fluctuate significantly between the maximum values provided in Table 4.1 and the minimum rates, should only one unit of the six units be operating at part-load.

4.7.22 The minimum discharge (generating) rate would be in the region of $50m^3/s$, with the minimum abstraction (pumping) flow of approximately $60m^3/s$.

Proposed Compensation Flows

4.7.23 Compensation Flows equivalent to Q95 would be passed at both the Fearna and Coire Dubh Dams at the rates shown in Table 4.2. The Q95 values have been derived from the *Allt Fearna Hydrometry and Resource Assessment* and *Allt a' Mheil and Allt Coire Peitireach Hydroelectric schemes, - Hydrology* respectively, which are contained within **Appendix C - Hydrology**.

Table 4-2 Proposed Project Compensation Flows

Catchment	OS NGR	Catchment (km^2)	Compensation flow (Litres/second)
Allt Fearna @ Fearna Dam	E: 205953 N: 803512 NH05953 03512	1.35	17
Allt A'Mheil tributary @ Coire Dubh Dam	E:205284 N: 804311 NH04850 03550	1.54	14.2

4.7.24 It should be noted that by their nature, seepage does occur through CFRD dams, which would be channelled to the watercourses and considered additional to the stated compensation flows. For reference, the seepage rate at the Quoich Dam is approximately 11 litres/second.

4.7.25 With no modifications required to the Quoich Dam or lower reservoir, the compensation flows at the dam would continue to be operate under CAR Licence CAR/L/1011471.

Geomorphology

4.7.26 No geomorphological implications on the SAR are expected as a result of the operation of the controlled activities.

4.7.27 No significant geomorphological effect from the proposed controlled activities are predicted during operation of the controlled activities,

4.7.28 Sediment augmentation to the River Garry in the downstream catchment is proposed as a biodiversity enhancement.

Water Temperatures

4.7.29 The effect of the proposed controlled activities on the temperature regime of Lochs Quoich and Fearna has been analysed, together with any potential effect on downstream waterbodies. Detailed modelling of Loch Quoich has shown that the seasonal thermocline regime within the loch would continue during the controlled activities, with a predicted increase on water temperature over the 12 and 48 month simulation periods at the discharge point of the Quoich reservoir through the dam and tunnel of 0.2°C and a peak temperature increase in the month of September of 1.0°C and average of 0.4°C.

4.7.30 It is predicted that these changes will not have a material effect on the temperature regime of the Gearr Garry, to which the Quoich reservoir discharges, which has a baseline seasonal temperature variation of approximately 15°C that is largely driven by ambient temperatures rather than the temperature of the water feeding it from Loch Quoich.

Reservoir Safety

4.7.31 The new upper dams would be controlled under the Reservoirs Act (2011) [the Act] by the Authorised Person.

4.7.32 The dams within the lower reservoir; Quoich Dam, Cruadhach North and Cruadhach South would continue to be controlled by SSE Generation under the Act.

4.7.33 Flood risk associated with the Fearna and Coire Dubh dams would be assessed in accordance with the Reservoirs (Scotland) Act 2011.

4.7.34 The Proposed Development would be designed with fail-safe control systems which would prevent pumping once the upper reservoir is full (the stop pumping level has been reached). Multiple levels of contingency are provided in these systems and this is an accepted approach in pumped storage projects globally. However, additional spillway provision has been included at this stage.

4.7.35 It is proposed that a spillway is provided at the Coire Dubh dam to allow the passing of Probable Maximum (PMF) levels, should these occur coincidentally with the upper reservoir being full. At this stage the spillway is also being designed to accommodate emergency over pumping flows and migration of material into the reservoir. This provision is the source of ongoing discussion within the industry and it is therefore

considered a robust approach at this stage of the project, which may be refined as the design, ground investigation and operational philosophy are developed.

4.7.36 The proposed spillway at the Coire Dam would be very similar in form and scale to the existing provision on the Quoich Dam, with a side spillway and open channel to return the flows to the watercourse downstream of the dam.

4.8 Conclusion

4.8.1 The Proposed Development is to build and operate a new PSH with an installed capacity of up to 1800 Megawatts (MW) utilising the existing Loch Quoich as the lower storage reservoir and Loch Fearna as the upper storage reservoir. Flows would be abstracted and returned to the reservoirs at the rates provided in this chapter.

4.8.2 The maximum energy storage of the Proposed Development would be up to 36 GWh, which corresponds to a useable water storage volume of 45Mm^3 (million cubic metres) in the reservoir system.

4.8.3 On commencement of operations, the upper reservoir would be pumped full using the available stored water in the lower reservoir.

4.8.4 The Proposed Development would only operate between agreed minimum and maximum levels of the proposed upper and lower reservoirs. There would be no impact on the current downstream flow regime from Loch Quoich.

4.8.5 All existing CAR Licences, namely CAR/L/1011471 covering the Ness catchment and CAR/L/1090786 covering the Allt a' Mheil hydro scheme would be unaffected by the Proposed Development.

4.8.6 Compensation flows would be passed through the two dams forming the upper reservoir, namely the Fearna Dam and Coire Dubh dam.

4.8.7 There would be no significant geomorphological effect from the proposed controlled activities, however sediment augmentation to the River Garry in the downstream catchment is proposed as a biodiversity enhancement.

4.8.8 The effect of the proposed controlled activities on the temperature regime of Lochs Quoich and Fearna has been analysed, together with any potential effect on downstream waterbodies. Detailed modelling of Loch Quoich has shown that the seasonal thermocline regime within the loch would continue during the controlled activities, with a predicted increase on water temperature over the 12 month simulation period at the discharge point of he Quoich reservoir through the dam and tunnel of 0.2°C and a peak temperature increase in the month of September of 1.0°C and average of 0.4°C. It is predicted that these changes will not have a material effect on the temperature regime of the Gearr Garry, to which the Quoich reservoir discharges, which has a baseline seasonal temperature variation of 15°C that is largely driven by ambient temperatures rather than the temperature of the water feeding it from Loch Quoich.

5 Effects on Biodiversity – Aquatic

5.1 Chapter Introduction

5.1.1 This chapter considers the likely effects of the Fearna Pumped Storage Hydro scheme (PSH), hereafter referred to as the 'Proposed Development', on the water environment for the purposes of Controlled Activity Regulations. For the purpose of this chapter, the scope is limited to the impact on the water environment encompassing waterbodies, watercourses, fish fauna, fish habitat, macroinvertebrates and macrophytes where a direct impact is likely to occur during the operation of the Proposed Development as a result of the controlled activity. Impacts predicted are considered post implementation of mitigation. One effect associated with the construction phase was also considered: drawdown of Loch Quoich.

5.1.2 The controlled activities referred to in this assessment include abstractions from surface water, impoundment of river and lochs, engineering in rivers and lochs, engineering activities in the vicinity of rivers and lochs which are likely to have a significant impact upon the water environment, and other activities which directly or indirectly are liable to cause a significant adverse impact upon the water environment.

5.1.3 The chapter was prepared by Gavia Environmental Ltd, with specialist input from Professor Colin Adams of Glasgow University.

5.2 Scope of Assessment

5.2.1 The assessment of effects within this chapter is informed by client derived, desk based and field survey data. Baseline surveys were undertaken in accordance with relevant good practice guidelines between winter 2022 and spring 2025. Please refer to **Appendix J – Aquatic Ecology Surveys** for the full results of the surveys undertaken.

5.2.2 The impacted area encompasses the area over which all desk-based and field data were gathered to inform the assessment. The impacted area comprises all watercourses, waterbodies and aquatic species that may experience effects as a result of the controlled activity, referred to as 'factors', but not necessarily all infrastructure within the red line boundary area.

5.2.3 Table 1 refers to the important factors (with SEPA ID if applicable). Nature Conservation Level refers to conservation status of species/habitat in Scotland, and Ecological Status to SEPA's water classification hub (where applicable).

Table 1 - Study Area

Important factor with SEPA ID (if applicable)	Nature Conservation Level / Ecological Status	Type of Factor	Area impacted by controlled activity
Loch Quoich (ID: 100186)	Poor ecological potential	Waterbody	Whole area of Loch.

Important factor with SEPA ID (if applicable)	Nature Conservation Level / Ecological Status	Type of Factor	Area impacted by controlled activity
Loch Fearna (ID: 20976)	No Information	Waterbody	Whole area of Loch.
Allt Coire nan Gall (ID: 20257)	Poor status	Watercourse	Lower reaches of watercourse only: subject to water level fluctuation within Loch Quoich
Allt a' Choire Reidh	No information	Watercourse	Lower reaches of watercourse only: subject to water level fluctuation within Loch Quoich
Allt a' Choire Buidhe	No information	Watercourse	Lower reaches of watercourse only: subject to water level fluctuation within Loch Quoich
Abhainn Chosaidh (ID 20304)	Poor status	Watercourse	Lower reaches of watercourse only: subject to water level fluctuation within Loch Quoich
Allt a' Mhaingir	No information	Watercourse	Lower reaches of watercourse only: subject to water level fluctuation within Loch Quoich
Caolie Water	No information	Watercourse	Lower reaches of watercourse only: subject to water level fluctuation within Loch Quoich
River Quoich (ID: 20303)	Poor status	Watercourse	Lower reaches of watercourse only: subject to water level fluctuation within Loch Quoich
Allt Fearna	No information	Watercourse	Entire reach (approximately 1.15 km).
Allt a' Mheil	No information	Watercourse	Entire reach downstream of dam (approximately 1.77 km in length).
Allt Coire Peitireach	No information	Watercourse	Lower reaches of watercourse only: subject to water level fluctuation within Loch Quoich
Gearr Garry – Loch Quoich to Loch Poulary (ID: 20256)	Poor status	Watercourse	Main stem is approximately 7.3 km. It is designated as a heavily modified water body.
Gearr Garry – Loch Garry to Loch Poulary (ID: 20255)	Good status	Watercourse	Main stem is approximately 4.6 km in length.

Important factor with SEPA ID (if applicable)	Nature Conservation Level / Ecological Status	Type of Factor	Area impacted by controlled activity
Allt Ladaidh (ID: 20298)	Moderate status	Watercourse	The main stem is approximately 9.0 km in length. Tributary of Gearr Garry.
Greenfield Burn (ID: 20299)	Moderate status	Watercourse	Main stem is approximately 7.1 km in length. Tributary of Gearr Garry.
Allt Lon Glas Bheinn (ID: 20300)	Poor status	Watercourse	Main stem is approximately 10.3 km in length. Tributary of Gearr Garry.
Allt Choire a Bhalachain (ID: 20301)	Moderate status	Watercourse	Main stem is approximately 9.2 kilometres in length. Tributary of Gearr Garry.
River Kingie (ID: 20302)	Moderate status	Watercourse	Main stem is approximately 23.6 kilometres in length. Tributary of Gearr Garry.
Arctic charr *Salvelinus alpinus*	National	Fish Species	Arctic charr were confirmed as present within Loch Quoich but not within Loch Fearna or any of the inflowing watercourses of Loch Quoich sampled.. Charr are also understood to be present in Loch Garry.
Brown trout *Salmo trutta*	Local	Fish Species	Brown trout are known to be present within Loch Quoich and most of its inflowing watercourses sampled by eDNA / electrofishing. Brown trout were absent from Loch Fearna and Allt a' Mheil catchments.
Atlantic Salmon *Salmo salar*	Local	Fish Species	Salmon were recorded through population surveys on Allt Choire a' Bhalachain, Greenfield Burn and River Kingie.
Macroinvertebrates	Local	Macroinvertebrate Species	All watercourses and marginal waterbody areas of Loch Quoich and Loch Fearna included above.

Important factor with SEPA ID (if applicable)	Nature Conservation Level / Ecological Status	Type of Factor	Area impacted by controlled activity
Macrophytes (higher plants)	Local	Macrophyte Species	Marginal waterbody areas of Loch Fearna.

5.3 Consultation

5.3.1 To inform the scope of the assessment for the Proposed Development, consultation was undertaken with the statutory and non-statutory bodies listed below.

- The Scottish Government Energy Consents Unit;
- The Highland Council;
- SEPA;
- NatureScot;
- Ness District Salmon Fishery Board; and
- Buglife Scotland.

5.4 Mitigation Measures

5.4.1 Proposed mitigation measures are described below. For more detailed information on mitigation measures please refer to Adams, 2025, **Appendix K - Summary of the Status and Mitigation of Impact on Arctic Charr**.

Engineered Spawning Areas

5.4.2 Mitigation would be provided in the form of high-quality artificial spawning habitat areas created below the minimum Loch Quoich drawdown level. These habitats would feature optimal spawning substrates for Arctic charr and would be regularly maintained to prevent siltation from fine sediment. Current spawning opportunities on loch margins are often affected by existing drawdown thus presenting an opportunity for enhancement. In addition to simply mitigating the effect of the pump storage, it is highly likely that a well-conceived mitigation plan would result in an environmental net gain, compared with the current position for Arctic charr.

Curtailment of pumping and generating

5.4.3 The Proposed Development would pump and discharge water to store and generate energy within the operational range of the Quoich Dam. Therefore ‘stop pumping’ and ‘stop generating’ limits would be applied via the CAR licence. The stop pumping level applied to the Proposed Development (181.38 m AOD) would be well above the current minimum operational limit of Loch Quoich (175.38 m AOD), therefore depletion of levels below this would not occur.

5.5 Methodology

5.5.1 The methodology for identifying likely effects and their significance is based on that outlined in 'Supporting Guidance (WAT-SG-67), Assessing the Significance of Impact – Social, Economic and Environmental (V5.1)'. This involved a 5-stage approach in determining impact.

Methodology Step 1: Identifying Likely Effects

Negative Effects

5.5.2 Negative effects were based on those likely to be forgone as a result of a proposal's impact on the water environment and include:

- Benefits no longer provided by the affected part of the water environment in cases where a proposed development would result in deterioration of the water environment; and
- Where a proposed development would prevent a waterbody from being restored to its target objective (typically good status or good ecological potential).

5.5.3 Only negative effects resulting from the changes to the water environment caused by the controlled activity (the proposed development) are considered. Potential negative effects of other aspects of the proposed development, e.g. access roads or other infrastructure, are not considered within this chapter and will be taken into account by the relevant planning authority.

5.5.4 Construction phases of development projects often pose a risk of pollution, in particular by soil and other fine sediments. These risks should be controlled by appropriate authorisation conditions and hence are not relevant to the balancing test. Notwithstanding this, the construction effects of the temporary construction drawdown of Loch Quoich and Loch Fearna are considered in this report.

5.5.5 To account for negative effects preventing the achievement of good status the loss of the benefit of improving the water environment should be accounted for. This is done by assessing the negative effects of a proposal as if the affected water body is at its target restoration objective (where available).

5.5.6 For example, if a waterbody is in moderate ecological status and has an objective of restoration to good ecological status, the proposed development's negative effects is assessed on the waterbody being in good ecological condition, in the absence of the proposed development going ahead.

Positive Effects

5.5.7 Positive effects include:

- Positive environmental benefits flowing directly from, and which are reliant on, the proposed development; and
- Indirect benefits (including social and economic) likely to result from those direct benefits.

5.5.8 Positive effects do not include any benefit resulting from developers using the financial resources available to them, including the profits of the development or any benefit resulting from a part of the proposed development that is not directly dependent on the controlled activity and could, in principle, be delivered without the controlled activity.

5.5.9 All effects, both negative and positive, are considered post mitigation. Compensatory measures are not considered as these are considered not directly dependent on the controlled activity.

Information Sources

5.5.10 The following information sources were used to identify the relevant factors:

- The information accompanying the application, including any subsequent information provided by the applicant in response to requests for further information;
- Responses from any relevant public bodies that have been consulted on the proposed development;
- Representations from the wider public in response to advertisements of the proposal or made at any meetings that SEPA or the applicant have organised to discuss the proposed development;
- Any environmental impact assessment that has been undertaken with respect to the proposed development (e.g., in support of an associated Section 36 planning application); and
- Any relevant information SEPA already holds or any relevant in-house expertise (e.g., SEPA waterbody classification hub).

5.5.11 The following documents were used to compile this chapter:

- SEPA. (2017). Supporting Guidance (WAT-SG-67), Assessing the Significance of Impact – Social, Economic and Environmental (V5.1);
- SEPA. (2017). WAT-RM-34: Derogation Determination – Adverse Impacts on the Water Environment;
- Scottish Biodiversity List (SBL);
- Gavia Environmental. (2025). Ecological Impact Assessment Report Chapter 11 Aquatic Ecology;
- Gavia Environmental. (2025). Ecological Impact Assessment Report Appendix 11.1 Fearna Aquatic Ecology Surveys;
- Gavia Environmental (2025). Ecological Impact Assessment Report Appendix 11.3 – Loch Quoich & Gearr Garry Temperature Monitoring Investigation
- Gavia Environmental (2025). Ecological Impact Assessment Report Appendix 11.4 – Loch Fearna Pumped Storage Hydroscheme: Summary of the status and mitigation of impact upon Arctic charr;
- Gavia Environmental. (2025), **Appendix J – Aquatic Ecology Surveys.**

Methodology Step 2: Assessment of magnitude of impact

5.5.12 The magnitude of an effect reflects its scale and duration.

5.5.13 Scale considers:

- The severity of the impact on the plant/animals that are directly affected;
- The spatial extent over which this direct impact occurs; and
- The consequences of the direct impact for the wider conservation of the affected species or assemblages of species.

5.5.14 The scale of effects has been assessed using the guidance in **Table 5-1** (for watercourses) and **Table 5-2** (for freshwater lochs) below.

Table 5-1 Guide to assessing the scale of an effect on the biodiversity of watercourses (SEPA WAT-SG-67 2017, Table 6)

Length of watercourse affected (km)		< 0.1	0.1 < 0.5	0.5 to < 1.5	1.5 to < 5	5 to < 10	10 to < 20	≥ 20
Extent of any relevant habitat or species population affected as a proportion the total relevant habitat or species population of the "high biodiversity interest site" (%)		< 0.1	0.1 < 1	1 to < 2	2 to < 10	10 to < 20	20 to < 30	≥30
Change in condition								
H → G	Minor or slight	N	N	VS	VS - S	S - M	M	M - L
P ↔ B **M ↔ P** **G ↔ M** **H → M**	Slight or moderate	N	N - VS	VS - S	S - M	M	M - L	L
G ↔ P **H → P**	Major	N	VS	S	M	M - L	L - VL	L - VL
M ↔ B **G ↔ B** **H → B**	Major or severe	N - VS	VS - S	S - M	M - L	L	L - VL	VL

Notes

"High biodiversity interest site" means one of such sites referred to in Table 4.

To assess the likely change in condition, you should apply the appropriate environmental standards. In this context, "change in condition" includes changes that do not affect the status of the water body as a whole (eg because the spatial extent over which the change occurs is too limited, etc).

The scale of an effect on a high biodiversity interest site should only be assessed if the change in condition is expected to affect the particular biodiversity interest of that site. Where the particular interest is likely to be affected, you should assess the likely change in its condition. This scale of change in its condition may differ substantially from that of other aspects of the ecological quality of the affected part of the watercourse.

N = negligible; VS = very small; S = small; M = medium; L = large; and VL = very large

H = high; G = good; M = moderate; P = poor; and B = bad.

