FEARNA STORAGE

Fearna Pumped Storage Hydro Scheme

CAR Licence Report

Appendix B – Outline Construction Environmental Protection Document (CEMD)

September 2025

Quality Information

Prepared by	Checked by	Approved by
[redacted]		

Revision History

Revision	Revision Date	Details	Authorised
01	September 2025	Issue to SEPA	[redacted]

1 Introduction

1. This Outline Construction Environmental Management Document (CEMD) has been drafted to support the Section 36 application for the Fearna Pumped Storage Hydro Scheme (the Proposed Development).

2. The Proposed Development is a large-scale long duration electricity storage scheme with up to 1,800MW of generation capacity and 36 GWh of electrical energy storage. The Proposed Development would operate by transferring water between a lower reservoir, the existing Quoich reservoir and an upper reservoir created by enlarging Loch Fearna by the construction of two dams. The reservoirs would be connected by an underground waterway system including up to two headrace tunnels.

3. This document is referred to as the Outline CEMD which means that it provides a framework from which a Final CEMD would be developed with the aim of avoiding, minimising or mitigating any construction effects on the environment.

4. The delivery of all of the mitigation identified in the Chapter 20 of the EIA Report would be controlled and delivered through the final construction stage CEMD. The final version (or construction version) of the CEMD would be drafted and owned by the Principal Contractor. It is anticipated that the final version of the CEMD would be submitted to the Planning Authority as a pre-commencement condition.

5. Whist the CEMD would be finalised and submitted as a final version as part of a pre-commencement condition, it is acknowledged that the CEMD would be a 'live' document and as such would be refined during the construction period.

6. In this outline CEMD the likely structure of the final document has been set out, along with highlighting key parts of the works that require early discussion and consideration.

7. In the final construction stage CEMD, all relevant published guidance by the Planning Authority, SEPA, Nature Scot and other competent authorities would be followed in the drafting and implementation of the CEMD.

8. If any construction of the Proposed Development is carried out under an enabling works contract in advance of the main construction contract, for example access works for the Southern Access Route (SAR), a CEMD would be prepared for these works and we propose that these enabling works are covered by a separate planning condition.

2 Key activities of the Proposed Development

9. The key stages in the construction process are set out below. The list below includes some high-level detail on the construction activities that would be undertaken and highlights key environmental considerations associated with these parts of the works. It is expected that the final CEMD would expand upon these points in some detail. Furthermore, the list below is not exhaustive and significant further information would be provided in the final CEMD document.

Mobilisation Stage:

10. One of the first activities for the Principal Contractor would be to set up the construction compounds. These compounds would include offices, the temporary accommodation camps, concrete mixing plants and large storage areas.

11. Each compound area would require a detailed plan which would include (but not be limited to) the location of cabins, welfare, associated water treatment areas, drainage and areas for spoil storage.

Enabling works

12. Early enabling works would be underway at the same time as the site set up. This would in include the upgrade of existing roads and construction of sections of new access tracks along the SAR,construction of the new junction at the A87(T) and bridges over the Garry, Kingie and Gearr Garry.

13. There are interfaces with existing water courses in the above works and the measures that would be taken to minimise any impact of the works on the water bodies would form a key part of the CEMD methodology associated with these enabling works.

14. The new access track works would pass close to key ecological receptors and the management of the works in these areas must be appropriate. The finalised CEMD would clearly set out the management of any potential habitat interface.

15. Borrow Pits would require bespoke Borrow Pit Management Plans and Spoil Management Plans which would include detailing drainage and EMPs along with any processing areas.

Powerhouse platform

16. A large platform for the powerhouse would be constructed in a cutting adjacent to the disused quarry at the north side of Loch Quoich. Significant earthworks would be required to form this platform and so the management of run off and drainage during the excavation process would be crucial and would require to be planned in detail with layout plans and drainage management methodology included within the Pollution Prevention Plan (PPP) which forms part of the CEMD.

Access Tunnels

17. The tunnel adits for the access tunnel would require a heading which would need to be stabilised and appropriate drainage put in place.

18. The access tunnel system would be constructed to reach key points in the waterway tunnel system. It would most likely be constructed using drill and blast tunnelling methods. Significant water would be required to support the drilling process, which would either be pumped or flow by gravity to the tunnel adit. This run off would be removed from the tunnel system and would then require treatment. The process for the treatment of water being removed from the tunnels would be fully detailed in the finalised CEMD and associated Pollution Prevention Plan (PPP).

Powerhouse Shaft Construction

19. Six deep shafts are required at the powerhouse and these would be sunk once the powerhouse platform is complete. The shaft construction would most likely be be a top-down drill and blast process which would include temporary concrete lining with permanent lining following. The removal of water from these works and the treatment process would be a key aspect of the finalised PPP and CEMD.

