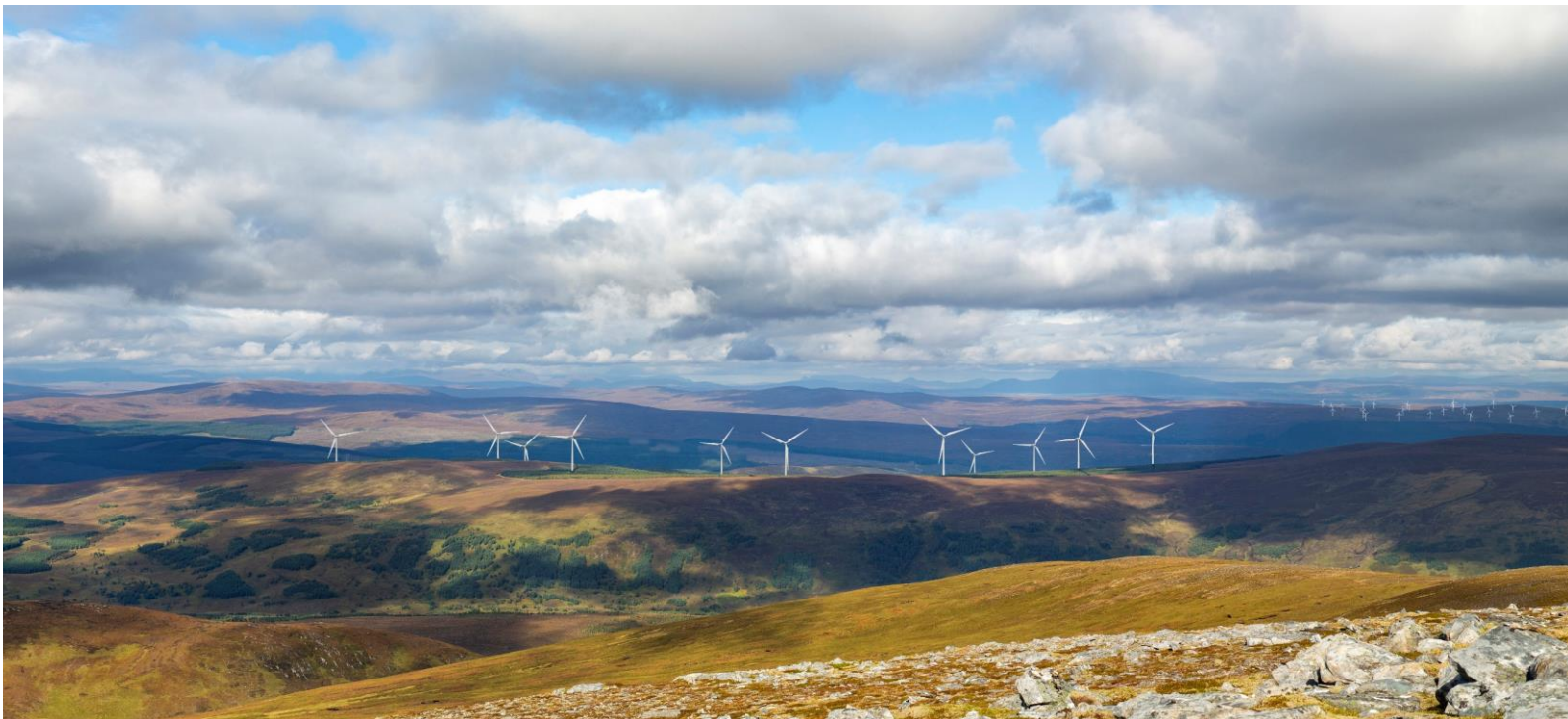
Coille Beith Wind Farm

Technical Appendix 8.1: Good Practice Methods

June 2025



Contents

1. Introduction

1.1 Background

1.1.1 There are a number of good practice techniques that will be employed during construction and operation of Coille Beith Wind Farm (the Proposed Development). The most important techniques with respect to the water and soil environment are summarised below. These techniques are considered the standard good practice techniques that will be applied by default by contractors and are considered as 'embedded mitigation'. This list is not exhaustive. The guidance and good practice literature will be used to further develop these methods in the detailed Construction Environmental Management Plan (CEMP) (an outline of which is included in **Appendix 2.1**, EIA Report Volume 4) and method statements for each type of work.

1.1.2 Mitigation measures are 'over and above' these standard good practice techniques and will be specific to the source-pathway-receptor identified at risk. These are described within **Chapter 8** (EIA Report Volume 2) and are specific to the identified effects where these could be significant.

1.1.3 **Chapter 8** (EIA Report Volume 2), assesses a worst-case scenario of the turbine dimensions/characteristics.

1.2 Procedures

1.2.1 Specific best practice procedures will be required for activities such as:

- Fuel handling and storage, including the locations of both periodic and regular fuelling points and emergency spill response. These should be agreed with the Environmental Clerk of Works (ECoW);
- Management of concrete wash out areas, including pollution prevention measures and drainage controls;
- Responsibilities and details for monitoring and training in relation to pollution prevention measures;
- Design, management, and mitigation measures for surface water drainage; and,
- Design, management, and mitigation measures for watercourse crossings.

2. Good Practice Methods to Reduce Impact on Peat and Hydrology

2.1.1 To reduce the impact on peat and hydrology the following good practice measures will, where possible, be considered during the construction and operation of the Proposed Development.