Table 5-2 Guide to assessing the scale of an effect on the biodiversity of waterbodies (SEPA WAT-SG-67 2017, Table 7)

Area of loch affected (ha)		< 0.5	0.5 < 2.5	2.5 to < 7.5	7.5 to < 50	50 to < 100	100 to < 500	≥ 500
Length of loch shore affected (km)		<0.1	0.1 < 0.5	0.5 to < 1.5	> 1.5 to < 5	> 5 to < 10	> 10 to < 20	≥ 20
Extent of any relevant habitat affected as a proportion the total relevant habitat of the "high biodiversity interest site" (%)		< 0.1	0.1 < 1	1 to < 2	2 to < 10	10 to < 20	20 to < 30	≥30
Change in condition								
H → G	Minor to slight	N	N	VS	VS - S	S - M	M	M - L
P ↔ B M ↔ P G ↔ M	Slight to moderate	N	N - VS	VS - S	S - M	M	M - L	L
H → M G ↔ P H → P	Major	N	VS	S	M	M - L	L - VL	L - VL
M ↔ B G ↔ B H → B	Major to severe	N - VS	VS - S	S - M	M - L	L	L - VL	VL

Notes

Depending on the proposed activity, the effects may be concentrated along the shore of the loch or extend across the body of the loch. You should refer to the most relevant of the first two rows of the table when assessing the scale of the effect.

"High biodiversity interest site" means one of such sites referred to in Table 4.

To assess the likely change in condition, you should apply the appropriate environmental standards. In this context, "change in condition" includes changes that do not affect the status of the water body as a whole (eg because the spatial extent over which the change occurs is too limited, etc).

The scale of an effect on a high biodiversity interest site should only be assessed if the change in condition is expected to affect the particular biodiversity interest of that site. Where the particular interest is likely to be affected, you should assess the likely change in its condition. This scale of change in its condition may differ substantially from that of other aspects of the ecological quality of the affected part of the watercourse.

N = negligible; VS = very small; S = small; M = medium; L = large; and VL = very large

H = high; G = good; M = moderate; P = poor; and B = bad.

5.5.15 Duration considers how long the effect is likely to occur from 1 year to more than 12 years. Magnitude determination is summarised in

5.5.16

5.5.17

5.5.18 Table 5-3 below.

Table 5-3 Indicative guide to assessing the magnitude of an effect (SEPA WAT-SG-67 2017, Table 1)

	Scale of effect				
Duration of effect	**V Small**	**Small**	**Medium**	**Large**	**V Large**
Only lasts up to around 1 year	VS	VS	VS	S	M
Only lasts up to around years 6 years	VS	VS	S	M	L
Lasts significantly more than 6 years	VS	S	M	L	VL
Starts up to around 2 to 3 years earlier*	VS	S	M	L	VL
Starts up to 3 to 12 years earlier*	VL	S-M	M-L	L	VL
Starts more than 12 years earlier*	S	M	L	L-VL	VL

Notes:

You should use these rows in the table when you are assessing a benefit that is already expected to be delivered through the implementation of the river basin management plan (RBMP) but which is expected to be realised sooner as a result of the proposal (ie the proposal will enable the early achievement of an RBMP improvement objective).

If you have assessed the scale of an effect as being negligible, you should not consider that effect further in your assessments.

5.5.19 Scale was determined by indicative guidance on assessing the scale of an effect on the biodiversity of watercourse.

Methodology Step 3: Assessment of importance of each effected factor

5.5.20 Importance is determined by the environmental value of a factor to society. An effect on a very important factor (e.g. one of national importance) will be of greater significance than the same magnitude of effect on a factor of limited importance (e.g. local importance), as highlighted in

5.5.21

5.5.22

5.5.23 Table 5-4 below.

Table 5-4 Indicative guide to assessing the magnitude of an effect (SEPA WAT-SG-67 2017, Table 1)

Low importance	The part of the water environment concerned is: • a loch that is locally rare or otherwise locally important based on its type and condition. To assess this, you should consider the frequency (locally, regionally and nationally) of lochs of the same or similar type and status to the loch concerned; or • a river or stream of low importance as identified according to Table 5 based on its type and condition; or • a high biodiversity interest site designated as a *Local nature reserve* or a *Local nature conservation site*.
Medium importance	The part of the water environment concerned is: • a loch that is regionally rare or otherwise regionally important based on its type and condition. To assess this, you should consider the frequency (locally, regionally and nationally) of lochs of the same or similar type and status to the loch concerned; or • a river or stream of medium importance as identified according to Table 5 based on its type and condition; or • a high biodiversity interest site because it plays an ecologically significant role in maintaining the ecological health of a large (regional-scale) river basin; or • a high biodiversity interest site because it supports a significant proportion of a habitat or a significant population of a species on the *Scottish Biodiversity List*. • a high biodiversity interest site because it supports a significant population of a species for which there is an *ICES* emergency plan (eg European eel).
High importance	The part of the water environment concerned is: • a loch that is nationally rare or otherwise nationally important based on its type and condition. To assess this, you should consider the frequency (locally, regionally and nationally) of lochs of the same or similar type and status to the loch concerned; or • a river of high importance as identified according to Table 5 based on its type and condition; or • a high biodiversity interest site designated as such (eg *Sites of Special Scientific Interest*; *National Nature Reserves*) because of its national importance for the conservation of a species it supports; a habitat it contains; or the rarity or quality of its geomorphological characteristics; or; or; • a high biodiversity interest site because it supports a nationally important assemblage of *Oceanic bryophytes*.
Very high importance	The part of the water environment concerned is: • a high biodiversity interest site designated as such because of its international importance for the conservation of a species it supports or a habitat it contains (ie *Special Areas of Conservation*, *Special Protection Areas* or *Ramsar sites*); or • a high biodiversity interest site because it supports a significant population of a globally threatened species (ie an *IUCN Red List of Threatened Species* species such as freshwater pearl mussel); or • a high biodiversity interest site because it supports an internationally important assemblage of *Oceanic bryophytes*.

Methodology Step 4: Assessment of significance of each effect

5.5.24 The significance of effects, both positive and negative, are a combination of the importance of the factor that is affected and the magnitude of the effect on the factor. Combined, importance and magnitude dictate significance of the effect, as shown in

5.5.25

5.5.26

5.5.27 Table 5-5 below.

Table 5-5 Indicative guide to assessing the significance of an effect (SEPA WAT-SG-67 2017, Table 2)

Importance of affected factor	Magnitude of effect					
	Negligible	V Small	Small	Medium	Large	V Large
Very low / negligible	N	N	N	N	N	N
Low	N	VL	VL	L	M	M-H
Medium	N	VL	L	M	M-H	H
High	N	VL-L	M	H	H-VH	VH
Very High	N	L	M-H	H-VH	VH	VH

Key:
N = negligible significance; VL = very low significance; L = low significance; M = moderate significance; H = high significance; and VH = very high significance.

5.6 Baseline Conditions

Designated sites

5.6.1 No designated sites with relevance to aquatic ecology were recorded within 10km of the Proposed Development boundary.

Desk Study

5.6.2 Results of the desk study are summarised in Table 7.

Table 7: Summary of Desk Study.

Habitats / Species / Constraints	Source (s)	Relevant Data
Aquatic Plants	SEPA River and Loch Classifications	Loch Quoich and Loch Garry are classified as 'High' for aquatic plants. Loch Fearna is unclassified. The data was requested from SEPA but no response has yet been received.
Loch Quoich	UK Lakes Portal	Loch Quoich (Water body ID 20828) is a large freshwater lake located in Highland, Scotland. It is generally deep with low alkalinity and is situated at mid altitude. It has a surface area of 1,746 ha, with a mean depth of 31.9 m. It sits at an elevation of 203 m A.O.D.
	SEPA River and Loch Classifications	Loch Quoich is a lake (ID: 100186), in the River Ness catchment of the Scotland river basin district. It is 17.5 square kilometres in area. The water body has been designated as a heavily modified water body on account of physical alterations that cannot be addressed without a significant impact on water storage for hydroelectricity generation (Quoich Dam). The Loch is classed as Poor for Fish and Fish barrier, Good for water quality and High for

Habitats / Species / Constraints	Source (s)	Relevant Data
		aquatic plants and has an overall status of Good Ecological Potential.
Loch Fearna	UK Lakes Portal	Loch Fearna (Water body ID 20976) is a small freshwater lake located in Highland, Scotland. It is generally shallow with low alkalinity and is situated at mid altitude. It has a surface area of 10 ha, with a mean depth of 6.6 m. It sits at an elevation of 543 m A.O.D.
	SEPA River and Loch Classifications	N/A – Not classified by SEPA.
Loch Garry	UK Lakes Portal	Loch Garry (ID 21023) is a large freshwater lake located in Highland, Scotland. It is generally deep with low alkalinity and is situated at low altitude. It has a surface area of 686 ha, with a mean depth of 23.8 m. It sits at an elevation of 83 m AOD.
	SEPA River and Loch Classifications	Loch Garry is a lake (ID: 100190), in the River Ness catchment of the Scotland River basin district. It is 6.9 square kilometres in area. The water body has been designated as a heavily modified water body on account of physical alterations that cannot be addressed without a significant impact on water storage for hydroelectricity generation. SEPA data from 2022 reveals that the waterbody was classified as High for fish barriers, fish and macroinvertebrates (CPET), however, it noted only a Good macroinvertebrate (acid) and good water quality classification. The overall ecological potential of the waterbody was Good.
Watercourses	SEPA River and Loch Classifications	River Garry - Loch Poulary to Loch Quoich is a river (ID: 20256), in the River Ness catchment of the Scotland river basin district. The main stem is approximately 7.3 kilometres in length. The water body has been designated as a heavily modified water body on account of physical alterations that cannot be addressed without a significant impact on water storage for hydroelectricity generation. This section of river is classed as Poor for Fish, Fish Ecology and has an overall status of Poor Ecological Potential. River Garry - Loch Garry to Loch Poulary is a river (ID: 20255), in the River Ness catchment of the Scotland River basin district. The main stem is approximately 4.6 kilometres in length. This section of river has been classed as high for fish barriers, fish, macroinvertebrates, Good for water quality and has an overall status of Good Ecological Potential. Allt Ladaidh is a river (ID: 20298), in the River Ness catchment of the Scotland River basin district. The main stem is approximately 9.0 kilometres in length. This section of river was classed as High for fish barriers and macroinvertebrates, Good for water quality and Moderate for fish ecology. Overall, this section is classed as Moderate for Ecological Potential.

Habitats / Species / Constraints	Source (s)	Relevant Data
		Greenfield Burn is a river (ID: 20299), in the River Ness catchment of the Scotland River basin district. The main stem is approximately 7.1 kilometres in length. This section of river is classed as High for fish barrier and macroinvertebrate, Moderate fish ecology. Good water quality and is classed as Moderate for overall Ecological Potential. Allt Lon Glas Bheinn is a river (ID: 20300), in the River Ness catchment of the Scotland River basin district. The main stem is approximately 10.3 kilometres in length. This section of river is classed as High for fish barriers and macroinvertebrates, Poor fish ecology, Good water quality and has an overall Poor Ecological Potential. Allt Choire a Bhalachain is a river (ID: 20301), in the River Ness catchment of the Scotland River basin district. The main stem is approximately 9.2 kilometres in length. This section of river is classed as High for fish barrier and macroinvertebrates, Moderate fish ecology, Good water quality and an overall Moderate Ecological Potential. River Kingie is a river (ID: 20302), in the River Ness catchment of the Scotland River basin district. The main stem is approximately 23.6 kilometres in length. This section of river is classed as High for fish barrier and macroinvertebrates, Moderate fish ecology, Good water quality and has an overall Moderate Ecological status.
Obstacles to fish migration	Scotland's Environment Web	Allt Ladaidh – One impassable natural waterfall (OBJECTID:1177) located downstream of crossing point 3 along the Proposed Access Track at NH 23339 01192. Greenfield Burn – One impassable natural waterfall (OBJECTID:3685) located upstream of crossing point 8 along the Proposed Access Track at NH 19912 00386. Allt Lon Glas Bheinn – One impassable natural waterfall (OBJECTID:2425) located downstream of crossing point 9 along the Proposed Access Track at NH 17058 00413. Allt Choire a Bhalachain - 1 impassable natural waterfall (OBJECTID:3687) located downstream of crossing point 11 along the Proposed Access Track at NH 13150 00273. River Garry - Loch Poulary to Loch Quoich – 1 passable artificial barrier (OBJECTID:4260) located upstream of crossing point 12 along the Proposed Access Track at NH 10911 01016. It should be noted that this point was impassable until 2004. Gearr Garry – 1 impassable artificial barrier (OBJECTID:2672) located at the hydro power dam upstream of crossing point 13 along the Proposed Access Track at NH 07055 02289.
Invasive Non-Native Species	NBN Atlas	No invasive aquatic features were identified.
	SEPA River and Loch Classifications	Loch Quoich, Loch Fearna and the Garry catchments are unclassified by SEPA for alien species.
Arctic charr	Maitland & Adams	No population data exists other than limited angling records.

Habitats / Species / Constraints	Source (s)	Relevant Data
		1957 - 'One fish from Niall Campbell' 1995 - 'Arctic charr angled from Loch Quoich'[23]
	Amber Project[24]	Charr detected in Loch Quoich above Quoich Dam in eDNA surveys in 2018.
	Godfrey et. al, 2007 Hydroacoustic surveys of five Scottish lochs. 2: 7.	Hydroacoustic surveys were conducted in Loch Quoich during 2007, noting a dominance of fish in water 35m in depth[25]. A reduction of fish numbers was recorded in deeper loch areas with fish presence at depths greater than 40 m considered scarce (indicating an absence of benthic fish). No sign of a deleterious impact of regulated hydrology on fish densities were noted.
Atlantic salmon	Marine Scotland – National Marine Plan Interactive Map[26]	Marine Scotland historic data shows salmon presence within Loch Garry and into the efferent rivers, however, no salmon presence was noted beyond the impassable barriers on the map. There is also salmon presence in the River Kingie at the proposed Southern Access Route (SAR) crossing point. No salmon presence was recorded on the River Gearr Garry however there were no barriers recorded to impede their migration into this part of the catchment. The Gearr Garry was also stocked with eyed ova in 2023 and 2024 as part of the Upper Garry Restoration Project and subsequent monitoring work in 2024 has recorded juvenile Atlantic salmon in this part of the catchment.[27]
Brown trout	Amber Project	Brown trout detected in Gearr Garry, River Kingie, Loch Garry and River Garry Loch Quoich above Quoich Dam in eDNA surveys in 2018. Loch Fearna is fishless.
Ferox trout	Greer et al., 2009 Internet searches	Presence of ferox trout in Loch Quoich noted in Greer et al., 2009[28] and Williams, 2020. Angling forums with photographs of captured ferox trout.
European eel	Amber Project	European eel detected in Gearr Garry, River Kingie and Loch Garry in eDNA surveys in 2018. No eel detected above Quoich Dam.
Macroinvertebrates	NBN Atlas	No recent information on species presence and/or abundance was available within the Zone of Influence. Unverified and unpublished resources were made available but were used for reference only and not incorporated into the assessment.
Designated sites/features	NatureScot Sitelink	No designated sites have been taken forward for assessment.

[23] [redacted] P. S. (2018). Arctic charr in the Lochs of Scotland, An Assessment of Distribution and Status.
[24] Amber (2020) D4.2 Report of Case Studies Demonstrating the Effects of Barrier Removal, Mitigation and Installation. [Online] Available: amber.international/wp-content/uploads/2020/07/D4.2-Report-of-Case-Studies-Demonstrating-the-Effects-of-Barrier-Removal-Mitigation-and-Installation.pdf#page=8.82
[redacted] (2007). Hydroacoustic surveys of five Scottish lochs. 2: 7.
[26] Marine Scotland. (2025) National Marine Plan Interactive Map Marine Scotland - National Marine Plan Interactive
[27] Ness District Salmon Fishery Board 2024 Gear Garry Facebook Post We visited the Gearr... - Ness District Salmon Fishery Board | Facebook
[redacted] (2009) Ferox trout: A Predator worthy of Pursuit and Protection. Available [Online]: wildtrout.org/assets/files/about_trout/Greer et al 2009 ISACF 8 14_20 B.pdf

5.7 Assessment

Assessment Step 1: Likely Effects

5.7.1 Likely significant effects resulting from the controlled activity on identified factors are summarised in 8 below.

Table 5-8 Aquatic Biodiversity likely effects

Likely Effect	Area affected	Feature affected	Effect (Positive or Negative)	Description of effect
Impact on Riverine Spawning Habitat via inundation	Watercourses	Brown trout	Negative	Riverine salmonid spawning habitat would likely be affected by increased fluctuation in water levels in the lower reaches of inflowing tributaries of Loch Quoich due to the more frequent water level fluctuations within the operational range of Loch Quoich. Spawning habitats were limited in extent due to steep gradients and limited suitable substrate within the areas which would be affected. Watercourses on shallower gradients featuring sections of Optimal spawning habitat including the River Quoich, Easter Glenquoich Burn, Allt a' Choire Reidh, Allt Coire nan Eiricheallach and Caolie Water offer more opportunities for spawning with greater accessibility for brown trout. eDNA results indicated that Arctic charr were absent from inflowing tributaries therefore unlikely to use these for spawning. It is considered unlikely that the temporary inundation caused by the Proposed Development would result in Optimal spawning habitats being adversely affected. Access to potential spawning sites would be maintained and due to the short duration of these effects, siltation of substrate is unlikely. Due to the fluctuating nature of the operation of pumped storage hydro schemes, the water levels would quickly recede to present riverine conditions for spawning in a matter of hours. Brown trout are also known to be capable of littoral zone spawning in lentic habitats, therefore the still water conditions presented on riverine habitats during inundation may not necessarily be a barrier to spawning. Optimal spawning habitat would also be created by provision of engineered spawning areas within Loch Quoich.
Reduction in Egg Viability and hatch success	Loch Quoich	Arctic charr, Brown trout	Negative	Salmonid spawning in loch margins would likely be affected by greater fluctuation in the water level of Loch Quoich, within the current operational range of the existing hydro scheme which has a much slower fluctuation in level. The range of the PSH level fluctuations overlain on the historical range of the current hydro scheme is shown in Chapter 2 – Water Management.