Headrace tunnels

20. Up to two tunnels would be required to connect the lower reservoir to the upper reservoir. These tunnels would be constructed using the drill and blast techniques. Following mucking out of the tunnel a temporary lining would be formed with rock bolts and sprayed concrete which would then be supplemented with a permanent concrete lining and in the highest-pressure section the permanent lining would be steel. There could be up to four tunnel faces being progressed at one time and this could produce a substantial volume of waterfrom the tunnels, all of which would require to be treated. This treatment process would be detailed in the PPP and CEMD including plans showing the location and size of treatment works.

21. At the upper end of the tunnel system, the tunnels will be in the form of vertical shafts below the upper reservoir. These shafts would likely be constructed by the raised bore technique and then expanded to their final diameter. This would mean that run off and muck is removed via the headrace tunnel below. Careful management of the works areas at ground level, which is approximately 600m above sea level would be required and detailed in the CEMD.

Dam Construction

22. No new dam would be required at the lower reservoir (Quoich), where the existing dam infrastructure would be used in its existing form.

23. The upper reservoir (Fearna) would be created by the construction of two new rockfill dams across i) Coire Dubh and ii) the southern and western edges of Loch Fearna. These would be named the Coire Dubh dam and the Fearna Dam respectively.

24. These dams would require a suitably designed temporary diversion channel or culvert to pass water from the upstream catchment safely through or around the dam works.

25. The Fearna dam would interface with Loch Fearna and this would likely mean partial dewatering of Loch Fearna as well as potentially further temporary works such as cofferdams to dewater the excavations for the dam foundations.

26. The dams are significant in size and would have large footprints. Design of the temporary drainage around the dam footprints would be crucial to avoid local flooding of excavations, which can cause delay and abortive work, as well as the subsequent treatment of the water that would require to be pumped out of the excavation(s). Drawings of the finalised drainage around the dam works would form part of the final PPP and CEMD documents.

Construction of the Control works

27. The Lower Control Works would provide the link from Loch Quoich to the tailrace tunnels. These works present an interface with an existing water body. Proposals are currently planned to draw down the level of Loch Quoich, within the limits of the existing CAR licence and allowing for seasonal ecological and meteorological sensitivities. A cofferdam would then be constructed within which to build the lower control works within Loch Quoich. Other construction techniques such as floated caissons may also be considered. The finalised temporary works would be carefully designed and managed to minimise any discharges into Loch Quoich during excavation or concreting works. Continuous monitoring of loch levels would also be required.

28. The upper control works link from the upper reservoir to the main pressure tunnel. These upper works would be constructed over the top of the vertical tunnel shafts. As for the tunnel shafts, lowering of Loch Fearna is envisaged to facilitate construction of the upper control works.

Powerhouse Superstructure

29. The installation of the powerhouse superstructure followed by the installation of the powerhouse overhead crane would mean drainage of the permanent works (roof) would need to be in place and the transition from temporary drainage to permanent needs to be done in such a way as to ensure that there are no pollution incidents.

Concreting works across the site

30. Concreting works would be undertaken across the site. The process to batch concrete, store associated materials, move concrete around site and safely transfer it to the formworks where it is required would be done in a manner that avoids environmental incident.

31. Concreting would be required throughout the full construction programme and on all elements of the project. However, the largest volume of concrete would be required at the powerhouse.

32. It is proposed that the main lower area concrete plant serving the Powerhouse and the underground tunnel system would be located in site compound SC2 close to the powerhouse, with a further concrete plant located in site compound SC3 within the footprint of the Fearna reservoir. In all areas, suitable bunding and drainage management would be employed to avoid potential impacts on nearby waterbodies. Further detail of this process would be provided in the PPP and CEMD.

E&M Installation

33. Installation of the powerhouse mechanical and electrical equipment and associated commissioning of turbines would be undertaken towards the end of the construction programme. The start of commissioning would mean watering up tunnels for the first time. The methodology that would be undertaken to avoid any contamination of the lower and upper reservoir bodies would need to be set out in the final CEMD.

Reinstatement

34. Reinstatement of the site would be a significant and ongoing process in order to enhance natural habitats and encourage re-growth of the natural environment at the earliest opportunity. The methodology which would be detailed in the final CEMD would be referenced to best practice guidance, A specific Reinstatement Plan would form a section to the CEMD.

3 Structure of the Final CEMD

35. The Principal Contractor would draft the Final CEMD document and as a minimum the document would be expected to include a structure that encompasses the key chapters as set out below.

36. It is noted that chapters (or sub-documents) such as a bespoke Peat Management Plan would sit within the CEMD. These sub-documents would focus on both individual aspects of the works along with a holistic approach to the site on the specific section or subtopic.

37. In some cases, it may be necessary for multiple sub-documents on the same topic to be contained within the CEMD. For example, the powerhouse would have a stand-alone pollution prevention plan, as would the Coire Dubh and Fearna dams.

38. The structure and approach to the CEMD as detailed below would be refined but fundamentally the Contractor would be encouraged to create each chapter of the CEMD to be as succinct as possible with the use of drawings encouraged. This would make the document site specific and easier to follow, which in turn would be useful when the Contractor is developing individual RAMS for site activities.

Introduction and description

39. The final CEMD would have an introduction and a full detailed description of the works. This would also be supported by key drawings showing the detailed design of the works.

Environmental Management Team

40. The Principal Contractor's Project Environmental Management Team would be set out, which would include the role of each team member, relevant experience and an organogram. This section would also outline the applicant's environmental support staff such as the project ECoW and any other assisting clerk of works that would be involved in site monitoring.

Policies, Training and Communication

41. There are a number of Environmental Policies, such as those drafted by SEPA, that would be applicable to the project. These would require to be summarised in the CEMD.

42. The hierarchy of communications must be developed. This set out the strategy for communication between the project parties with regard to the development, management and response to all environmental matters.

43. There would be a large workforce on site and environmental training along with toolbox talks focusing on environmental lessons learned would need to be undertaken. There would be a clear section in the CEMD setting out the training and toolbox talk process.

44. The transfer of information from the CEMD to the works RAMs and daily site briefings etc would be outlined.

Monitoring Plan

45. Details of the site Monitoring Plan that would assess the performance of the construction process against key environmental criteria would be documented in the CEMD. This would include items such as the performance of Environmental Protection Measures (EPMs). It would be a contractual responsibility of the Principal Contractor to ensure that the measures set out in the CEMD are implemented. Fully executing a well thought out monitoring plan would greatly reduce the risk of environmental incident.

46. In addition to this the Applicant would set up a site team to oversee the Principal Contractor's performance at implementing the CEMD.

47. During construction there may observations made over the suitability and effectiveness of implemented measures from the CEMD. Any need for improvement or alteration of an approach would be communicated to the Site team. Should improvement or modifications be made to the CEMD then these would be issued to the relevant stakeholders for comment as required.

Incident Response Plan

48. The Contractor's planned responses to, and measures for dealing with environmental emergencies would be clearly set out in an Incident Response Plan, which would include any incidents occurring out of hours and communication protocols. The applicant would be expected to be informed along with SEPA (via the hotline), the Local Authority or any other relevant competent authority as appropriate if there was such an incident and in compliance with any relevant planning conditions.

Pollution Prevention Plan (PPP)

49. A Pollution Prevention Plan (PPP) would form part of the CEMD. The Principal Contractor would have obtained a construction licence from SEPA as required under The Water Environment (Controlled Activities) (Scotland) Regulations 2011and the PPP would be drafted to set out how the Principal Contractor would comply with the Construction licence.

50. As mentioned above separate PPPs (or separate chapters of the PPP) would likely be required for each part of the works.

Final Water Crossings Schedule

51. Each interface with a water crossing must also be managed and **Appendix 12.4 – Schedule of Watercourse Crossings** provides initial detail of these; this would be further developed at detailed design stage and a final water crossings schedule would form part of the CEMD.

Drainage Impact Assessment (DIA)

52. A Drainage Impact Assessment (DIA) will form part of the final CEMD. The DIA would include details relating to any existing field drains 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 risk of overland flow are included in **Chapter 12 Geology, Soils and Water** of the EIAR this would be linked to **Appendix 12.4 – Schedule of Watercourse Crossings**.

Ecological Management Plan (EMP)

53. This plan would include how the ecology interface with the works across the site would be managed.

54. The final EMP would provide detail on the working practices that would be implemented to minimise the impact of the works on site ecology, including the implementation of any Species Protection Plans required for specific species.

55. Furthermore, at the start of the project, prior to mobilisation, a number of Ecological Pre-commencement Surveys would be required and the timetable for these surveys would be clearly set out.

56. There may be Ornithological or other constraints that impact the works at different times of the year. Any resulting restrictions on working hours would be clearly set out along with a plan showing the location of the constraints. Where possible these would be designed out for example aligning access tracks to avoid areas of concern.

57. The EMP would provide plans and detail on any required habitat protection, such as isolating GWDTEs, so the works are properly managed adjacent to these areas.

58. The EMP would also make reference to the proposed mitigations contained each chapter of the EIAR and would use information contained in the following Appendices in the EIAR:

- **Appendix 8.2: NVC Survey Report**
- **Appendix 8.3: Protected Species Survey Report**
- **Appendix 8.4: Otter Survey and Monitoring Report**
- **Appendix 10.2 – Ornithology – Field Survey Methodology**
- **Appendix 11.1 and 11.2 - Aquatic Surveys**
- **Appendix 12.4 – Potential GWDTE**

Waste Management Plan

59. The Waste Management Plan would detail how waste material arising from the works would be managed during construction.