				Spawning areas on loch margins of Loch Quoich would likely be affected by water level fluctuations as a result of pumped storage hydro generation cycles. Due to relative homogeneity of substrate in marginal/littoral areas there is a risk that fish may spawn in suitable areas (shallow gravel/pebble) during periods of artificially elevated water levels. Eggs deposited in such habitats may subsequently become aerially exposed as a result of water level reduction during abstraction, with a consequent degradation to viability and hatch success of eggs. Effects on Arctic charr shoreline spawning habitats are considered of greater significance than on Brown trout which are more likely to make use of riverine watercourses for spawning. Mitigation includes creating and then maintaining optimal spawning habitat around Loch Quoich in the form of new spawning beds below the minimum proposed reservoir water level.
Fish attraction to the intake	Loch Quoich	Arctic charr, Brown trout	Negative	The fish present do not typically display migratory pathways within waterbodies, but under the precautionary principle it is assumed that brown trout would likely be present around the proposed location of the intake structures. Arctic charr typically reside in deeper water outside of the spawning period and eDNA results indicated their distribution was limited to the western half of Loch Quoich, well away from the Proposed Development. Brown trout are known to demonstrate a rheotactic movement response to currents/flowing water[29], however, this may not be as strong a response as other migratory salmonids (e.g. Atlantic salmon or Sea trout). Attraction towards the screen during abstraction periods could increase energy expenditure and make fish more vulnerable to predation from mammalian (e.g. otter) and avian predators (e.g. divers).
Ingress and entrainment	Loch Quoich	Arctic charr, Brown trout	Negative	Ingress and entrainment of fishes within the underground waterway system presents a risk of injury, mortality and/or transfer of individuals between Loch Quoich and Loch Fearna. Fish screens would be installed on the lower control works intakes to prevent entrainment. A maximum mesh size or bar spacing of 12.5 mm would be employed at the lower control works intake in Loch Quoich. This mesh size would be used to ensure that larger maturing salmonids, of greater importance to recruitment in populations are not entrained. Detections of Arctic charr via eDNA sampling carried out in February 2025 were limited to the western half of the Loch, well away from the Proposed Development. No Arctic charr were detected within the sample closest to the Proposed Development intake screens. Sampling was carried

[29] O'Keeffe, N. & Turnpenny, A.W.H. (2005) Screening for Inlet and Outlets: a best practice guide. Science Report SC030231. Environment Agency: Bristol

				out after the period in which Arctic charr would be spawning in marginal areas. Arctic charr are likely to reside in deeper water away from the intake screens outwith the spawning season, limiting the likelihood of ingress and entrainment to only within the short spell in which they are spawning and within close proximity of the intake screens.
Impingement	Loch Quoich	Arctic charr, Brown trout	Negative	Fish present near the intake screens pose a risk of impingement against intake screens. The sustained swimming speed of an Arctic charr of 0.10 m body length is 0.411 m/s, with a short term bust (escape) swim speed in excess of this. The designed maximum velocity approaching the intake is no greater than 0.3 m/s, therefore juvenile Arctic charr would have the ability to overcome the draw of the intake velocity voluntarily preventing any injury / mortality associated with impingement on the screens. Similarly, brown trout of 0.10 m body length have a sustained swimming speed of 0.598 m/s. Larger Arctic charr and brown trout have greater sustained swimming speeds. Regular clearing of the intake screen by the pumping/generation cycling of the scheme should prevent debris build-up that may increase approach velocities across the screen outwith escapable velocities.
Reduction in food availability for fish	Loch Quoich	Arctic charr, Brown trout	Negative	Zooplankton species are less likely to be affected by fluctuating water levels as they would be subject to diurnal movement vertically within the water column, rather than the washing actions affecting the littoral zone species likely to be impacted by water level change. This is unlikely to impact plankton feeding Arctic charr morphs, however, zoobenthos, favoured by Brown trout are likely to be affected. Food sources for Arctic charr, pelagic and benthic sources would be less affected by fluctuations of water levels than other fish species (e.g. Brown trout) which feed within the (already depleted) littoral zone and are therefore more likely to be affected by fluctuations in water levels.
Fish stranding	Loch Quoich and Watercourses	Brown trout	Negative	Brown trout occupying newly inundated areas during generation may become stranded on dry land or within small puddles when the water level recedes during pumping periods. This would place individuals at greater risk of injury, mortality and/or predation. It is anticipated that most fish would track receding water levels during generation/pumping periods, as is observed in established hydro schemes (pumped storage and conventional). Arctic charr are less likely be impacted given their tendency to predominantly occupy deeper loch areas at 20 m+ depth (and not littoral zones primarily affected).
Fluctuations in Water Levels	Waterbodies and Watercourses	Loch Fearna and Loch Quoich	Negative	Loch margins are likely to be affected by the fluctuations in water level within Loch Fearna. The level of Loch Fearna is expected to fluctuate by up to 60 m (540 m AOD – 600 m AOD). This is likely to

				lead to deterioration of the aquatic ecology in drawdown areas. Macroinvertebrates and macrophytes are likely to be impacted due to greater frequency of air exposure and unsettled conditions. There are no fish present in Loch Fearna. The margins of Loch Quoich are already affected by water level fluctuation due to the existing hydro scheme and the PSH would operate within the existing footprint of this.
Fragmentation of Habitat (including access to spawning habitat).	Loch Quoich inflowing watercourses	Brown trout	Negative	The dam footprints at Loch Fearna would not affect access to fish spawning as no fish populations were detected in electrofishing surveys of the upper reaches of the Allt Fearna and Allt a' Mheil catchments. Riverine spawning brown trout have the potential to be impacted by water level fluctuations (±3.2 m in 20 hours under a worst case scenario) as a result of the pumping and generating cycles of the PSH. Given the topography of the loch basin, there may be instances where access to certain steeper burns is temporarily cut off during the spawning period due to impassable barriers to fish migration presenting as a result of the water level drawdown. A spawning habitat assessment carried out in February 2025 found that spawning habitats on steeper inflowing burns were very limited, with predominantly coarser substrates including boulder and bedrock present at these locations. It is considered more likely that Brown trout use sections of the River Quoich, Easter Glenquoich Burn, Allt a' Choire Reidh, Allt Coire nan Eiricheallach and Caolie Water for spawning which are at lower gradients and feature a higher abundance of Optimal spawning habitat. Access for trout to these watercourses which are on shallower gradient is likely to be maintained during periods of drawdown. It is worth noting that the time duration for this effect is expected to be short-lived i.e. hours / days rather than weeks at a time as when the scheme generates, the loch level would rise again, providing access to previously cut off areas. There may also be some positive impact where inundation of watercourses provides access above previously inaccessible areas, during periods when the Loch is particularly high. Detections of Arctic charr via eDNA sampling carried out of both inflowing tributaries and Loch Quoich in February 2025 were limited to Loch Quoich, indicating there is no evidence of stream spawning Arctic charr, therefore this species is unlikely to be affected.
Noise and Vibration	Loch Quoich	Arctic charr, Brown trout	Positive and Negative	Both fish species have the potential to be impacted by operational noise and vibration associated with the Proposed Development. Likely effects are expected to be non-lethal for fish but may cause temporary displacement and avoidance of the area around the inlet/outlet. Positive effects may be

				experienced in that displacement resulting from noise and vibration avoidance would mitigate potential effects associated with abstraction and generation (e.g. attraction to the inlet / impingement).
Water temperature changes from compensation flow	Allt Fearna and Allt a' Mheil	Brown trout	Positive	Compensation flow released from the Fearna dam into the Allt Fearna and Coire Dubh dam into the Allt a' Mheil would be low in temperature due to the discharge pipes being located at the bottom of the dams where temperature is lowest. There are no fish in these watercourses immediately downstream of the release points indicated by electrofishing surveys therefore there is very little risk of thermal shock. Water downstream may decrease in temperature, however, in light of projected water temperature increases from climate change this may be beneficial in buffering this effect.
Water temperature changes from water transfer	Waterbodies	Loch Fearna & Loch Quoich	Negative	Studies have been carried out to measure the baseline temperatures in Loch Quoich and the Gearr Garry, to model the increase in temperature of water as it passes through the pump turbines and underground waterway system and to assess any variance in temperatures in Loch Quoich as a result of the operation of the Proposed Development. These studies and their results are detailed in Section 4.5 of this report. The studies have established that there would be no material effect on water temperatures and the thermocline within Loch Quoich, and that there would be no material effect on water temperatures in the Gearr Garry and other downstream watercourses and waterbodies.
Water temperature changes from water transfer	Gearr Garry	Atlantic Salmon, Brown Trout	Neutral	Studies have been carried out to measure the baseline temperatures in Loch Quoich and the Gearr Garry, to model the increase in temperature of water as it passes through the pump turbines and underground waterway system and to assess any variance in temperatures in Loch Quoich as a result of the operation of the Proposed Development. These studies and their results are detailed in Section 4.5 of this report. The studies have established that there would be no material effect on water temperatures and the thermocline within Loch Quoich, and that there would be no material effect on water temperatures in the Gearr Garry and other downstream watercourses and waterbodies.
Water quality reduction	Waterbodies	Loch Fearna and Loch Quoich	Negative	Increased water level fluctuation and reduction in macrophyte growth (Loch Fearna) would have the likely effect of destabilisation within the drawdown zone and a consequent erosion of marginal substrate. This may lead to short term changes in water quality parameters within thresholds capable of causing injury and/or mortality to aquatic life (e.g. total dissolved solids and/or turbidity). Due to the impact occurring over months/seasons water quality deterioration is likely to be gradual and not in concentrations consistent with major pollution events.

Water quality reduction	Watercourses and Waterbodies	River Garry and tributaries to River and Loch Garry	Negative	The closed-system configuration between Loch Fearna and Loch Quoich being controlled through the operation of Quoich Dam limits direct hydrological connectivity to the Gearr Garry and subsequent downstream waterbodies and watercourses. The controlled nature of the system limits likelihood of significant entrainment or displacement of aquatic organisms beyond the scheme footprint. The permanent installation of new bridge structures on the River Kingie and Gearr Garry would have no predicted effects on Atlantic salmon, brown trout or European eel during the operational phase of the project.
Reduction in macrophyte cover	Waterbodies and Watercourses	Loch Fearna	Negative	The increase in the minimum operating level of Loch Fearna from 537 m AOD to 540 m AOD would likely lead to permanent submergence of macrophytes by an additional 3 m and reduce photosynthetic ability due to decreased light levels at greater depths. Further fluctuation when Loch Fearna is filling during pumping operations would increase this effect (up to 60 m above minimum operational level). Increased water level fluctuation is also likely to create unsuitable conditions for macrophyte assemblage. Increased water level fluctuation could also result in short term aerial exposure and submerged periods of any new plant assemblages. If water quality deteriorates in these areas, notably turbidity, this would further reduce light penetration. Combined this is likely to affect macrophyte cover. It should be noted that macrophyte cover is currently limited to Loch Fearna, due to existing drawdown zones from the current hydro scheme infrastructure on Loch Quoich.
Reduction in macroinvertebrate abundance	Loch Fearna Loch Quoich	Macroinvertebrates	Negative	Increased water level fluctuation is likely to affect existing macroinvertebrates. Increased water level fluctuation is likely to result in greater instances of aerial exposure and submerged periods placing macroinvertebrates outwith preferential habitat leading to injury and/or death. Macroinvertebrates which are more mobile and accustomed to water level fluctuation would be less affected. Water quality deterioration resulting from the controlled activity may further reduce macroinvertebrate abundance.

5.7.2 Catastrophic failure of the Loch Fearna dams is not considered within likely effects. Under the Reservoirs (Scotland) Act 2011 it is considered that catastrophic failure is highly unlikely given the extremely stringent building and maintenance standards set.

5.7.3 Likely effects such as light pollution associated with other infrastructure is not considered, as is stipulated under the methodology.

5.7.4 The risk of transfer of INNS with regards to the Proposed Development has been assessed and is covered within a separate chapter as part of this report.

Assessment Step 2: Magnitude of Effect

5.7.5 Assessment of magnitude of impact is summarised in Table 9, comprising both scale (and justification of scale) and duration aspects to provide magnitude of effect (final column).

Table 5-9 Assessment of Magnitude of Impact

Likely Effect	Scale	Scale Justification	Duration	Magnitude of Effect
Impact on Riverine Spawning Habitat via inundation	Very Small	Length affected would be 0.5 - 1 km (includes sections of both Optimal and Sub-Optimal spawning habitat). The highest condition of overall classification status is currently Poor (River Quoich) due to existing hydro scheme infrastructure. Other watercourses featuring spawning potential are unclassified by SEPA. The condition of affected stretches of watercourses is expected to remain poor (predicted to only be temporarily inundated). Access to potential spawning sites would be maintained and due to the short duration of these effects, siltation of substrate is unlikely. Due to the fluctuating nature of the operation of pumped storage hydro scheme, the water levels would quickly recede to present riverine conditions for spawning in a matter of hours. All of the affected sections are already affected by the operational range of the existing hydro scheme. Historical data from SSE and aerial mapping shows these areas become inundated.	>6 years	**Very Small**
Reduction in Egg Viability and hatch success in Loch Quoich	Small	Likely effects would occur over the marginal habitat of Loch Quoich (>20 km). The UK lakes portal measures this at 58 km however the affected area is likely to be much less than this as the maximum loch level is depleted by the effect of hydro infrastructure, resulting in normally a smaller surface area than on OS mapping. There are sections of this perimeter which would be unsuitable for spawning featuring predominantly peat, sand, boulder or bedrock substrates as well as existing hydro dam infrastructure. Detections of Arctic charr via eDNA sampling carried out in February 2025 were limited to the western half of the Loch only suggesting that spawning distribution may be spatially limited to certain parts of the Loch. The condition status of Loch Quoich is currently 'good ecological potential' however this does not relate to Arctic Charr. Despite the presence of the existing hydroscheme and drawdown zone, under the precautionary principle, the baseline spawning habitat condition for Arctic Charr is considered 'Good' in Loch Quoich. Adams analysed water level data and showed that typically loch levels rise over the egg incubation period each year, therefore viability of laid eggs may currently be high.	>6 years	**Small**

Likely Effect	Scale	Scale Justification	Duration	Magnitude of Effect
		Greater fluctuation of water levels during the operation of the PSH may place the viability of eggs laid at risk due to aerial exposure. Effects on Arctic charr shoreline spawning habitats are considered of greater significance than on Brown trout which are more likely to make use of watercourses for spawning. Mitigation includes creating and then maintaining optimal spawning habitat around Loch Quoich in the form of new spawning beds below the minimum proposed reservoir water level which would reduce the impact. With mitigation in place the scale is considered small.		
Fish attraction to the intake	Very Small	Likely effects would occur over a small waterbody area (7.5 - <50 ha) and small area of loch shore affected (0.5 - <1.5 km). Detections of Arctic charr via eDNA sampling carried out in February 2025 were limited to the western half of the Loch, well away from the Proposed Development. No Arctic charr were detected within the samples closest to the Proposed Development intake screens. Effect is unlikely to result in change in condition of brown trout or Arctic charr.	>6 years	**Very Small**
Ingress and entrainment	Negligible	Likely effects would occur over a small waterbody area (7.5 - <50 ha) and small area of loch shore affected (0.5 - <1.5 km). Fish screens would be installed on intakes to prevent entrainment. The approach velocity of water across the Loch Quoich intake screen during abstraction / pumping mode would be <0.3 m/s, within escapable velocities for most life stages of Arctic charr and brown trout. Detections of Arctic charr via eDNA sampling carried out in February 2025 were limited to the western half of the Loch, well away from the Proposed Development. No Arctic charr were detected within the sample closest to the Proposed Development intake screens. Effect is unlikely to result in change in condition of brown trout or Arctic charr.	>6 years	**Very Small / Not considered further**
Impingement	Negligible	Likely effects would occur over a small waterbody area (7.5 - <50 ha) and small area of loch shore affected (0.5 - < 1.5 km). The approach velocity of water across the Loch Quoich intake screen during abstraction / pumping mode would be <0.3 m/s, within escapable velocities for most life stages of Arctic charr and brown trout, reducing the likelihood of impingement further. Effect is unlikely to result in change in condition of brown trout or Arctic charr.	>6 years	**Very Small / Not considered further**
Reduction in food availability for fish	Large	Likely effects would occur over the margins of Loch Quoich (≥20km).	>6 years	**Large**

Likely Effect	Scale	Scale Justification	Duration	Magnitude of Effect
		The margins of the loch are already impacted by the existing hydroscheme drawdown and fluctuation of levels, therefore additional effects are likely to have minimal marginal impact, i.e. a slight to moderate change in condition. Food decrease would likely occur in marginal littoral areas and therefore affect Brown trout only.		
Fish stranding	Medium - Large	Likely effects would occur across all marginal areas in Loch Quoich (excluding dams), however, the occurrence of strandings is considered small.	>6 years	**Small**
Fluctuations in Water Levels – Loch Quoich	Very Large	Likely effects would occur over Loch Quoich (1746 ha / 58 km margins). Due to the size of Loch Quoich and the relatively large variation in water level, scale of impact is large, as fluctuations in water level already happen around the margins of Loch Quoich due to the existing hydro scheme. The PSH would operate within the existing hydro scheme limits and mimic existing trends in levels, however with greater fluctuation on a daily basis (see Chapter 4).	>6 years	**Large**
Fluctuations in Water Levels – Loch Fearna	Large	Likely effects would occur over Loch Fearna (10 ha / 1 km margins) Due to large variation in water level (65m), the scale of impact is very large.	>6 years	**Large**
Fragmentation of Habitat (including access to spawning habitat).	Very Small	Likely effect would only occur for short periods during the fish spawning season when the PSH is in a pumping phase and the water level draws down. This is only likely to impede access to Sub-Optimal spawning habitats which were on steeper gradients. The Optimal spawning habitats identified would remain accessible.	>6 years	**Very Small**
Noise and Vibration	Negligible	Likely effects would occur over a small waterbody area (7.5 - <50 ha) and small area of loch shore affected (0.5 < 1.5 km). Effect is unlikely to result in change in condition of Brown trout.	>6 years	**Very Small / Not considered further**
Water temperature changes from compensation flow	Negligible	Likely effects are over 0.1 - <0.5 km of the Allt Feana and Allt Mheill catchments	>6 years	**Very Small / Not considered further**
Water temperature changes from water transfer – Loch Quoich	Medium	Likely effects would occur over Loch Quoich (1746 ha) Scale is driven by the size of Loch Quoich.	>6 years	**Medium**
Water temperature changes from water transfer – Loch Fearna	Very Small	Likely effects would occur over Loch Fearna (10 ha),		**Very Small**

Likely Effect	Scale	Scale Justification	Duration	Magnitude of Effect
Water temperature changes from water transfer – Gearr Garry	Medium	Gearr Garry (Loch Quoich to Loch Poulary [7.3 km] and Loch Poulary to Loch Garry [4.6 km]).	>6 years	**Medium**
Water quality reduction	Small - Medium	Likely effects would occur over Loch Fearna (10 ha) and a small area of Loch Quoich around the intakes (~10 ha).	>6 years	**Small**
Water quality reduction	Very Small	Gearr Garry (Loch Quoich to Loch Poulary [7.3 km] and Loch Poulary to Loch Garry [4.6 km]) and tributaries to both Gearr Garry and Loch Garry (Allt Ladaidh [9 km], Greenfield Burn [7.1 km], Allt Lon Glas Bheinn [10.3 km], Allt Choire a Bhalachain [9.2 km], River Kingie [23.6 km]).	>6 years	**Very Small / Not considered further**
Reduction in macrophyte cover	Very Small	Likely effects would occur over marginal areas of Loch Fearna and effect macrophyte populations. Species recorded were of low conservation value.	>6 years	**Very Small**
Reduction in macroinvertebrate abundance (Loch Quoich)	Large	Likely effects would occur over marginal areas of Loch Quoich (58 km) and affect macroinvertebrate populations. Existing macroinvertebrate habitat on Loch Quoich is however limited and adversely affected due to the existing hydro scheme drawdown effects (annually), however, is likely to further deteriorate for species present that are sensitive to a more rapid fluctuation.	>6 years	**Large**
Reduction in macroinvertebrate abundance (Loch Fearna)	Very Small	Likely effects would occur over marginal areas of Loch Fearna (1 km) and affect macroinvertebrate populations.	>6 years	**Very Small**

5.7.6 If a likely effect has a scale of an effect as being negligible, these are not considered further in the assessment. Likely effects excluded include: ingress and entrainment, impingement, and noise and vibration.

Assessment Step 3: Importance of effect

5.7.7 Importance of effect is detailed in Table 10 below.

Table 5-10 Importance of effect

Likely Effect	Importance	Importance Justification
Impact on Riverine Spawning Habitat via inundation	Low	Locally important brown trout may be affected. No evidence of Arctic charr spawning was detected in eDNA sampling of riverine habitat.

Likely Effect	Importance	Importance Justification
Reduction in fish egg Viability and hatch success	Medium	A high biodiversity interest site because it supports a significant proportion of a habitat or a significant population of a species on the Scottish Biodiversity List, Arctic charr. Brown trout may additionally be impacted, however, these are of local (low) importance.
Fish attraction to the intake	Low	A loch that is locally rare or otherwise locally important based on its type and condition. Supports a locally important population of Brown trout. The loch is not regionally rare or important based on its type and condition and therefore not of medium importance. Arctic char are unlikely to be affected by the intake.
Reduction in food availability for fish	Low	A loch that is locally rare or otherwise locally important based on its type and condition. Supports a locally important population of Brown trout. Deep water dwelling Arctic char are unlikely to be affected by impacts on the littoral zone.
Fish stranding	Low	A loch that is locally rare or otherwise locally important based on its type and condition. Supports a locally important population of brown trout. Deep benthic dwelling Arctic char are unlikely to be affected by impacts on the littoral zone.
Fluctuations in Water Levels – Loch Quoich	Medium	A high biodiversity interest site because it supports a significant proportion of a habitat or a significant population of a species on the Scottish Biodiversity List, Arctic charr. Brown trout would additionally be impacted, however, these are of local (low) importance.
Fluctuations in Water Levels – Loch Fearna	Very High	A high biodiversity interest site because it supports a single pair of Common Scoter which are considered to be a meta-population of the West Inverness-shire Lochs SPA population.
Fragmentation of Habitat (including access to spawning habitat).	Low	A river or stream of local (low) importance. Brown trout as a species are ubiquitous and not considered a significant population of a species on the Scottish Biodiversity List.
Water temperature changes from compensation flow	Low	A river or stream of low importance based on its condition. Allt Fearna (lower reaches only) supports a locally important population of Brown trout.
Water temperature changes from water transfer – Loch Quoich	Low	A high biodiversity interest site because it supports a significant proportion of a habitat or a significant population of a species on the Scottish Biodiversity List, Arctic charr. Brown trout would additionally be impacted, however, these are of local (low) importance.
Water temperature changes from water transfer – Loch Fearna	Very High	A high biodiversity interest site because it supports a a single pair of Common Scoter, which are considered a meta-population of the West Inverness-shire Lochs SPA population.

Likely Effect	Importance	Importance Justification
Water temperature changes from water transfer – Gearr Garry	Low	A high biodiversity interest site because it supports a significant proportion of a habitat or a significant population of a species on the Scottish Biodiversity List, Arctic charr. Brown trout would additionally be impacted, however, these are of local (low) importance.
Water quality reduction	Medium	Loch Quoich is a high biodiversity interest site because it supports a significant proportion of a habitat or a significant population of a species on the Scottish Biodiversity List, Arctic charr. Brown trout would additionally be impacted, however, these are of local (low) importance. Loch Fearna does not support Arctic charr or brown trout based on field studies.
Reduction in macrophyte cover	Low	Loch Fearna is a loch that is locally rare or otherwise locally important based on its type and condition. Supports a locally important macrophyte assemblage.
Reduction in macroinvertebrate abundance	Low	Loch Fearna and Loch Quoich are locally rare or otherwise locally important based on its type and condition. No species of high nature conservation interest were recorded and low number of taxa were recorded at Loch Quoich, likely due to the effects of existing drawdown.

5.8 Assessment Step 4: Significance of effect

5.8.1 Significance of effect is summarised in Table 11. It should be noted that ingress and entrainment, impingement, noise and vibration and water temperature changes from compensation flow were scoped out of further assessment in Step 1 as likely effect was considered negligible in line with SEPA guidance.

Significance Table 5-11 Significance of Effect

Likely Effect	Positive/ Negative	Scale	Duration	Magnitude	Importance	Significance
Impact on Riverine Spawning Habitat (inundation)	Negative	Very Small	>6 years	Very Small	Low	Very Low
Reduction in Egg Viability and hatch success	Negative	Small	>6 years	Small	Medium	Low
Fish attraction to the intake	Negative	Very Small	>6 years	Very Small	Low	Very Low
Reduction in food availability for fish	Negative	Large	>6 years	Large	Low	Moderate
Fish stranding	Negative	Medium - Large	>6 years	Medium	Low	Low

Likely Effect	Positive/ Negative	Scale	Duration	Magnitude	Importance	Significance
Fluctuations in Water Levels – Loch Quoich	Negative	Very Large	>6 years	Very Large	Medium	High
Fluctuations in Water Levels – Loch Fearna	Negative	Large	>6 years	Large	Very High	High
Fragmentation of Habitat (including access to spawning habitat).	Negative	Very Small	>6 years	Very Small	Low	Very Low
Water temperature changes from water transfer – Loch Quoich	Negative	Medium	>6 years	Medium	Low	Low
Water temperature changes from water transfer – Loch Fearna	Negative	Very Small	>6 years	Very Small	Very High	Low
Water temperature changes from water transfer – Gearr Garry	Negative	Medium	>6 years	Medium	Low	Low
Water quality reduction	Negative	Small - Medium	>6 years	Small	Medium	Low
Reduction in macrophyte cover	Negative	Very Small	>6 years	Very Small	Low	Very Low
Reduction in macroinvertebrate abundance (Loch Quoich)	Negative	Large	>6 years	Large	Low	Moderate
Reduction in macroinvertebrate abundance (Loch Fearna)	Negative	Very Small	>6 years	Very Small	Low	Very Low

5.9 Conclusion

5.9.1 To conclude, a total of 16 likely effects were identified. Three of these were scoped out in Section 3.2 due to predicted negligible impacts and included ingress & entrainment, impingement, noise & vibration and water temperature changes from compensation flow.

5.9.2 Assessment of magnitude, importance and significance of 13 remaining factors concluded:

5.9.3 Negative effects (13 in total) ranged in significance from:

- **Very Low** (impact on riverine spawning habitat, fish attraction to intake, fragmentation of habitat, Reduction in macrophyte cover, reduction in macroinvertebrate abundance (Loch Fearna));
- **Low** (reduction in egg viability & hatch success, fish stranding and water quality reduction, water temperature changes from water transfer);
- **Moderate** (reduction in food availability for fish and Reduction in macroinvertebrate abundance (Loch Quoich)); and
- **High** (fluctuations in water level in Loch Quoich and Loch Fearna).

5.9.4 Mitigation would be provided in the form of high quality artificial spawning habitat areas created below the minimum Loch Quoich drawdown level. These habitats would feature optimal spawning substrates for Arctic charr and be regularly maintained to prevent siltation from fine sediment. Current spawning opportunities on loch margins is often affected by existing drawdown thus presenting an opportunity for enhancement. In addition to simply mitigating the effect of the pump storage it is highly likely that a well-conceived mitigation plan would result in an environmental net gain, compared with the current position for Arctic charr.

5.9.5 For more detailed information on proposed mitigation measures, please refer to: Adams, 2025. **Appendix K - Summary of the status and mitigation of impact on Arctic charr**.

6 Effects on Terrestrial Biodiversity

6.1 Chapter Introduction

6.1.1 This assessment addresses impacts on terrestrial biodiversity associated with the proposed controlled activities' effects on waterbodies and watercourses.

6.1.2 A full Environmental Impact Assessment (EIA) has been carried out in support of the planning application for the Proposed Development under Section 36 of The Electricity Act. This is available at this link: https://fearnastorage.co.uk/documents/ The following sections are relevant:

Terrestrial Ecology
Chapter 8 - Chapter Text
Figures
Figure 8.1.1 - Quadrat Location Plan (Volume 2)
Figure 8.1.2 - NVC Survey Plan (Volume 2)
Figure 8.1.3 - UKHab Survey Plan (Volume 2)
Figure 8.1.4 - Habitat Designation Plan (Volume 2)
Figure 8.1.5 - GWDTE Plan (Volume 2)
Figure 8.7.1 - Habitat Compensation and Biodiversity Enhancement Opportunities Plan
Appendices
Appendix 8.1a: PSH National Vegetation Classification Survey Report
Appendix 8.1b: SAR National Vegetation Classification Survey Report
Appendix 8.2a: PSH Protected Species Survey Report
Appendix 8.2.1a: PSH **CONFIDENTIAL** Badger Annex
Appendix 8.2b: PSH Protected Species Survey Report
Appendix 8.3: Otter Survey and Monitoring Report
Appendix 8.4: Invertebrate Survey Report
Appendix 8.5: Odonata Baseline Assessment Report
Appendix 8.6: Not Used
Appendix 8.7: Outline Biodiversity Enhancement and Management Plan
Appendix 8.7.1: Peatland Restoration Assessment Report
Appendix 8.7.1.1: Deer Management Assessment
Appendix 8.7.1.2: Drone Survey for Assessment of Peat Reinstatement and Restoration

6.1.3 Rather than transpose this extensive and complex assessment into the format defined in the SEPA guidance "Supporting Guidance (WAT-SG-67) - Assessing the Significance of Impacts -Social, Economic and Environmental, Version: v5.1, November 2017", a summary of the terrestrial ecology EIA is included below, together with **Table 6-1** which summarises the residual significance effects on important ecological receptors.

6.1.4 A number of the habitats covered in this assessment are not linked to the proposed controlled activities' effects on waterbodies and watercourses, but some are, due to the loss of these habitats to construction of the associated infrastructure and the reservoir inundations.

6.2 Summary of the Terrestrial Ecology EIA

6.2.1 An Ecological Impact Assessment (EcIA) has been completed which evaluates the potential ecological impacts associated with the proposed Fearna Pumped Storage Hydro (PSH) development, focusing on designated sites, habitats and protected species. The EcIA provides a comprehensive assessment of the ecological implications during both construction and operational phases, detailing predicted impacts, mitigation measures, biodiversity enhancements, and anticipated residual effects.

6.2.2 The proposed development site comprises a variety of ecologically sensitive areas, including Annex 1 habitats and Scottish Biodiversity List Priority Habitats, some of which qualify as Priority Peatland, Ancient Woodland, and Caledonian Pinewood. The project area also supports protected and notable species, including otter, pine marten, red squirrel, amphibians, reptiles, dragonflies, and other protected Scottish Biodiversity List (SBL) invertebrates. The main potential impacts identified include:

- The construction of dams, access tracks, and reservoirs would result in the permanent loss of certain habitat areas and temporary loss/modification/degradation of others.
- Peat and carbon-rich soils would be lost and disturbed, affecting soil integrity and carbon storage. Construction activities may also alter water flow and quality, potentially impacting adjacent peatland, wetland, and aquatic habitats.
- Risks to protected and notable species include habitat degradation, fragmentation of foraging and commuting habitats, disruption of rest and breeding sites, pollution incidents, and potential for vehicle collisions.

6.2.3 To address these impacts, a 30-year Biodiversity Enhancement and Management Plan (BEMP) would be produced, with specific, measurable goals for habitat restoration, enhancement, and biodiversity net gain. An outline of this BEMP is included with the EIAR chapter at **Appendix 8.7: OBEMP**. Key mitigation and biodiversity net gain strategies include:

- Woodland, peatland, and montane scrub habitats would be restored or created in the Glen Garry and Clunes Forest areas to compensate for habitat loss.
- A Peat and Soil Management Plan and water quality protocols (aligned with SEPA guidelines) would reduce the risk of contamination and protect water and soil resources.
- Measures such as timed vegetation clearance, speed restrictions, translocation of vulnerable species would be implemented to reduce disturbance to wildlife and minimise ecological impacts during construction activities.

6.2.4 An Invasive Non-Native Species (INNS) Management Plan would be implemented to prevent the spread of invasive species, including biosecurity protocols for construction activities.

6.2.5 After the application of mitigation measures, the residual effects on most ecological receptors are expected to be non-significant, with a moderate to high confidence level in the effectiveness of the mitigation strategies. Long-term habitat restoration efforts are

anticipated to promote recovery and provide biodiversity net gain, reducing long-term impacts on local populations and sensitive habitats.

Table 6-1 Summary of Residual Effects on Important Terrestrial Ecological Receptors

Phase	Potential Impact	Avoidance, Mitigation and Biodiversity Enhancement	Residual Effect	Significance of Residual Effect	Duration of Effect	Confidence in Prediction
Habitats						
Construction	Permanent Habitat Loss of Annex 1 Habitats and Priority Habitats	A full BEMP would be implemented with 30-year measurable goals for habitat restoration and enhancement, including woodland and peatland habitat creation and enhancement in the wider Glen Garry and Clunes Forest areas.	Permanent loss of specific habitat areas; however, restoration and enhancement efforts expected to compensate for biodiversity loss long-term.	Significant at local level	Long-term	High
	Temporary Habitat Loss of Annex 1 Habitats and Priority Habitats.	Restoration efforts post-construction to reinstate temporarily disturbed habitats. Restrict activities to designated zones and use existing access tracks to minimise footprint.	Temporary habitat loss during construction; habitats expected to recover post-reinstatement.	Non-significant	Medium-term	High
	Disturbance Of Peat and Carbon-Rich Soils	Implement a Peat and Soil Management Plan to ensure soil integrity and reduce carbon emissions. Store and reuse excavated peat in restoration efforts. Minimise peat disturbance by using low-ground pressure vehicles and floating access over sensitive habitats. Peatland restoration to compensate for loss of priority peatland habitat.	Potential local peat disturbance; peat storage and reuse to mitigate loss of soil integrity and carbon emissions.	Significant at local level	Long-term	High
	Reduced Stability of Peat-Based Habitat on Slopes	Align construction with natural land contours to reduce erosion risks. Monitor peat stability on slopes, especially near steep areas, to avoid peat slides. Use bunds to restore natural hydrology in peatland areas.	Minimal long-term impacts on stability. Proactive measures should prevent significant peat slides or erosion, as detailed in EIAR Appendix 12.1: Peatland Landform and Hydrological Resilience Assessment (PLHRA),	Non-significant	Medium-term	High

Phase	Potential Impact	Avoidance, Mitigation and Biodiversity Enhancement	Residual Effect	Significance of Residual Effect	Duration of Effect	Confidence in Prediction
	Risk Of Contamination from Runoff, Fuel, and Oil Spills	Follow SEPA pollution prevention guidelines to protect water quality. Create a surface water management plan to manage runoff. Store machinery and materials on hardstanding to avoid soil contamination	Reduced contamination risk due to runoff management. Minor potential for isolated contamination events, mitigated by controls.	Non-significant	Medium-term	High
	Altered Water Flow	Design drainage systems to mimic natural hydrology, minimising water flow alteration in sensitive habitats. implement buffers to protect adjacent retained wetland habitats from water flow disruptions	Minimal alteration to natural flow; buffer zones expected to reduce significant impacts on wetland habitats.	Non-significant	Medium-term	High
	Introduction of Invasive Species	Develop an INNS Management Plan targeting the removal of species like rhododendron within infestation areas. Implement a strict biosecurity protocol to prevent the spread of invasive species.	Eradication and long-term management of invasive species spread within the project vicinity. INNS management in woodland creation areas. Some risk remains but mitigated by strict protocols.	Non-significant	Medium-term	High
	Dust Generation	Use dust suppression techniques, such as water sprays, to minimise dust. Locate stockpiles away from sensitive habitat boundaries.	Temporary impact on air quality and vegetation growth near construction; expected to cease post-construction.	Non-significant	Medium-term	High
Operation	Operational Impacts	N/A	N/A	Non-significant	Long-term	High

Phase	Potential Impact	Avoidance, Mitigation and Biodiversity Enhancement	Residual Effect	Significance of Residual Effect	Duration of Effect	Confidence in Prediction
Otter						
Construction	Habitat Loss and Degradation	Woodland and riparian habitat creation to compensate for habitat loss	Potential displacement. Restoration of habitats expected to provide suitable foraging and commuting habitats post-construction.	Non-significant	Medium-term	High
	Impact on Otter Holt Sites	Pre-works check for otter holts. Monitoring of holt site at River Garry	Minor disturbance risk to otters if active holts are present. Regular monitoring minimises long-term impacts.	Non-significant	Medium-term	High
	Vehicle Traffic Risks	Enforce a 15mph speed limit and use designated access routes	Small numbers of individuals may be lost to vehicle collisions; however, the population is expected to adapt to the loss over the long-term. Speed limits reduce overall risk to otters.	Significant at local level	Medium-term	High
	Pollution Risks	Dust suppression techniques. Restricted use of dangerous chemicals. Runoff management. SEPA pollution prevention guidelines.	Low risk of pollution affecting otters. Mitigation expected to prevent serious incidents.	Non-significant	Medium-term	High
	Noise, Light, and Visual Disturbance	Schedule blasting and other high-noise activities outside peak otter activity periods SAR and access tracks would be unlit.	Likely avoidance of high-activity areas due to construction disturbances, possibly leading to minor habitat fragmentation and disrupted movement and foraging patterns.	Non-significant	Medium-term	High
	Injury Risk from Construction Hazards	Cover excavations and cap pipes overnight	Low risk of injury, mitigated by site precautions.	Non-significant	Medium-term	High
Operational	Operational Impacts	No operational external lighting in PSH to minimise disturbance. Only use task-based lighting to reduce impacts on nocturnal species	N/A	Non-significant	Long-term	High

Phase	Potential Impact	Avoidance, Mitigation and Biodiversity Enhancement	Residual Effect	Significance of Residual Effect	Duration of Effect	Confidence in Prediction
Pine Marten						
Construction	Habitat Loss and Degradation	Retain woodland where feasible. Provide compensatory woodland planting for any loss. Protect sensitive areas with fencing and restrict storage outside of designated zones.	Temporary displacement. Habitats expected to recover through compensatory planting and protections.	Non-significant	Medium-term	High
	Disruption of Dens	Pre-works checks for active pine marten dens, with work suspension near active sites as needed.	Low risk of den disturbance. Pre-checks reduce likelihood of impacts to active dens.	Non-significant	Medium-term	High
	Reduction of Prey Availability	Provide compensatory habitat areas to support prey species.	Short-term reduction in prey. Expected to recover in adjacent habitats or compensatory areas.	Non-significant	Medium-term	High
	Risk Of Injury or Death from Vehicle Movements	Enforce a 15mph speed limit and use designated access routes	Small numbers of individuals may be lost to vehicle collisions; however, the population is expected to adapt to the loss over the long-term. Speed limits reduce overall risk to pine marten.	Significant at local level	Medium-term	High
	Noise, Light, and Visual Disturbance	Limit lighting in sensitive areas and use directional lighting. Toolbox Talks on species protection	Likely avoidance of high-activity areas due to construction disturbances, possibly leading to minor habitat fragmentation and disrupted movement and foraging patterns.	Non-significant	Medium-term	High
	Injury Risk from Construction Hazards	Cover excavations and cap pipes overnight	Potential moderate impact from occasional collisions. Speed limits reduce overall risk to pine marten.	Non-significant	Medium-term	High
Operational	Operational Impacts	No operational external lighting in PSH to minimise disturbance. Emergency-only lighting to reduce impacts on nocturnal species	N/A	Non-significant	Long-term	High

Phase	Potential Impact	Avoidance, Mitigation and Biodiversity Enhancement	Residual Effect	Significance of Residual Effect	Duration of Effect	Confidence in Prediction
Red Squirrel						
Construction	Habitat Loss and Degradation	Retain woodland where feasible. Provide compensatory woodland planting for any loss. Protect sensitive areas with fencing and restrict storage outside of designated zones.	Minor local displacement. Long-term habitat availability and enhancement expected to stabilise population	Non-significant	Medium-term	High
	Disruption of Dreys	Pre-works checks for active squirrel dreys, with work suspension near active sites as needed.	Low risk of disturbing breeding sites, monitoring minimises impacts.	Non-significant	Medium-term	High
	Risk Of Injury or Death from Vehicle Movements	Enforce a 15mph speed limit and use designated access routes	Small numbers of individuals may be lost to vehicle collisions; however, the population is expected to adapt to the loss over the long-term. Speed limits reduce overall risk to red squirrel.	Significant at local level	Medium-term	High
Operational	Operational Impacts	N/A	N/A	Non-significant	Long-term	High