60. It is expected that a waste avoidance process would be set up by the Principal Contractor to minimise the need to dispose of waste. This would then be followed by trying to recycle or reuse as much of the unavoidable waste that is produced on the site. Waste to landfill would, at all times, be minimised. The process to achieve these key aims would be challenging given the scale and complexity of the Proposed Development and would therefore require considerable forward planning. The WMP would provide the detail to achieve these objectives for the site.

61. The WMP would also outline the methods by which waste would be classified, sorted and stored on site. Storage of waste has impacts on the environment so this needs to be done in accordance with best practice and this would be set out in the WMP.

Peat Management Plan (& Soil Management Plan) (PMP & SMP)

62. Large quantities of peat excavation are required in the construction of the Proposed Development. These quantities are set out in **Appendix 12.2 – Initial Peat Management Plan (PMP)**. The approach to any excavation of peat is that it would be put to beneficial use and Appendix 12.2 also sets out how this peat would be used on site. It should be noted that as part of the Section 36 application a significant number of peat probes have been undertaken to inform the outline Peat Management Plan.

63. Following detailed design, the final footprint of the works would be known and there would be further ground investigation data to assess peat depths. With this information the peat management plan would be finalised and it would also include further information added from the Principal Contractor on their approach to stripping, storing and reinstating the excavated peat.

64. The final PMP would be a significant document with peat quantities from each part of the works documented, along with location for storage and the final area for the peat to be used in reinstatement works. The final PMP would underline one the Proposed Development's key objectives that excavated peat shall not be disposed of and must be put to beneficial use.

65. The PMP would also consider the stability of the Peat. Please refer **Appendix 12.1 – Peat Landslide Hazard Risk Assessment (PLHRA).**

66. Given that the Proposed Development is in an upland site in the Highlands, peat would be the main organic material that is stripped from excavations prior to removal of glacial tills or rock deposits. Following the final GI an assessment would be made on whether a separate Soil Management Plan (SMP) would be required. This SMP would detail how soil (not peat) would be stripped, stored and reinstated if required.

Reinstatement Plan

67. Following on from the PMP the Reinstatement Plan would detail how the site would be restored. Where possible reinstatement would be undertaken as soon as is practical so as to best utilise stripped vegetation and give it the best possible chance of establishing.

68. It is expected that the ECoW would be closely involved in this process.

Construction Noise and Vibration Management Plan (CNVMP)

69. This section of the CEMD would detail how construction noise is to be controlled in line with best practise and guidance. This may be through a combination of types of construction plant, certain working methods or a control of working hours for some construction activities.

70. At this stage of the project a draft Construction Noise & Vibration Management Plan (CNVMP) has been drafted and this is included in Appendix 16.3 of the EIAR.

Cultural Heritage

71. The Proposed Development would have only minimal interaction with Cultural Heritage interests but a short section of the CEMD would be dedicated to providing a Cultural Heritage Management Plan.

4 Finalising of the CEMD

72. The Principal Contractor would finalise the CEMD as they work towards mobilising to site. This document would then be submitted to the appropriate stakeholders including THC and SEPA allowing sufficient time for their review and feedback.

73. As set out in the narrative above it is expected that the CEMD would be an extensive document with site specific works areas discussed in detail.

74. Any comments from stakeholders would be reviewed and implemented into a revised final version. Site visits and workshops with stakeholders to review the Contractors proposals may also be beneficial.

5 Implementation & Purpose of the CEMD

75. The CEMD document would form the basis for environmental protection measures required across the site at the various works areas. The CEMD provides the site team with a go to document when drafting individual RAMS for site tasks so that the environmental aspects can be considered and understood. These RAMS would then be expected to reflect the environmental interface with inclusion of appropriate methodology.

76. The Principal Contractor would likely require the assistance of Subcontractors. It is expected that the CEMD would be fully signed up to and implemented by all subcontractors. The contractual obligations put on the Principal Contractor by the applicant to adhere to and implement the CEMD would be imposed by the Principal Contractor onto any subcontractors in a 'back to back' arrangement.

77. The CEMD would be Live document and it is expected there would be a number of revisions throughout the duration of the works. Updates to the CEMD may be required due to the following:

- Working methods may change such that the CEMD would also require updating;
- The Principal Contractor may be required to deal with unforeseen events or conditions that could impact environmental management;
- Additional environmental issues or interfaces may be identified by ecologists during the works period;
- The Proposed development has a long programme and Construction best practices may be altered during the works which would require revision to parts of the CEMD; and
- Comments or advice from the ECoW or stakeholders following site visits may mean a change of working methods is required, to be reflected in a revised CEMD.

The above list is not exhaustive.