Phase	Potential Impact	Avoidance, Mitigation and Biodiversity Enhancement	Residual Effect	Significance of Residual Effect	Duration of Effect	Confidence in Prediction
Amphibians						
Construction	Permanent Habitat Loss	Restore and enhance wetland, peatland, and woodland areas in wider landscape to offset habitat loss.	Long-term habitat availability expected post-construction, though localised displacement would occur initially.	Non-significant	Long-term	Intermediate
	Risk of Direct Harm During Vegetation Clearance	Two-stage vegetation clearance to allow species time to vacate areas. Avoid vegetation clearance during hibernation periods	Displacement and moderate risk of harm; mitigated by timing and clearance approach.	Significant at local level	Short-term	Intermediate
	Edge Effects from Silt Runoff	Dust and silt control measures to prevent runoff contamination. Buffer zones around sensitive habitats, like wetlands, to minimise edge effects.	Temporary degradation of adjacent habitat. Quality expected to recover post-construction.	Non-significant	Medium-term	High
	Pollution Incidents	Dust suppression techniques. Restricted use of dangerous chemicals. Runoff management. SEPA pollution prevention guidelines.	Low risk of contamination affecting amphibians. Emergency protocols in place.	Non-significant	Medium-term	High
	Risk Of Injury or Death from Vehicle Movements	Enforce a 15mph speed limit and use designated access routes	Moderate risk of collision-related injury or death for amphibians crossing the SAR and hill track.	Significant at local level	Medium-term	High
	Injury Risk from Construction Hazards	Cover excavations and cap pipes overnight. Avoid creation of temporary pools	Low risk of injury, mitigated by site precautions.	Non-significant	Medium-term	High
Operational Impacts	N/A	N/A	N/A	Non-significant	Long-term	High

Phase	Potential Impact	Avoidance, Mitigation and Biodiversity Enhancement	Residual Effect	Significance of Residual Effect	Duration of Effect	Confidence in Prediction
Reptiles						
Construction	Permanent Habitat Loss	Habitat compensation efforts within the BEMP, with focus on enhancing areas that support reptile populations. Creation of hibernacula. Limit disturbance in sensitive habitats like peatlands.	Long-term habitat availability expected post-construction, though localised displacement would occur initially.	Significant at local level	Long-term	Intermediate
	Risk of Direct Harm During Vegetation Clearance	Two-stage vegetation clearance to allow species time to vacate areas. Avoid vegetation clearance during hibernation periods	Displacement and moderate risk of harm; mitigated by timing and clearance approach.	Significant at local level	Short-term	Intermediate
	Edge Effects from Silt Runoff	Dust and silt control measures to prevent runoff contamination. Buffer zones around sensitive habitats, like wetlands, to minimise edge effects.	Temporary degradation of adjacent habitat. Quality expected to recover post-construction.	Non-significant	Medium-term	High
	Pollution Incidents	Dust suppression techniques. Restricted use of dangerous chemicals. Runoff management. SEPA pollution prevention guidelines.	Low risk of contamination affecting amphibians. Emergency protocols in place.	Non-significant	Medium-term	High
	Risk of Injury or Death from Vehicle Movements	Enforce a 15mph speed limit and use designated access routes	Moderate risk of collision-related injury or death for reptiles crossing SAR and hill track.	Significant at local level	Medium-term	High
	Injury Risk from Construction Hazards	Cover excavations and cap pipes overnight	Low risk of injury, mitigated by site precautions.	Non-significant	Medium-term	High
Operational	N/A	N/A	N/A			

Phase	Potential Impact	Avoidance, Mitigation and Biodiversity Enhancement	Residual Effect	Significance of Residual Effect	Duration of Effect	Confidence in Prediction
Invertebrates						
Construction	Permanent Habitat Loss	Enhance blanket bog, wet grassland, and woodland edges within the compensatory habitat areas to support invertebrate populations	Minimal long-term impacts due to compensatory habitat. Temporary population reductions possible.	Non-significant	Long-term	Intermediate
	Risk of Direct Harm During Vegetation Clearance	Phased habitat clearance to minimize harm	Risk of harm to individuals; potential moderate impact.	Significant at local level	Short-term	Intermediate
	Degradation of Retained Invertebrate Habitat	Dust suppression and silt runoff controls to protect retained habitats. Buffer zones around sensitive habitats to limit edge effects	Temporary habitat quality reduction near construction areas. Full recovery expected post-construction.	Non-significant	Medium-term	High
	Risk of Vehicular Collision	Avoid additional lighting on tracks to prevent attraction of nocturnal invertebrates.	Negligible risk; low impact expected on invertebrate population.	Non-significant	Medium-term	High
Operational Impacts	N/A	N/A	N/A	Non-significant	Long-term	High

Phase	Potential Impact	Avoidance, Mitigation and Biodiversity Enhancement	Residual Effect	Significance of Residual Effect	Duration of Effect	Confidence in Prediction
Odonates						
Construction	Permanent Habitat Loss (Northern Emerald and White-Faced Darter)	Targeted habitat restoration to create suitable breeding habitats.	Minor local habitat loss compensated by restored habitats nearby.	Non-significant	Long-term	Intermediate
	Permanent Habitat Loss (Azure Hawker)	Translocation of azure hawker larvae to suitable nearby habitat before inundation. Creation of replacement wetland areas to support azure hawker	Potential short-term local population decline. Success of habitat restoration and mitigation may maintain local population, but it is uncertain.	Significant at regional level	Long-term	Intermediate
	Risk of Direct Harm During Vegetation Clearance	Timed clearance to avoid critical life stages, such as larvae. Translocate larvae/nymphs to suitable habitats prior to clearing activities	Potential short-term local population decline. Success of novel mitigation including careful translocation and timing is uncertain.	Significant at regional level	Short-term	Intermediate
	Edge Effects on Surrounding Habitats	Dust and water management to protect nearby bog pools. Buffer zones around retained bog pools to minimize impact on sensitive odonate habitats.	Temporary degradation of adjacent habitat. Quality expected to recover post-construction.	Non-significant	Long-term	Intermediate
	Pollution Incidents	Pollution prevention protocols with SEPA guidelines. Emergency response measures for pollution events to protect odonate habitats.	Low risk of contamination affecting amphibians. Emergency protocols in place.	Non-significant	Long-term	Intermediate
	Risk of Vehicular Collision	N/A	Negligible risk. Low impact expected on invertebrate population.	Non-significant	Medium-term	High
Operational Impacts	N/A	N/A	N/A	Non-significant	Long-term	High

7 Effects on Biodiversity - Ornithology

7.1 Chapter Introduction

7.1.1 This assessment addresses impacts on ornithological biodiversity associated with the proposed controlled activities' effects on waterbodies and watercourses.

7.1.2 A full Environmental Impact Assessment (EIA) has been carried out in support of the planning application for the Proposed Development under Section 36 of The Electricity Act. This is available at this link: https://fearnastorage.co.uk/documents/. The following sections are relevant:

Ornithology
Chapter 10 - Chapter Text
Figures
Figure 10.1.2 - **CONFIDENTIAL** -Protected Species Near Development
Figure 10.2.2 - SPA and SSSI Near Development
Appendices
Appendix 10.1 - Ornithology **CONFIDENTIAL** Annex
Appendix 10.2 - Field Survey Methodology
Appendix 10.1.1 - **CONFIDENTIAL** 2022 Breeding Bird Survey Ornithology Report
Appendix 10.1.2 - **CONFIDENTIAL** 2023 Breeding Bird Survey Ornithology Report
Appendix 10.1.3 – **CONFIDENTIAL** 2023-24 Winter Bird Survey Ornithology Report
Appendix 10.1.4 – **CONFIDENTIAL** 2024 Breeding Bird Survey Ornithology Report

7.1.3 Rather than transpose this extensive and complex assessment into the format defined in the SEPA guidance "Supporting Guidance (WAT-SG-67) - Assessing the Significance of Impacts -Social, Economic and Environmental, Version: v5.1, November 2017", a summary and conclusions of the ornithology chapter of the EIA report are included below.

7.1.4 Three protected species, Common Scoter (Melanitta nigra), Black-throated Diver (Gavia Arctica) and Red-throated Diver (Gavia stellata) would be affected by the proposed controlled activities' effects on waterbodies and watercourses. Only details of these are included in this chapter.

7.2 Relevant Summary and Conclusions of the Ornithology EIA

7.2.1 The potential effects during construction and operation of the Proposed Development on designated sites (selected for avian ecology features) have been assessed. A detailed assessment of effects on West Inverness-shire Lochs Special Protected Area (SPA), which is functionally linked to the Site, is provided in a separate shadow Habitats Regulations Appraisal (sHRA) report.

7.2.2 The ornithology EIA considers the potential effects of the Proposed Development / proposed controlled activities on relevant wild bird populations and reaches conclusions on the likely significant effects on ornithology.

7.2.3 A desk study was accompanied by two breeding season surveys and two winter surveys undertaken between April 2022 and July 2024 to establish baseline bird populations in

the area. Two ornithologically-designated sites are present approximately 5 km from the Proposed Development (West Inverness-shire Lochs Special Protection Area (SPA) and West Inverness-shire Lochs Site of Special Scientific Interest (SSSI), both designated for their breeding Black-throated Diver and Common Scoter populations. Of the 72 species recorded during the survey period, six species are considered to have the potential to be affected by the proposed controlled activities and have been assessed in Chapter 10 of the EIA report (Common Sandpiper, Common Scoter, Dipper, Goldeneye, Ptarmigan and Ringed Plover), and three further species not affected by the controlled activities but which are afforded additional legal protection (Greenshank, Red-throated Diver and Wood Sandpiper) have been assessed in the EIA report, Appendix 10.1 - Ornithology - Confidential Annex.

7.2.4 There were three potential impacts on the bird life of the area identified during the construction phase of the Proposed Development (habitat loss, disturbance and displacement), with disturbance and displacement also being assessed as potential impacts during the operational phase.

7.2.5 The assessment determined that five of the nine species considered would be subjected to permanent habitat loss and temporary displacement and disturbance throughout the construction period. However, they would only suffer negligible or low impacts from both the construction phase and the operational phase of the Proposed Development. The effects of the Proposed Development on these species are considered to be not significant.

7.2.6 Due to the presence of one pair on Loch Fearna, Common Scoter have been assessed as likely to suffer major habitat loss and major displacement impacts resulting in significant effects to the species on the Site during the construction phase of the proposed controlled activities. However, once recommended habitat enhancement measures have been implemented within the wider area to benefit the local breeding population, it is concluded that an increase in Common Scoter breeding numbers would result in a significant positive long-term effect.

7.2.7 Once standard mitigation measures (provision of an Ecological Clerk of Works (ECoW), preconstruction monitoring of nesting birds, creating no-go zones around any sensitive nesting areas, etc.) are implemented, there will be no residual effect from the construction or operational activity of the Proposed Development on any ornithological receptors within the area.

7.2.8

7.2.9

7.2.10

7.2.11 **Table 7-1** and **Table 7-2** below summarises the residual effects of the Proposed Development on the species considered to be impacted by the fluctuating water levels.

Table 7-1 Summary of Residual Effects on non-Schedule 1 Birds

Phase of Project	Important Ecological Feature (IEF)	Importance of IEF	Sensitivity of IEF	Nature of Impact	Duration of Impact	Magnitude of Impact	Significance of Effect
Construction	Common Scoter	National	High	Habitat Loss	Permanent	Major	Significant > Not Significant
				Noise & Visual Disturbance	Temporary	Low	Not Significant
				Displacement	Temporary	Major	Significant > Not Significant
	Goldeneye	National	Low	Habitat Loss	Permanent	Low	Not Significant
				Noise & Visual Disturbance	Temporary	Low	
				Displacement	Temporary	Low	
	Ptarmigan	National	Negligible	Habitat Loss	Permanent	N/A	Not Significant
				Noise & Visual Disturbance	Temporary	Negligible	
				Displacement	Temporary	Moderate	
	Ringed Plover	National	Low	Habitat Loss	Permanent	Moderate	Not Significant
				Noise & Visual Disturbance	Temporary	Low	
				Displacement	Temporary	Moderate	
	Common Sandpiper	Regional	Negligible	Habitat Loss	Permanent	Negligible	Not Significant
				Noise & Visual Disturbance	Temporary	Low	
				Displacement	Temporary	Negligible	
	Dipper	Regional	Negligible	Habitat Loss	Permanent	Negligible	Not Significant
				Noise & Visual Disturbance	Temporary	Low	
				Displacement	Temporary	Negligible	
Operational							
	Common Scoter	National	Negligible	Noise & Visual Disturbance	Temporary	N/A	Not Significant > Positive Significant
				Displacement	Temporary		

Phase of Project	Important Ecological Feature (IEF)	Importance of IEF	Sensitivity of IEF	Nature of Impact	Duration of Impact	Magnitude of Impact	Significance of Effect
	Goldeneye	National	Negligible	Noise & Visual Disturbance	Temporary	Low	Not Significant
				Displacement	Temporary		
	Ptarmigan	National	Negligible	Noise & Visual Disturbance	Temporary	Negligible	Not Significant
				Displacement	Temporary		
	Ringed Plover	National	Negligible	Noise & Visual Disturbance	Temporary	Negligible	Not Significant
				Displacement	Temporary		
	Common Sandpiper	Regional	Negligible	Noise & Visual Disturbance	Temporary	Low	Not Significant
				Displacement	Temporary		
	Dipper	Regional	Negligible	Noise & Visual Disturbance	Temporary	Low	Not Significant
				Displacement	Temporary		
	Snipe	Regional	Negligible	Noise & Visual Disturbance	Temporary	Negligible	Not Significant
				Displacement	Temporary		

Table 7-2 Summary of Residual Effects on Schedule 1 Birds

Phase of Project	Important Ecological Feature (IEF)	Importance of IEF	Sensitivity of IEF	Nature of Impact	Duration of Impact	Magnitude of Impact	Significance of Effect
Construction	Red-throated Diver	International	Low	Habitat Loss	Permanent	Moderate > Low	Not Significant
				Noise & Visual Disturbance	Temporary		
				Displacement			
	Wood Sandpiper	International	Low	Habitat Loss	Permanent	N/A	
				Noise & Visual Disturbance	Temporary	Low	
				Displacement	Temporary	Low	
	Greenshank	National	Low	Habitat Loss	Permanent	N/A	
				Noise & Visual Disturbance	Temporary	Low	
				Displacement	Temporary	Low	

Phase of Project	Important Ecological Feature (IEF)	Importance of IEF	Sensitivity of IEF	Nature of Impact	Duration of Impact	Magnitude of Impact	Significance of Effect
Operational	Red-throated Diver	International	Low	Habitat Loss	N/A	N/A	Not Significant
				Noise & Visual Disturbance	Temporary	Low	
				Displacement	Temporary	Low	
	Wood Sandpiper	International	Negligible	Habitat Loss	N/A	N/A	
				Noise & Visual Disturbance	Temporary	Negligible	
				Displacement	Temporary	Negligible	
	Greenshank	National	Negligible	Habitat Loss	N/A	N/A	
				Noise & Visual Disturbance	Temporary	Negligible	
				Displacement	Temporary	Negligible	
Cumulative	Red-throated Diver	International	Moderate	Habitat Loss	N/A	N/A	Not Significant
				Disturbance / Displacement	Permanent	Major > Low/Moderate*	Significant > Not Significant*
				Collision Risk	Permanent	Major > Low/Moderate*	
	Wood Sandpiper	International	N/A	Habitat Loss	N/A	N/A	Not Significant
				Disturbance / Displacement	Permanent	N/A	
				Collision Risk	Permanent	N/A	

Phase of Project	Important Ecological Feature (IEF)	Importance of IEF	Sensitivity of IEF	Nature of Impact	Duration of Impact	Magnitude of Impact	Significance of Effect
	Greenshank	National	N/A	Habitat Loss	N/A	N/A	
				Disturbance / Displacement	Permanent	N/A	
				Collision Risk	Permanent	N/A	

* = Depending on the Beinn Bheag Wind Farm assessment resulting in collision risk to the local Red-throated Diver population expected to be extremely low.

8 Effects on Economy

8.1 Chapter Introduction

8.1.1 The economic effect of the proposed Fearna Pumped Storage Hydro scheme (the Proposed Development) has been assessed in accordance with the SEPA Guidance Note WAT-SG-67.

8.1.2 The assessment set out below has determined that the significance of the effect on the economy as a consequence of the Proposed Development is **Positive High to Very High**.

8.1.3 As part of the EIAR a separate report on the socioeconomic impact of the Proposed Development was drafted. This document contains significant detail on the wider benefits of the Proposed Development and therefore is included in **Appendix L** of this report.

8.2 Economic Effect Summary

Employment

8.2.1 The Proposed Development would employ a large number of people throughout the five-to-seven-year construction period. This employment is estimated to average approximately 500 people on site during the construction period.

8.2.2 Once operational, the Proposed Development will directly require 29 full time skilled positions. Including multiplier effects, it is estimated that the Proposed Development will create 48 new full-time jobs, injecting £2.5 million per annum into the local economy. More details of this can be found in **Appendix L** of this report which contains the Socioeconomic chapter of the EIAR.

The effect of importing electricity

8.2.3 Renewable energy generation requires to be curtailed at times of excess power production. Curtailment has a significant cost which is largely passed on to electricity consumers. Analysis undertaken by LCP estimates that wind curtailment cost GB consumers £299m in 2020 and £507m in 2021.

8.2.4 LDES projects can make use of the excess renewable electricity which in turn would substantially reduce curtailment payments, saving the UK consumer money.

8.2.5 Wind congestion costs across the Scotland-England boundary are only set to grow in the coming years and without the implementation of appropriate Long Duration Electricity Storage (LDES) projects these costs could surpass £3.5 billion by 2030.

The effect of exporting electricity

8.2.6 Currently, unabated natural gas generation is the only realistic option to support the electricity network at times of renewable energy shortfall. LDES and specifically Pumped Storage Hydro can release large quantities of electricity to balance this renewable deficit. Without LDES the only way to balance the electricity network will be to continue to use large quantities of gas which is highly costly and inconsistent with

Net-Zero. Alternatives such as gas generation with carbon capture or hydrogen storage are both far from being commercially viable.

Employee Spend

8.2.7 During construction, a proportion of the workforce will arrive from out-with Scotland and as a consequence they will spend money in the Scottish Economy on food, transport and accommodation.

8.2.8 During operation, full-time employees will likely settle in the local area and this will increase the permanent population which will introduce spending in local shops and businesses.

8.3 Determining the Scale of Economic Effect

Gross Value Added (GVA)

8.3.1 The direct economic effect (GVA in £/year) of the Proposed Development has been estimated using the information in **Table 8-1**, Appendix B of SEPA's Supporting Guidance (WAT-SG-67). For Electricity Developments this is £47k per annual GWh generated.

Table 8-1 WAT-SG-67 Table 8 with the Proposed Development Business Sector highlighted in the red box

Business sector	Units	Approximate annual GVA per unit (£/year)
Aquaculture	Number of employees at site	£63,000
Agriculture	Number of employees at site	£25,000
Electricity generation	Giga Watt hours power generated/year at site	£47,000
Manufacture of beverages	Number of employees at site	£204,000
Manufacture of chemicals and chemical products	Number of employees at site	£95,000
Manufacture of food products	Number of employees at site	£46,000
Manufacture of paper and paper products	Number of employees at site	£52,000
Mining and quarrying	Number of employees at site	£64,000
Notes: GVA = Gross Value Added		

8.3.2 Fearna is forecast to generate 4,500,000 MWh/year or 4,500 GWh/year and therefore the annual GVA would be £212M.

8.3.3 Referring to Table 9, a multiplier of 1.9 has been applied to the GVA to account for indirect and induced economic effects.

Table 8-2 WAT-SG-67 Table 9 Multiplier for the Proposed Development shown in the red box

Business sector	GVA multiplier
Aquaculture	2.4
Agriculture	1.7
Beverage manufacture	1.8
Chemicals manufacturing (listed as 'other chemicals)	1.5
Electricity generation	1.9
Food manufacturing	1.8
Mining and quarrying (average of coal and lignite and other mining and quarrying)	1.8
Paper and paper products manufacture	1.9
The Scottish Government has produced estimates of the *Multipliers* associated with all industrial sectors. This Table reproduces only a sub-set of multipliers	

8.3.4 This means that the adjusted GVA for the Proposed Development is £402M.

Scale of Economic Impact

8.3.5 Referring to Table 10 of the SEPA guidance the scale of economic impact has been assessed.

Table 8-3 WAT-SG-67 Table 10 with the Proposed Development's Scale of economic impact highlighted in red box

	Scale of economic impact				
	Very Small	Small	Medium	Large	Very Large
% of Scottish GVA	≤ 0.002%	0.002 – 0.01%	0.01 - 0.04%	0.04 – 0.2%	> 0.2%
GVA based on the Scottish economy's GVA in 2015/16 (£/year) (rounded)	≤ £3m	£3 - £100m	£100-£500m	£500-£3,000m	>£3,000m

8.3.6 The Proposed Development is classed as having a medium scale of economic impact based on the Scottish economy's GVA in 2015/16 (£/year) (rounded).

Assessing Magnitude of Economic Effect

8.3.7 The magnitude of the effect has been assessed based on WAT-SG-67 Table 1, shown below. The duration of the Proposed Development's effect will be considerably longer than 6 years. PSH has a typical operational life of 100 years or more. Furthermore, considerable expenditure on the Proposed Development has started and there are a

number of years before operation will commence. Therefore, it is considered that the magnitude of the effect is medium tending towards **Large**.

Table 8-4 WAT-SG-67 Table 1 with the Proposed Development shown in red box

	Scale of effect				
Duration of effect	V Small	Small	Medium	Large	V Large
Only lasts up to around 1 year	VS	VS	VS	S	M
Only lasts up to around years 6 years	VS	VS	S	M	L
Lasts significantly more than 6 years	VS	S	M	L	VL
Starts up to around 2 to 3 years earlier*	VS	S	M	L	VL
Starts up to 3 to 12 years earlier*	VL	S-M	M-L	L	VL
Starts more than 12 years earlier*	S	M	L	L-VL	VL

Notes:
You should use these rows in the table when you are assessing a benefit that is already expected to be delivered through the implementation of the river basin management plan (RBMP) but which is expected to be realised sooner as a result of the proposal (ie the proposal will enable the early achievement of an RBMP improvement objective).
If you have assessed the scale of an effect as being negligible, you should not consider that effect further in your assessments.

Assessing the Significance of the Economic Effect

8.3.8 Referring to Table 2 of the SEPA guidance WAT-SG-67, the importance of the Proposed Development's economic benefit has been assessed. The Importance of Economic benefit has been assessed as Very High due to the current economic climate and the cost-of-living crisis.

Table 8-5 WAT-SG-67 Table 2 with the Proposed Development shown in the red box

Importance of affected factor	Magnitude of effect					
	Negligible	V Small	Small	Medium	Large	V Large
Very low / negligible	N	N	N	N	N	N
Low	N	VL	VL	L	M	M-H
Medium	N	VL	L	M	M-H	H
High	N	VL-L	M	H	H-VH	VH
Very High	N	L	M-H	H-VH	VH	VH

Key:
N = negligible significance; VL = very low significance; L = low significance; M = moderate significance; H = high significance; and VH = very high significance.

8.3.9 Therefore, in conclusion the economic effect of the Proposed Development is a **Positive of High to Very High Significance**.

9 Effects on Health and Safety

9.1 Chapter Introduction

9.1.1 This chapter assess the likely effects of the Proposed Development on the population in terms of human health and human safety under the following categories:

- the risk of ill-health or disease;
- the risk of injury; or
- human well-being more generally.

9.2 Study Area

9.2.1 The Study Area comprises the area including and surrounding the Proposed Development, together with the waterbodies and watercourses downstream from the Proposed Development.

9.3 Methodology

9.3.1 This assessment has been carried out in accordance with the SEPA guidance "Supporting Guidance (WAT-SG-67) - Assessing the Significance of Impacts -Social, Economic and Environmental, Version: v5.1, November 2017".

9.3.2 The assessment has involved the following key tasks:

- Consultation with organisations and landowners concerned with recreational interests in the area;
- Site survey and recording;
- Reference to relevant Local Development Plans and other literature to obtain baseline information; and
- Evaluation of impacts based on the following steps:
    - Step 1: Identifying the positive and negative economic, social and environmental effects likely to result from the proposal;
    - Step 2: Assessing the magnitude of each identified effect;
    - Step 3: Assessing the importance of each affected economic, social and environmental factor;
    - Step 4: Taking account of the results of steps 2 and 3, assessing the significance of each identified effect; and
    - Step 5: Weighing up all the significant positive and negative effects.

Magnitude of Effect

9.3.3 The magnitude of an effect reflects its scale and duration. An effect of a particular scale will be of greater magnitude if it is long-lasting than if it is only short-term. Similarly, a beneficial effect that will be produced in due course by other means will be of greater magnitude than it would otherwise be if it happens earlier as a result of the proposed activity.

9.3.4 Before you can assess the magnitude of an effect, you need to decide on its scale. To do so, you need to consider both the quantity/extent and degree of the effect. For example,

all else being equal, the effect on river biodiversity of a proposal damaging 1 kilometre of a river is smaller in terms of its extent than that of a proposal damaging 2 kilometres; and the degree of an effect that causes deterioration from good to bad is greater than that of an effect that causes deterioration from good to moderate.

9.3.5 The scale of an effect on human health or human safety depends on:

- the degree to which risks to health and safety are altered; and
- the number of people likely to be affected.

9.3.6 Guidance on assessing the scale of a range of effects is provided in **Table 9-1 Indicative guide to assessing the scale of an effect on human health or human safety (**WAT-SG-67 Table 12). Once you have assessed the scale of the effect, you can use **Table 9-2 - Indicative guide to assessing the magnitude of an effect**, to judge the magnitude of the effect.

Table 9-1 Indicative guide to assessing the scale of an effect on human health or human safety (WAT-SG-67 Table 12)

Increase or decrease in risk, or benefit, to health and well-being	**Number of people likely to be affected**					
	< 10	10 to < 100	100 to < 1,000	1,000 to < 10,000	> 10,000	*General population; or*
			10 to < 100	100 to < 1,000	> 1,000	*Disadvantaged groups*
Very small *(perhaps imperceptible)*	N	VS	VS - S	S	S - M	
Small	VS	VS - S	S	S - M	M	
Modest	S	S - M	M	M	M - L	
Large	S - M	M	M - L	L	L - VL	
Very large *(eg a risk to health completely, or nearly completely, eliminated)*	M	M - L	L	L - VL	VL	
Key: N = negligible; VS = very small; S = small; M = medium; L = large; and VL = very large						

Table 9-2 Indicative guide to assessing the magnitude of an effect (WAT-SG-67 Table 1)

	Scale of effect				
Duration of effect	**V Small**	**Small**	**Medium**	**Large**	**V Large**
Only lasts up to around 1 year	VS	VS	VS	S	M
Only lasts up to around years 6 years	VS	VS	S	M	L
Lasts significantly more than 6 years	VS	S	M	L	VL
Starts up to around 2 to 3 years earlier*	VS	S	M	L	VL
Starts up to 3 to 12 years earlier*	VL	S-M	M-L	L	VL
Starts more than 12 years earlier*	S	M	L	L-VL	VL

Notes:

You should use these rows in the table when you are assessing a benefit that is already expected to be delivered through the implementation of the river basin management plan (RBMP) but which is expected to be realised sooner as a result of the proposal (ie the proposal will enable the early achievement of an RBMP improvement objective).

If you have assessed the scale of an effect as being negligible, you should not consider that effect further in your assessments.

Importance of Affected Factor

9.3.7 The importance of a factor refers to its relative social, economic or environmental value to society. An effect on a very important factor (e.g. one of national importance) will be of much greater significance than the same magnitude of effect on a factor of limited importance (e.g. one of only local value).

9.3.8 The importance of an effect on human health and safety depends on the seriousness of the potential effect were it to occur and the degree of control people have over their exposure to a risk. You can use the guidance in **Table 9-3 - indicative guide to assessing the importance of an effect on health and safety** to help judge the importance of an effect on human health or safety.

Table 9-3 - indicative guide to assessing the importance of an effect on health and safety (WAT-SG-67 Table 11)

Low importance	• The effect would be to produce or remove a health or safety issue that would not be (or is) not very serious; people are unlikely to notice the change; and people are easily able to control their exposure to the risk to their health or safety.
Medium importance	• The effect would be to produce or remove a health or safety issue that would not be (or is) not life-threatening, not particularly debilitating and not long-lasting; effective treatments/alternatives are readily available and full recovery would be likely in a few days; and with care, people are able to avoid exposure to the risk to their health or safety.
High importance	• The effect would change the status of a Bathing Water; or • The effect would be to produce or remove a health or safety issue of significant concern and that would be (or is) debilitating at least for a short period; effective treatments/alternatives exist but recovery may take several weeks; people are unlikely to be able to completely avoid exposure to the risk to their health or safety but may have some control over exposure; and the people affected will tend to include those from vulnerable or disadvantaged groups.
Very high importance	• The effect would be to produce or remove a health or safety issue that would be (or is) very serious, life-threatening or very debilitating; completely effective treatments/alternatives may not available and recovery is likely to require a lengthy period of time; people are not able to avoid their exposure to the risk to their health or safety; and the effect is likely to be particularly concentrated on vulnerable or disadvantaged groups.
Notes: To use this guide, you need to decide if a proposal would remove or create effects falling within a particular importance category.	

Significance of Effect

9.3.9 The significance of an effect (whether positive or negative) is a combination of the importance of the factor that is affected and the magnitude of the effect on the factor.

9.3.10 Once you have worked out the magnitude of an effect and the importance of the affected factor, you can use **Table 9-4** below to help judge the significance of the effect.

Table 9-4 Indicative guide to assessing the significance of an effect (WAT-SG-67 Table 2)

Importance of affected factor	Magnitude of effect					
	Negligible	V Small	Small	Medium	Large	V Large
Very low / negligible	N	N	N	N	N	N
Low	N	VL	VL	L	M	M-H
Medium	N	VL	L	M	M-H	H
High	N	VL-L	M	H	H-VH	VH
Very High	N	L	M-H	H-VH	VH	VH
Key: N = negligible significance; VL = very low significance; L = low significance; M = moderate significance; H = high significance; and VH = very high significance.						

9.3.11 The assessment considers the potential effects of the Controlled Activities on human health and safety during both the construction phase and the longer-term operation.

9.4 Potential Significant Effects

9.4.1 This section considers the potential effect of the Controlled Activities on human health and human safety under the following categories:

- the risk of ill-health or disease;
- the risk of injury; or
- human well-being more generally.

Ill Health or Disease

9.4.2 The operation of the Controlled Activities would not give rise to any emissions which could cause ill health or disease.

9.4.3 There are no public water supplies abstracted from within the area of the controlled activities.

9.4.4 All of Scotland's groundwater bodies have been designated as Drinking Water Protected Areas under the Water Environment (Drinking Water Protected Area) (Scotland) Order 2013 and require protection for their current use or future potential as drinking water resources.

9.4.5 The current status of groundwater bodies in Scotland has been classified by SEPA in accordance with the requirements of the Water Framework Directive (WFD). SEPA have identified that the area of the controlled activities is underlain by the Northern Highlands groundwater body (SEPA ID: 150701) which was classified in 2022 (the last reporting cycle) with an Overall Status of Good with no pressures identified.

9.4.6 A private water supply risk assessment has identified a number of private water supplies that could potentially be affected by the controlled activities, together with the processes that would be followed to manage any risks to these.

9.4.7 Fewer than 1,000 people would be affected with a Small increase in risk, giving rise to a Small scale and a Small magnitude based on the long-term operation of the controlled activities. The importance has been assessed as Medium based on the possible impact of foreseeable health risks, giving rise to a Low significance.

9.4.8 Hydrocarbon pollution from turbine or transformer lubricants and vehicles could pose a risk of pollution of waterbodies and watercourses. The risk of this hazard would be controlled by the management processes outlined in **Appendix B - Outline Construction Environmental Management Document** (during construction) and similar operational management processes thereafter.

9.4.9 Fewer than 1,000 people would be affected with a Small increase in risk, giving rise to a Small scale and a Small magnitude based on the long-term operation of the controlled activities. The importance has been assessed as Medium based on the possible impact of foreseeable health risks, giving rise to a Low significance.

The Risk of Injury

9.4.10 There is a risk of injury to recreational users of the area from interaction with the construction process. Mitigation for this is addressed in the Draft Outdoor Access Management Plan (EIAR Appendix 14.1[30]).

9.4.11 Fewer than 1,000 people would be affected with a Small increase in risk (after mitigation), giving rise to a Small scale and a Small magnitude based on the construction period lasting up to around 6 years. The importance has been assessed as Very High based on the possible impact of foreseeable health risks, giving rise to a Moderate – High significance.

9.4.12 There is a risk of injury to recreational users of the area from water hazards caused by the operation of the reservoirs. Mitigation for this is also addressed in the Draft Access Management Plan (EIAR Appendix 15.1).

9.4.13 Fewer than 100 people would be affected with a Small increase in risk, giving rise to a Very Small scale and a Very Small magnitude based on the long-term operation of the controlled activities. The importance has been assessed as Very High based on the possible impact of foreseeable health risks, giving rise to a Low significance.

9.4.14 There is a risk of injury due to partial of complete failure of any of the three dams, Shuas, Shios and Leamhain. This risk would be managed through the application of the Reservoirs (Scotland) Act 2011.

9.4.15 Fewer than 1000 people would be affected with a Very Small increase in risk, giving rise to a Very Small - Small scale and a Very Small - Small magnitude based on the long-term operation of the controlled activities. The importance has been assessed as Very High based on the possible impact of foreseeable health risks, giving rise to a Low – Moderate significance.

9.4.16 Outside of the site there would be an increased risk of injury in a road traffic accident caused by the additional traffic generated by the construction of the scheme. Mitigations have been proposed to reduce this as far as possible, which are outlined in the Transport chapter of the S36 planning application EIA Report.

9.4.17 Fewer than 10,000 people would be affected with a Small increase in risk, giving rise to a Small scale and a Very Small - Small magnitude based on the long-term operation of the controlled activities. The importance has been assessed as Very High based on the possible impact of foreseeable health risks, giving rise to a Low – Moderate significance.

Human Well Being

9.4.18 The primary potential effect on human well-being would arise from any disturbance to recreational access to the area around the Proposed Development. Mitigation for this is detailed in the Draft Outdoor Access Management Plan (EIAR Appendix 14.1). In addition, the Draft Construction Environmental Management Document outlines the management processes that would be in place to manage noise, dust and any other nuisances.

[30] https://fearnastorage.co.uk/documents/

9.4.19 Fewer than 1,000 people would be affected with a Very Small increase in risk, giving rise to a Small - Medium scale and a Very Small magnitude based on the construction period lasting up to around 6 years. The importance has been assessed as Medium based on the possible impact of foreseeable health risks, giving rise to a Low significance.

9.5 Summary of Effects

9.5.1 Potential effects after mitigation and associated effect significance of the construction and operation of the Proposed Development following the implementation of mitigation measures are summarised in Table 9-5.

Table 9-5 Summary of effects on human health and human safety

Effect	Type of Effect	Magnitude of Effect	Importance of Effect	Significance of Effect
Ill Health or Disease				
Private water supplies	Negative	Small	Medium	Low
Hydrocarbon pollution	Negative	Small	Medium	Low
Risk of Injury				
Public / Construction interface	Negative	Small	Very High	**Moderate - High**
Water Hazards	Negative	Very Small	Very High	Low
Road Traffic Accidents	Negative	Very Small - Small	Very High	Low - Moderate
Human Well Being				
Disturbance to recreational access	Negative	Very Small	Medium	Low

10 Effects on Recreation

10.1 Introduction

10.1.1 This chapter uses publicly available information to assess the likely effects of the Proposed Development on the population in terms of public recreation and access.

10.1.2 The forms of public recreation known to take place within and around the site of the Proposed Development, and which are considered in this Chapter are as follows:

- Canoeing;
- Swimming;
- Angling; and
- Land based recreation including walking and running, mountaineering, cycling, backpacking and horse riding.

10.1.3 This Chapter considers the potential effects of the Proposed Development on public recreation during construction and operation. Such effects generally include disruption to the use of recreational facilities/sites. The proposed scheme may also result in changes to the perceived amenity value of recreational facilities/sites. These however generally relate to visual and noise effects which are assessed in Chapter 11 - Visual Amenity and Landscapes. Only recreational activities in or affected by the water environment are considered further in this chapter. Land-based recreational activities are considered in the Section 36 planning application EIAR, Chapter 14 - Recreation and Access.

10.2 Study Area

10.2.1 The Study Area comprises Glen Garry, and more specifically the area including and surrounding the Proposed Development, together with the waterbodies and watercourses downstream from the Proposed Development.

10.3 Methodology – Desk Study & Field Study

Desk Study

10.3.1 A desk study to identify the key components of recreational use in the local area has been undertaken to establish the existing conditions.

10.3.2 The following sources of data have been used in the preparation of this assessment:

- Ordnance Survey mapping;
- The SCA Guidebook Scottish White Water – 3rd Edition, 2018[31] ;
- The UK Rivers Guidebook[32] ; and
- Strava Global Heatmap[33] ;

[31] The SCA Guidebook Scottish White Water – 3rd Edition, 2018: https://www.pesdapress.com/index.php/product/scottish-white-water/
[32] The UK Rivers Guidebook: https://www.ukriversguidebook.co.uk/rivers/scotland/west-highlands/river-garry/ , accessed May 2025.
[33] Strava Global Heatmap: https://www.strava.com/heatmap#7.00/-120.90000/38.36000/hot/all , accessed May 2025

Field Study

10.3.3 Feedback has been sought from recreational users on the site of the Proposed Development including canoeists, hillwalkers, cyclists and backpackers. Additional information has been volunteered by attendees at public consultation meetings held in Invergarry in December 2023 and December 2024.

10.4 Assessment Methodology

10.4.1 This assessment has been carried out in accordance with the SEPA guidance "Supporting Guidance (WAT-SG-67) - Assessing the Significance of Impacts -Social, Economic and Environmental, Version: v5.1, November 2017".

10.4.2 The assessment has involved the following key tasks:

- Consultation with organisations and landowners concerned with recreational interests in the area;
- Site survey and recording;
- Reference to relevant Local Development Plans and other literature to obtain baseline information; and
- Evaluation of impacts based on the following steps:
    - Step 1: Identifying the positive and negative economic, social and environmental effects likely to result from the proposal.
    - Step 2: Assessing the magnitude of each identified effect.
    - Step 3: Assessing the importance of each affected economic, social and environmental factor.
    - Step 4: Taking account of the results of steps 2 and 3, assessing the significance of each identified effect.
    - Step 5: Weighing up all the significant positive and negative effects.

Magnitude of Effect

10.4.3 The magnitude of an effect reflects its scale and duration. An effect of a particular scale will be of greater magnitude if it is long-lasting than if it is only short-term. Similarly, a beneficial effect that will be produced in due course by other means will be of greater magnitude than it would otherwise be if it happens earlier as a result of the proposed activity.

10.4.4 Before you can assess the magnitude of an effect, you need to decide on its scale. To do so, you need to consider both the quantity/extent and degree of the effect. For example, all else being equal, the effect on river biodiversity of a proposal damaging 1 kilometre of a river is smaller in terms of its extent than that of a proposal damaging 2 kilometres; and the degree of an effect that causes deterioration from good to bad is greater than that of an effect that causes deterioration from good to moderate.

10.4.5 Guidance on assessing the scale of a range of effects is provided in **Table 10-1** – Indicative guide to assessing the scale of an effect on recreation, and **Table 10-2**- Indicative guide assessing the scale of an effect on canoeing/kayaking. Once you have assessed the scale of the effect, you can use **Table 10-3**- Indicative guide to assessing the magnitude of an effect, to judge the magnitude of the effect.

Table 10-1 Indicative guide to assessing the scale of an effect on recreation (WAT-SG-67 Table 14)

Very small	Very small effects less than around a 5% increase in: • the availability of the recreational resource (within a time period); or • the usage of the resource (numbers of people)
Small	Small effects:- around a 6% to 15% reduction or increase in: • the availability of the recreational resource; or • the usage of the resource If effects are concentrated at low usage times (eg week days) then a greater than 15% reduction or increase in the availability of the resource at these times may still be small. If effects are concentrated at high usage times (eg weekends), then reductions or increases in availability of less than 15% may be medium scale
Medium	Moderate effects:- around a 16% to 40% reduction or increase in: • the availability of the recreational resource; or • the usage of the resource If effects are concentrated at low usage times (eg week days) then a greater than 40% reduction or increase in the availability of the resource at these times may still be small. If effects are concentrated at high usage times (eg weekends), then reductions or increases in availability of less than 40% may be medium scale
Large	Large effects:- around a 41% to 80% reduction or increase in: • the availability of the recreational resource; or • the usage of the resource
Very Large	Very large scale effects:- more than an 80% reduction or increase in: • the availability of the recreational resource; or • the usage of the resource

Table 10-2 Indicative guide assessing the scale of an effect on canoeing/kayaking (WAT-SG-67 Table 15)

Very small	• No more than 5% of potential canoe days completely lost or gained; and/or • less than a 5% reduction or increase in number of potential canoe-able days on which flows are better than scrape-able Aesthetic impacts would be expected to be minor.
Small	• Between 6% - 15% of potential canoe days completely lost or gained; and/or • between a 6 % - 15% reduction or increase in number of potential canoe-able days on which flows are better than scrape-able If the availability, quality and extent of the recreational resource on weekends is largely unaffected and there is evidence that weekday use is much less important than weekend use, the scale of the impact may be considered small even if the overall reduction in the availability and quality of the resource is as high as 20 - 30 %.
Medium	• Between 16% – 40% of potential canoe days completely lost or gained; and/or • between a 16% - 40% reduction or increase in the number of potential canoe-able days on which flows are better than scrape-able. If the availability, quality and extent of the recreational resource on weekends is only subject to a very small reduction and there is evidence that weekday use is much less important than weekend use, the scale of the effect overall may be considered medium even if the overall reduction in the availability and quality of the resource is as high as 45 - 55 %.
Large	• Between 41% - 80% of potential canoe days completely lost or gained; and/or • between a 41% - 80% reduction or increase in the number of potential canoe-able days on which flows are better than scrape-able
Very Large	• More than 80% of potential canoe days completely lost or gained; and/or • more than an 80% reduction or increase in number of potential canoe-able days on which flows are better than scrape-able

Table 10-3 Indicative guide to assessing the magnitude of an effect (WAT-SG-67 Table 1)

	Scale of effect				
Duration of effect	**V Small**	**Small**	**Medium**	**Large**	**V Large**
Only lasts up to around 1 year	VS	VS	VS	S	M
Only lasts up to around years 6 years	VS	VS	S	M	L
Lasts significantly more than 6 years	VS	S	M	L	VL
Starts up to around 2 to 3 years earlier*	VS	S	M	L	VL
Starts up to 3 to 12 years earlier*	VL	S-M	M-L	L	VL
Starts more than 12 years earlier*	S	M	L	L-VL	VL

Notes:

You should use these rows in the table when you are assessing a benefit that is already expected to be delivered through the implementation of the river basin management plan (RBMP) but which is expected to be realised sooner as a result of the proposal (ie the proposal will enable the early achievement of an RBMP improvement objective).

If you have assessed the scale of an effect as being negligible, you should not consider that effect further in your assessments.

Importance of Affected Factor

10.4.6 The importance of a factor refers to its relative social, economic or environmental value to society. An effect on a very important factor (e.g. one of national importance) will be of much greater significance than the same magnitude of effect on a factor of limited importance (e.g. one of only local value).

10.4.7 The indicative guide to assessing the importance of an effect on recreation is given in **Table 10-4** below:

Table 10-4 indicative guide to assessing the importance of an effect on recreation (WAT-SG-67 Table 13)

Low importance	• The part of the water environment is frequently used for recreation but does not meet any of the other criteria listed in this Table.
Medium importance	• The part of the water environment is among the most popular locations regionally for a particular form of recreation or type of experience/challenge within that form; and the qualities of the part of the water environment (including its landscape qualities) place it amongst the best sites in the region for a particular form of recreation or type of experience/challenge within that form. Similar sites are likely to be rare to very rare in the region; or the site is used by clubs in the region as a venue for training or competitions; or the site is particularly important regionally because its location means that it is particularly accessible to recreational users in the region; or the site is a recreational resource for deprived or otherwise disadvantaged communities or groups.
High importance	• The part of the water environment is regularly used by people from all over Scotland; and the qualities of the part of the water environment place it amongst the best sites in Scotland for a particular form of recreation or type of experience/challenge within that form. Similar sites are likely to be rare to very rare in Scotland; or the site is one of the top sites regionally for a particular form of recreation and its location means that it is particularly accessible from a number of Scotland's major population centres - so making it of national importance; or the site is a recreational resource for one or more of the most deprived or otherwise disadvantaged communities in Scotland; or the site may host national competitions or events or be an important training site for such events.
Very high importance	• The part of the water environment specifically attracts overseas visitors interested in this form of recreation; and the qualities of the part of the water environment make it one of the most renowned sites for this form of recreation or type of experience/challenge within the form in the UK; or the site is a venue for international competitions or events or an important training venue for such events.

Significance of Effect

10.4.8 The significance of an effect (whether positive or negative) is a combination of the importance of the factor that is affected and the magnitude of the effect on the factor.

10.4.9 Once you have worked out the magnitude of an effect and the importance of the affected factor, you can use Table 5 below to help judge the significance of the effect.

Table 10-5 Indicative guide to assessing the significance of an effect (WAT-SG-67 Table 2)

Importance of affected factor	Magnitude of effect					
	Negligible	V Small	Small	Medium	Large	V Large
Very low / negligible	N	N	N	N	N	N
Low	N	VL	VL	L	M	M-H
Medium	N	VL	L	M	M-H	H
High	N	VL-L	M	H	H-VH	VH
Very High	N	L	M-H	H-VH	VH	VH
Key: N = negligible significance; VL = very low significance; L = low significance; M = moderate significance; H = high significance; and VH = very high significance.						

10.4.10 The assessment considers the potential effects of the Proposed Development on recreational activities during both the construction phase and the longer-term operation.

Assumptions and Limitations

10.4.11 Whilst every effort has been made to ensure that the information on public recreation and access from the desk study, consultation and fieldwork described above is comprehensive, it is possible that other less well-known forms of recreation are pursued at the site of the Proposed Development, that have been overlooked and have not been considered in this assessment.

10.5 Baseline Conditions

Existing Baseline

10.5.1 Recreation and tourism are key activities within the area. The site of the Proposed Development lies within an area which is used by hillwalkers, cyclists, canoeists, backpackers, swimmers, and potentially horse riders.

10.5.2 For all recreation not directly using the lochs and watercourses for the activity, which is all of them except for canoeing, swimming and angling, the effects will be limited to those associated with visual amenity and landscapes. These activities are not considered further in this chapter, except for hillwalking on the Munro Spidean Mialach, where the current path would be impacted by the proposed Fearna Reservoir

Canoeing

10.5.3 No canoeing is recorded on Strava on Loch Quoich, although it is known that canoes are sometimes used to cross Loch Quoich from the C1144 to access the hills to the south and west.

10.5.4 The River Garry downstream of Invergarry dam is used by canoeists and white water rafters during scheduled water releases from Loch Garry.

Swimming

10.5.5 Open water swimming in is currently a popular activity, but an internet search has not identified any popular swimming spots within the development area.

Angling

10.5.6 None of the burns within the main PSH site are used for fishing, and there are no fish in Loch Fearna. It is understood that Loch Quoich is occasionally fished, with records posted on the internet of sizeable trout having been caught there.

10.5.7 There is fishing on sections of the River Garry, Loch Garry and its feeder rivers. This is an important contributor to the local economy.

Hillwalking on the Munro Spidean Mialach

10.5.8 The current footpath between the summit of Spidean Mialach and Coire Mheil traverses Coire Dubh.

10.6 Potential Significant Effects

10.6.1 This section considers the potential effect of The Proposed Development on recreational in the area.

Canoeing

10.6.2 Whilst no canoeing is recorded on Strava on Loch Quoich nor Loch Garry, boat access to Loch Quoich would be maintained during construction and operation of the Proposed Development, leading to no effect on boating activities. There would be no effect on boating on Loch Garry.

10.6.3 The magnitude of effect for canoeing on Lochs Quoich and Garry during construction and operation is considered to be Negligible and permanent and the importance of effect is assessed as Very Low. The significance of the effect on canoeing is therefore considered to be Negligible.

10.6.4 Canoeing and white water rafting on the River Garry downstream of Invergarry dam would be unaffected by the construction and operation of the Proposed Development.

10.6.5 The magnitude of effect for canoeing and white water rafting the River Garry during construction and operation is considered to be Negligible and permanent and the importance of effect is assessed as High. The significance of the effect on canoeing is therefore considered to be Negligible.

Swimming

10.6.6 It is considered that there would be no material effect on the opportunity for swimming in the area as a result of construction of the Proposed Development.

10.6.7 The magnitude of effect for swimming during operation is considered to be Very Small and permanent and the importance of effect is assessed as Very Low. The significance of the effect on swimming is therefore considered to be Negligible.

Angling

10.6.8 There would be no effect on angling during construction and operation of the Proposed Development, unless by a pollution event, the risk of which would be controlled by the measures outlined in the Section 36 planning application EIAR, Appendix 2.2 – Outline CEMD. Access to put boats into Loch Quoich would be maintained and for Loch Garry would be unaffected.

10.6.9 The magnitude of effect for angling during construction and operation is considered to be Negligible and permanent and the importance of effect is assessed as High. The significance of the effect on angling is therefore considered to be Negligible.

Hillwalking on the Munro Spidean Mialach

10.6.10 Hillwalking on the Munro Spidean Mialach. The current footpath between the summit of Spidean Mialach and Coire Mheil traverses Coire Dubh, which would be inundated by the proposed Fearna Reservoir. In order to avoid this area during the construction and operational periods, it is proposed to divert this path to the east and south of the proposed Fearna dam. The proposed diversion would have the effect of increasing the length of the Munro walk by approximately 1.2km. There would be some steeper ground in the section from the Fearna dam to rejoining the existing path, but this would be a made path to the Red Specification so it should not be uncharacteristically steep or difficult within the context of the overall walk.

10.6.11 The magnitude of effect for hillwalking on the Munro Spidean Mialach during construction and operation is considered to be Very Small and permanent and the importance of effect is assessed as Medium. The significance of the effect on hillwalking on the Munro Spidean Mialach is therefore considered to be Very Low.

10.7 Mitigation and Enhancement

10.7.1 Mitigation and enhancement during construction and operation is as outlined in the EIAR Appendix 14.1 - Draft Access Management Plan, which has been prepared in consultation with The Highland Council.

10.8 Residual Effects

10.8.1 Potential residual effects and associated effect significance of the construction and operation of the Proposed Development following the implementation of mitigation measures are outlined in paragraph 10.7 above.

10.8.2 A summary of the proposed scheme's residual effects is provided in Table 10.6.

Table 10.6 Summary of Residual Effects

Effect	Type of Effect	Magnitude of Effect	Importance of Effect	Significance of Effect
Canoeing – Lochs Quoich and Garry	Negative	Negligible	Very Low	Negligible
Canoeing – River Garry	Negative	Negligible	High	Negligible
Swimming	Negative	Very Small	Very Low	Negligible
Angling	Negative	Negligible	High	Negligible
Hillwalking on the Munro Spidean Mialach	Negative	Very Small	Medium	Very Low

10.9 Conclusion

10.9.1 The assessment addresses only direct impacts on recreation and access, with those associated with visual amenity assessed in Chapter 11 - Visual Amenity and Landscapes.

10.9.2 The forms of public recreation known to take place within and around the site of the Proposed Development, and which have been assessed in this Chapter are as follows:

- Canoeing;
- Swimming;
- Angling; and
- Hillwalking on the Munro Spidean Mialach.

10.9.3 The Proposed Development has the potential to impact upon recreational use and access within the proposed site and surrounding area. Some effects relate to construction disturbance and modifications to water discharges. Construction and operational disturbance would be managed by provision of the measures outlined in the Section 36 planning application EIAR Appendix 14.1 – Draft Access Management Plan.

10.9.4 All impacts on recreation and access within the water environment during both construction and operation have been assessed as Negligible. The impact on hillwalking on the Munro Spidean Mialach from the construction and operation of the Fearna Reservoir has been assessed as Very Low.

11 Effects on Visual Amenity and Landscapes

11.1 Chapter Introduction

11.1.1 This chapter addresses effects on visual amenity and landscapes.

11.1.2 A full Landscape and Visual Impact assessment (LVIA) has been carried out as part of the Environmental Impact Assessment supporting the planning application for the Proposed Development under Section 36 of The Electricity Act. This is available at this link: https://fearnastorage.co.uk/documents/ The following sections are relevant:

Landscape and Visual
Chapter Text
Figures
Figure 7.1a: Zone of Theoretical Visibility (ZTV) of Proposed Dams
Figure 7.1b: ZTV of Proposed Dams and Powerhouse
Figure 7.1c: ZTV of Proposed Access Track to Upper Reservoir
Figure 7.2: Visualisation Locations
Figure 7.3: Designated and Protected Landscapes
Figure 7.4: Landscape Character Types
Figure 7.5a and b: Visual Receptors
Figure 7.6: Cumulative Developments
Figure 7.4.1: WLA Assessment Study Area
Figure 7.4.2: Map of Relative Wildness
Figure 7.4.3: Wild Land Attribute Mapping
Figure 7.4.4: Map of Relatively Wildness (Jenks 8 Interpretation)
Figure 7.4.5: Changes to the Study Area since production of the WLA mapping
Figure 7.4.6a – 7.5.6i: Representative Wirelines from WL 1 – WL 9
Visualisations to NatureScot Standards
Figure V3a-1a-e: VL1 - Minor Road Near Proposed Powerhouse Site
Figure V3a-2a-f: VL2 - Path from Quoich Dam
Figure V3a-3a-e: VL3 - Gleouraich Summit
Figure V3a-4a-e: VL4 - Spidean Mialach Summit
Figure V3a-5a-f: VL5 - Gairich Summit
Figure V3a-6a-e: VL6 – Kingie
Figure V3a-7a-e: VL7 - Minor Road near Loch a' Choire Bheithe
Figure V3a-8a-e: VL8 - Sgurr Mhurlagain Summit
Figure V3a-9a-e: VL9 - Minor Road near Bac nan Canaichean Path
Figure V3a-10a-e: VL10 - Sgùrr Mòr
Visualisations to THC Standards
Figure V3b-1a-h: VL1 - Minor Road Near Proposed Powerhouse Site
Figure V3b-2a-k: VL2 - Path from Quoich Dam
Figure V3b-3a-h: VL3 - Gleouraich Summit
Figure V3b-4a-h: VL4 - Spidean Mialach Summit
Figure V3b-5a-k: VL5 - Gairich Summit
Figure V3b-6a-h: VL6 – Kingie

Figure V3b-7a-h: VL7 - Minor Road near Loch a' Choire Bheithe
Figure V3b-8a-h: VL8 - Sgurr Mhurlagain Summit
Figure V3b-9a-h: VL9 - Minor Road near Bac nan Canaichean Path
Figure V3b-10a-h: VL10 - Sgùrr Mòr
Appendices
Appendix 7.1 – Technical Methodologies for Visual Representation
Appendix 7.2 – Visual Assessment Tables
Appendix 7.3 – Assessment of Landscape Character Types
Appendix 7.4 – Wild Land Area Assessment – Wild Land Area 18: Kinlochhourn - Knoydart - Morar
Appendix 7.5 – Assessment of Moidart, Morar and Glen Shiel Special Landscape Area
Appendix 7.6 – Appraisal of The Highland Council's Criteria for the Consideration of Onshore Wind Proposals

11.1.3 Rather than transpose this extensive and complex assessment into the format defined in the SEPA guidance "Supporting Guidance (WAT-SG-67) - Assessing the Significance of Impacts -Social, Economic and Environmental, Version: v5.1, November 2017", the summary of the EIA LVIA is included below.

11.1.4 The LVIA has identified that there would be localised significant landscape and visual effects occurring during the construction of the Proposed Development within an area extending up to around 5 km and affecting the landscape character and special qualities of localised parts of the Moidart Morar and Glen Shiel SLA, and Wild Land Area (WLA) 18. Significant effects are also predicted to the visual amenity of those using the minor road to Kinloch Hourn and walking routes to the mountains of Gleouraich and Spidean Mialach, and Gairich.

11.1.5 Significant effects to landscape areas would reduce after 15 years to an area affected by the upper reservoir and dams within around 4 km. Significant visual effects would be limited to those accessing the Gleouraich / Spidean Mialach walking route. An additional cumulative significant effect is predicted for those accessing the Gairich walking route within a scenario where the Beinn Bheag wind farm is also operational.

11.1.6 Whilst some longer term significant effects within this localised area are predicted to qualities of the SLA and WLA 18, within which the Proposed Development would be situated, the wider effect on these areas as a whole would not be significant.

11.1.7 No significant effects are predicted to the Knoydart NSA during either construction or operation.

11.1.8 No waterfalls or other similar features would be affected by the Proposed Development and as such, this is not addressed in this chapter nor in the EIA Report LVIA Chapter.

11.2 Summary of EIA Landscape and Visual Impact Assessment

11.2.1 A Landscape and Visual Impact Assessment (LVIA) has been undertaken for the Proposed Development within a study area of 10 km. The LVIA has been undertaken by Chartered Landscape Architects at ASH design + assessment Ltd. (ASH), a registered practice with the Landscape Institute, in accordance with best practice guidance, the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA).

11.2.2 The LVIA considers the two separate subjects of landscape and visual amenity as follows:

- The landscape assessment considers the potential effects of the Proposed Development on landscape character, designated and protected landscapes.
- The visual assessment considers the potential effects of the Proposed Development on the visual amenity of those present within the landscape, including established views from residential areas and routes.

11.2.3 The LVIA also gives consideration to cumulative effects occurring as a result of the addition of the Proposed Development to other proposed hydro and electrical infrastructure development within the study area.

11.2.4 Potential effects have been considered during the construction phase of the Proposed Development and during operation, in approximately year 1 and year 15 of operation, to illustrate the change associated with proposed landscape mitigation and regeneration. This includes the narrowing of access tracks, vegetated front faces to the Shios and Shuas Dams and woodland planting around the lower reservoir area and lower access track areas.

Summary of Landscape Effects

11.2.5 The landscape assessment has considered the potential effects of the Proposed Development to Landscape Character Types (LCTs) identified by NatureScot's National Landscape Character Assessment of Scotland and designated and protected landscapes within the study area including the Knoydart NSA, Moidart, Morar and Glen Shiel SLA, and WLA 18: Kinlochourn – Knoydart – Morar.

11.2.6 The landscape assessment has established that during construction, there would be temporary, localised significant effects resulting from the Proposed Development, mostly occurring within an area contained by the surrounding ridgeline of Gleouraich and Spidean Mialach to the north of Loch Quoich and extending to areas within around 5 km from the Proposed Development on the southern side of Loch Quoich. A small area to the west of the Quoich Dam would also be affected by access to the Proposed Development.

11.2.7 By 15 years post construction, once restoration of vegetation has taken place and planting proposals have been allowed to establish, the area of significant effects would reduce and would be mostly focused around the permanent features of the Proposed Development at the upper reservoir. These effects would be largely contained by the horseshoe ridge of Gleouraich and Spidean Mialach to the north, and the facing slopes and summit of Gairich to the south (within around 4 km of the Fearna Dam).

11.2.8 These effects are also predicted lead to significant effects during construction and operation within a corresponding localised area of WLA 18 (Kinlochhourn - Knoydart – Morar) and the Moidart, Morar and Glen Shiel SLA. However, there would be no significant effects on the Knoydart NSA during construction or operation.

11.2.9 No significant effects are predicted on the Special Landscape Qualities of the Cairngorm National Park.

Summary of Visual Effects

11.2.10 The detailed assessment of effects on visual amenity has considered potential effects on visual receptors (those obtaining views) based in buildings and residential properties and using transport and recreational routes.

11.2.11 No significant visual effects are identified for any residential or other building-based receptors during the construction or operation of the Proposed Development, although some non-significant effects may occur during construction where visibility of the Southern Access Route (SAR) and main construction compound is obtained.

11.2.12 Significant visual effects during construction have been identified for users of the minor public road to and alongside Loch Quoich and recreational users of two mountain walking routes: a circular route ascending the mountains of Gleouraich and Spidean Mialach, which would be diverted for the Proposed Development; and a route ascending Gairich, on the opposite side of Loch Quoich. Users of these routes would obtain close or overlooking views of construction activities at the powerhouse and / or upper reservoir area, likely to be distracting, during this period.

11.2.13 During operation, after 15 years, the effects on the minor road and route ascending Gairich are predicted to reduce to levels that would not be significant. However, significant visual effects are predicted for recreational user of the circular route up Gleouraich and Spidean Mialach where the upper reservoir area would be very visible, and the route would be diverted to cross the Fearna dam.

Cumulative Landscape and Visual Effects

11.2.14 The Proposed Development is also predicted to lead to some cumulative landscape and visual effects within a baseline scenario which includes the proposed Beinn Bheag Wind Farm. Under this scenario, one additional significant effect is predicted during operation, affecting users of the walking route to Gairich.

11.3 Conclusion

11.3.1 The LVIA has identified that there would be localised significant landscape and visual effects occurring during the construction of the Proposed Development within an area extending up to around 5 km and affecting the landscape character and special qualities of localised parts of the Moidart Morar and Glen Shiel SLA, and WLA 18. Significant effects are also predicted to the visual amenity of those using the minor road to Kinloch Hourn and walking routes to the mountains of Gleouraich and Spidean Mialach, and Gairich.

11.3.2 Significant effects to landscape areas would reduce after 15 years to an area affected by the upper reservoir and dams within around 4 km. Significant visual effects would be limited to those accessing the Gleouraich / Spidean Mialach walking route. An additional cumulative significant effect is predicted for those accessing the Gairich walking route within a scenario where the Beinn Bheag wind farm is also operational.

11.3.3 Whilst some longer term significant effects within this localised area are predicted to qualities of the SLA and WLA 18, within which the Proposed Development would be situated, the wider effect on these areas as a whole would not be significant.

12 Economic opportunities for disadvantaged groups

12.1.1 The effect of the Fearna Pumped Storage Hydro (the Proposed Development) on economic opportunities for disadvantaged groups has been assessed in accordance with the SEPA Guidance Note WAT-SG-67.

12.1.2 The Construction stage of the project will provide around 500 employment opportunities for semi-skilled and skilled workers. The approximately 6-year construction period is the focus of the assessment on opportunities for disadvantaged groups.

The Operational stage of the project will require around 29 skilled workers. The Authorised Person continues to explore training and educational opportunities for these skilled workers such that there would be a benefit to disadvantaged groups, but this is ongoing and as such has been omitted from this assessment.

12.1.3 The assessment set out below has determined that the Proposed Development has a Positive effect of very low Significance relating to economic opportunities to disadvantaged groups.

12.2 Assessment of the effect of the Proposed Development

Importance of the effect

12.2.1 The Proposed Development impacts on the Lochaber East and North area within the Scottish Index of Multiple Deprivation 2020.

12.2.2 This area is in the seventh decile of neighbourhoods in Scotland[34].

12.2.3 The Proposed Development would be a large construction project with an accommodation camp on site for the workforce. It is therefore feasible that disadvantaged groups from across Scotland could find employment opportunities at the Proposed Development for the duration of the construction works. As the employment opportunities will fall to communities across Scotland it is considered that whilst the area that the site encompasses is outwith the classification in **Table 12-1** below, the opportunities during construction mean that it is still considered that the Proposed Development would have a low to medium social importance of economic effect.

Table 12-1Indicative guide to assessing the social importance of an economic effect (Table 20)

Low importance	The affected community is, or would be, in the most deprived >20% to 30 % of neighbourhoods in Scotland
Medium importance	The affected community is, or would be, in the most deprived >10% to 20% of neighbourhoods in Scotland
High importance	The affected community is, or would be, in the most deprived > 5% to 10% of neighbourhoods in Scotland
Very high importance	The affected community is, or would be, in the most deprived 5% of neighbourhoods in Scotland

[34] Scottish Index of Multiple Deprivation 2020 https://simd.scot/#/simd2020/BTTTFTT/9/-4.0000/55.9000/

Scale of the effect

12.2.4 The scale of an effect on economic opportunity depends on the degree of change in economic opportunity and the numbers of people affected by the change. This has been assessed as small to medium, as indicated by the red box in **Table 12-2** below, due to the potential employment opportunities at the construction stage of the Proposed Development.

Table 12-2 Indicative guide to assessing the scale of an effect on a disadvantaged group (Table 21)

Very small	There would be a very small change to the economic opportunities of the group as a whole. A very small number of individuals may benefit more significantly
Small	There would be a small change to the economic opportunities of the group as a whole. A small number individuals may benefit more significantly
Medium	There would be a moderate change to a moderate proportion of the affected group
Large	There would be a large change to a moderate proportion of the affected group or a moderate change to a very large proportion of the group
Very Large	There would be a very large change to the economic opportunities available to a very large proportion of the affected group. The size of the affected group or groups is large (eg several 1,000s of people)

Magnitude of effect

12.2.5 The construction period will last up to around 6 years and therefore referring to **Table 12-3** the magnitude of the effect is assessed to be small as indicated by the red box.

Table 12-3 Guide to assessing the magnitude of effect (Table 1)

	Scale of effect				
Duration of effect	**V Small**	**Small**	**Medium**	**Large**	**V Large**
Only lasts up to around 1 year	VS	VS	VS	S	M
Only lasts up to around years 6 years	VS	VS	S	M	L
Lasts significantly more than 6 years	VS	S	M	L	VL
Starts up to around 2 to 3 years earlier*	VS	S	M	L	VL
Starts up to 3 to 12 years earlier*	VL	S-M	M-L	L	VL
Starts more than 12 years earlier*	S	M	L	L-VL	VL

Notes:
You should use these rows in the table when you are assessing a benefit that is already expected to be delivered through the implementation of the river basin management plan (RBMP) but which is expected to be realised sooner as a result of the proposal (ie the proposal will enable the early achievement of an RBMP improvement objective).
If you have assessed the scale of an effect as being negligible, you should not consider that effect further in your assessments.

Significance of Effect

12.2.6 The significance of effect has been assessed using **Table 12-4** below with the result, a very low positive impact, shown within the red box.

Table 12-4 Guide to assessing the significance of effect (Table 2)

Importance of affected factor	**Magnitude of effect**					
	Negligible	**V Small**	**Small**	**Medium**	**Large**	**V Large**
Very low / negligible	N	N	N	N	N	N
Low	N	VL	VL	L	M	M-H
Medium	N	VL	L	M	M-H	H
High	N	VL-L	M	H	H-VH	VH
Very High	N	L	M-H	H-VH	VH	VH

Key:
N = negligible significance; VL = very low significance; L = low significance; M = moderate significance; H = high significance; and VH = very high significance.

12.2.7 The conclusion is that the **positive** economic effect of the Proposed Development on disadvantaged groups would be **very low**. It should be noted that as part of a sensitivity analysis it was considered that if a significant proportion of the workforce was to come

from the 5% most deprived areas of Scotland then the significance of effect become Medium to High.

13 Effects on Climate Change

13.1 Chapter Introduction

13.1.1 The effect of the Fearna Pumped Storage Hydro (the Proposed Development) on climate change has been assessed in accordance with the SEPA Guidance Note WAT-SG-67.

13.1.2 The assessment set out below has determined that the Proposed Development has a Positive effect of Very High Significance on Climate Change.

13.2 Climate Change Effect Summary

Reducing Reliance on Fossil Fuels

13.2.1 To achieve Net Zero a significant expansion of renewable energy generating capacity is required. This increase in deployment of renewables means that there will be increasingly longer periods of time when there is an excess or deficit in renewable generation. At present a deficit in renewable generation means that there is a reliance on carbon emitting gas power generation.

13.2.2 While battery storage and interconnectors can mitigate some of the deficit on an hour by hour basis, there is a need to balance power across longer periods, for example when wind and solar power isn't operating. This means that there is a need for investment in large-scale, long duration electricity storage 'LDES'.

13.2.3 Pumped Storage Hydro 'PSH' is the only form of LDES which is a mature, proven, long-lifespan technology and has the ability to deliver large capacities of power and energy storage at a competitively low cost per MW and MWh vs other storage technologies.

13.2.4 The Proposed Development would significantly reduce the national reliance on fossil fuel energy by enabling us to maximise the use of our renewable energy assets. The Proposed Development would contribute to our Net Zero targets by saving approximately 931,500 tonnes of CO2 per annum, which is considered to be nationally significant.

13.3 Determining the Significance of the Effect on Climate Change

Importance of Climate Change Effects

13.3.1 Tackling climate change is a national and global priority. Therefore, the reduction of greenhouse gases that the Proposed Development could bring is considered of High Importance.

Assessing the Scale of Climate Change Effect

13.3.2 The Proposed Development could deliver 4,500 GWh of clean electricity which would save 931,500 tonnes of CO2 per annum. Referring to **Table 13-1** below the Proposed Development has a Positive Very Large scale effect on Climate Change.

Table 13-1 WAT-SG-67 Table 22 The scale of the Proposed Development is shown in the red box

	Scale					
	Negligible	Very Small	Small	Medium	Large	Very Large
Average net increase in renewable energy generated or non-renewable energy consumed per year (GWh)	≤ 0.25	> 0.25 to < 20	20 to < 120	120 to < 150	150 to < 200	≥ 200
Carbon equivalents[9] (t/year)	≤ 108	> 108 to < 8,600	8,600 to < 51,600	51,600 to < 65,000	65,000 to < 86,000	≥ 86,000
Note: You should treat effects on greenhouse gas emissions that are smaller than those in the "very small" category as non-significant effects. You should ignore such effects when weighing up the positive and negative effects of the proposed activity.						

Assessing the Magnitude of the Climate Change Effect

13.3.3 Once operational, the effect of the Proposed Development would last significantly more than 6 years. The typical operational lifespan of a PSH project can be in excess of 100 years. Referring to **Table 13-2** below the Proposed Development has a Very Large magnitude of effect on Climate Change.

Table 13-2 WAT-SG-67 Table 1 with the Proposed Development shown in red box

	Scale of effect				
Duration of effect	**V Small**	**Small**	**Medium**	**Large**	**V Large**
Only lasts up to around 1 year	VS	VS	VS	S	M
Only lasts up to around years 6 years	VS	VS	S	M	L
Lasts significantly more than 6 years	VS	S	M	L	VL
Starts up to around 2 to 3 years earlier*	VS	S	M	L	VL
Starts up to 3 to 12 years earlier*	VL	S-M	M-L	L	VL
Starts more than 12 years earlier*	S	M	L	L-VL	VL

Notes:
You should use these rows in the table when you are assessing a benefit that is already expected to be delivered through the implementation of the river basin management plan (RBMP) but which is expected to be realised sooner as a result of the proposal (ie the proposal will enable the early achievement of an RBMP improvement objective).
If you have assessed the scale of an effect as being negligible, you should not consider that effect further in your assessments.

Assessing the Significance of the Climate Change Effect

13.3.4 Referring to **Table 13-3** below, the importance of the Proposed Development's Climate Change benefit has been assessed. The Importance of Climate Change benefit has been assessed as **Very High**.

13.3.5 This means that the significance of the Proposed Development's effect on Climate Change has been assessed as having a **Positive effect of Very High Significance**.

Table 13-3 WAT-SG-67 Table 2 with the proposed Development shown in the red box

Importance of affected factor	Magnitude of effect					
	Negligible	**V Small**	**Small**	**Medium**	**Large**	**V Large**
Very low / negligible	N	N	N	N	N	N
Low	N	VL	VL	L	M	M-H
Medium	N	VL	L	M	M-H	H
High	N	VL-L	M	H	H-VH	VH
Very High	N	L	M-H	H-VH	VH	VH

Key:
N = negligible significance; VL = very low significance; L = low significance; M = moderate significance; H = high significance; and VH = very high significance.

14 Invasive Non-native Species (INNS)

14.1 Introduction

14.1.1 This chapter sets out the effect the proposed development would have on the likelihood of the introduction, transfer and spread of INNS, and the measures proposed to prevent that.

14.2 Background

14.2.1 The Fearna PSH scheme would convey water between Loch Quoich (an existing hydro reservoir) and Loch Fearna. Both lochs are within the same catchment. Whilst these two waterbodies are already hydraulically connected (Loch Fearna drains via the Allt Fearna into Loch Quoich), during pumping the operation of the PSH would allow transfer of water from Quoich to Fearna, whilst presently only transfer from Fearna to Quoich is naturally possible.

14.2.2 There would be no alteration of existing hydraulic structures controlling flows downstream of Loch Quoich, namely the Quoich dam and the Quoich hydro scheme abstraction facilities, water transfer tunnel, powerhouse and tailrace.

14.2.3 There would be no bulk movement of water between hydrologically unconnected waterbodies. The PSH will operate as a closed loop between Lochs Quoich and Fearna. Loch Quoich would continue to discharge to the river Gearr Garry either through the Quoich dam or through the turbines of the existing Quoich hydroelectric scheme.

14.2.4 The PSH would be accessed during construction by the “Southern Access Route” (SAR), an access track connecting the A87 at White Bridge, Invergarry, to the PSH site utilising sections of existing forestry track through the Glen Garry Forest, extended by the construction of a new track from the River Kingie to the C1144 public road. The SAR will cross the River Garry at White Bridge, as well as a number of watercourses draining to Loch Garry including the River Kingie and the Gearr Garry. Any new or upgraded river crossings would be clear span construction with no in-river construction.

14.3 Existing INNS within the Development Area

14.3.1 During the ecology surveys carried out in support of the Section 36 planning application EIAR and CAR licence application, no aquatic INNS (macrophytes, invertebrates, fishes) were found within the development area.

14.3.2 Surveys carried out in 2023 and 2024 have identified that currently Loch Quoich contains trout, Arctic charr and minnow, and Loch Fearna contains no fishes.

14.4 INNS Risk Assessment

14.4.1 The risk of the introduction, transfer or spread of INNS to or within the area of the Proposed Development by the controlled activities and their construction and operation has been considered, and the following risks identified:

The Risk of Transfer of Fishes from Loch Quoich to Loch Fearna

14.4.2 Because the proposed water transfer creates a new pathway from Loch Quoich to Loch Fearna, it represents a high-risk pathway for the transfer of fishes, which are currently present in Loch Quoich but absent from Loch Fearna. As such, these fishes could be considered to be an INNS within the context of Loch Fearna. Mitigation could theoretically be provided to prevent the transfer of fishes by their entrainment in pumped flows as eggs or fry, but it is considered impractical to implement such mitigation for the volumes of water that would be transferred.

The Risk of Introduction of INNS from outwith the Development Area

14.4.3 There is a risk of introduction of INNS to the development area through the transport and deployment of personnel, equipment and materials.

14.5 INNS Mitigation Measures

14.5.1 Based on practical considerations, it is not proposed to try prevent the potential transfer of fishes from Loch Quoich to Loch Fearna.

14.5.2 The risk of introduction of INNS to the development area through the transport and deployment of personnel, equipment and materials would be controlled by the implementation of biosecurity controls included in the project's Construction Environmental Management Document (CEMD), which would be drafted in compliance with the latest version of the following documents:

1. SEPA guidance "Biosecurity Management of INNS for Construction Sites and Controlled Activities"[35]
2. Ness Catchment Biosecurity Plan 2021 - 2030[36]

14.6 Conclusion

14.6.1 The mitigation outlined above is considered a robust approach to minimise the INNS risk to the catchments potentially affected by the construction and operation of the Proposed Development and associated controlled activities. It is considered that the mitigation proposed means that the risk of INNS transfer is low.

[35] Biosecurity Management of INNS for Construction Sites and Controlled Activities: https://www.sepa.org.uk/media/163480/biosecurity-and-management-of-invasive-non-native-species-construction-sites.pdf , accessed May 2025

[36] Ness Catchment Biosecurity Plan 2021 - 2030 file:///C:/Users/Chris%20Pasteur/OneDrive%20-%20Cairneyhill%20Ltd/Documents/WORK/Gilkes%20energy/Fearna/SEPA/CAR/CAR%20Licence%20Application/Aquatic/Ness-Biosecurity-Plan-2020-v1.1-161220%20(1).pdf ,accessed May 2025

15 Draft Balancing Test

15.1.1 The Applicant acknowledges that SEPA must weigh up the positive and negative effects and make a recommendation based on the balance of these effects.

15.1.2 The Applicant has undertaken a draft balancing test and considers that the Proposed Development has positive benefits that outweigh those that are negative.

15.1.3 Further assessment was then done using a sensitivity analysis which involved assessing the implications of applying a best case and worst-case assumptions in relation to aspects of those effects about which you are uncertain. The effects that are classed as Moderate-High or greater are listed in the table below along with the results of the sensitivity analysis.

Effect	**Type of Effect**	**Significance of Effect**	**sensitivity analysis**
Fluctuations in water level	Negative	High	sensitive to uncertainties
Public / Construction interface	Negative	Moderate - High	sensitive to uncertainties
Economy	Positive	High to Very High	insensitive to uncertainties
Climate Change	Positive	Very High	insensitive to uncertainties

15.1.4 The Very High positive effect on Climate Change was very robust when scrutinised in the sensitivity analysis and remained at Very High positive effect even with adjustment of associated factors used to determine the overall significance. This supports the conclusion that the very high positive effect on Climate Change is of a magnitude that concludes that the project has resulting greater positive benefits than negative.