<u>Access Tracks</u>

- On slopes above tracks, the cut off ditch should be positioned close to the track to minimise the impact on upgradient peat;
- Regular discharge of water from the track and from the upgradient diversion channel to the down gradient land required. This process will allow the water to infiltrate a short distance from the track and can help counter potential down gradient dewatering effects; and
- Dressing the cut slopes alongside tracks with low permeability material can potentially help reduce flow rates from more permeable sections as it will act as a barrier to groundwater flow.

<u>Turbine Bases and Other Infrastructure</u>

- Dewatering of the turbine bases may be required depending on the permeability of the surrounding geology; however, given the low permeability of the formations on-site this is unlikely. If required, this will be limited to as short a duration as possible to keep the excavation dry until concrete is poured, cured, and the void space backfilled;
- Any water from dewatering excavations should be discharged to any peat areas surrounding the turbine base excavation to promote recharge and reduce the impact of dewatering. This is a recognised method of mitigating the environmental impact of an abstraction. If there are no peat areas immediately surrounding the infrastructure, but they are close by then the water should be discharged between the excavation and the peat to reduce the extent of drawdown in the other formations that may extend to the peat;
- Cut off ditches on upgradient slopes should be as close to the excavated areas as is practical to allow water to recharge the surrounding peat; and

- Excavations should be left open for as short a duration as practical to reduce the impact of dewatering on the surrounding peat.

Peat Habitat and Deep Peat Avoidance

- The Proposed Development has been designed to avoid good quality peatland habitats and areas of peat (>0.5 m depth), particularly deeper peat (>1.0 m depth) (Scottish Government, Guidance on Developments on Peatland, 2017)[1] where possible. This has been conducted through habitat mapping and through probing and coring to establish the spatial distribution of peat across the Site as discussed in the Peat Survey Report (**Appendix 8.2**, EIA Report Volume 4) and presented in **Figures 8.9** and **8.10** (EIA Report Volume 3a);
- Additional micro-siting of infrastructure will be undertaken in conjunction with the ECoW prior to construction for further avoidance as described in the Outline Peat Management Plan (**Appendix 8.3**, EIA Report Volume 4); and,
- Areas of disturbed peat will be reinstated as described in the **Appendix 8.3** (EIA Report Volume 4).

Contractor Awareness

2.1.2 Contractors will be made aware through the induction process of:

- The location of existing peat habitats and areas of forest to bog so that they can be particularly vigilant in avoiding these areas; and
- Areas designated for peat storage.

3. Good Practice Measures to Protect the Water Environment

3.1.1 Good practice measures implemented during the construction stage will involve both management and monitoring. As there are some significant nearby hydrological and water dependent receptors, measures will be applied that, as a minimum, to meet the requirements of good practice guidelines.

3.2 Contractor Tendering Process

3.2.1 During the tendering process for the works, environmental specifications and objectives will be included in tender documents so that all contractors can allow for good practice measures in their tender costs. Sub-contractors will be required to implement the CEMP, which will be agreed with The Highland Council (THC) via a suitably worded planning condition.

3.3 Site Induction

3.3.1 During the induction of contractors, a specific session on *'good practice to control water pollution from construction activities'* will be included by the Contractor's Environmental Manager or appointed ECoW. The responsibility for protecting the water environment will be shared with all staff on the Site with an appropriate level of support from construction managers to achieve this. The site induction process will be based on Guidance for Pollution Prevention (GPP) and good practice documents indicated within **Chapter 8** (EIA Report Volume 2).

3.4 Construction Method Statement (CMS)

3.4.1 The tender procedures for construction contracts will include the requirement to produce a Construction Method Statement (CMS). Following the more detailed design of tracks and drainage, the CMS will define the construction planning and procedures to be applied. The CMS will demonstrate, to the satisfaction of SEPA, how construction will be in accordance with GPP5[2], GPP6[3] and the Water Environment (Controlled Activities) (Scotland) Regulations CAR) 2011 (amended 2023)[4]. This document will be produced to function alongside the CEMP.

3.4.2 In all construction designs Sustainable Urban Drainage Systems (SUDS) shall be incorporated to minimise hydrological effects of the development and to maintain the current hydrological systems.

[1] Peatland Survey. Guidance on Developments on Peatland. Scottish Government, Scottish Natural Heritage (SEPA ,2017)
[2] GPP5: Works and maintenance in or near water (SEPA, DAERA, NRW & NIEA, January 2017)
[3] GPP6: Working at construction and demolition sites, version 1 (EA, SEPA & NIEA, 2023)
[4] Water Environment (Controlled Activities) (Scotland) Regulations (CAR) 2011 (as amended) A Practical Guide, Version 9.3 June 2023

3.5 Watercourse Crossings

3.5.1 The layout of the turbines, on-site tracks, and the access route has been designed in line with good practice guidelines, and the number of crossings of watercourses have been minimised where possible by design and using or replacing existing crossings appropriately.

3.5.2 A total of 25 watercourse crossings will be required for the Proposed Development (based on western access option as a worst-case scenario):

- Eleven new watercourse crossings;
- Use of 14 existing access track watercourse crossings that will either be re-used, extended, or replaced as determined later in the design process depending on specific engineering requirements and opportunities for habitat improvement.

3.5.3 Further crossings of minor, man-made, forestry or ephemeral drain crossings will also be required and determined later in the detailed design process.

3.5.4 The watercourse crossing will be designed so that its presence does not increase flood risk by having adequate capacity and by avoiding any structure being within the channel or flood zone.

3.5.5 Watercourse crossings will be the subject of detailed design within a CMS to be submitted to SEPA and the THC (as appropriate) prior to commencement of construction. A monitoring programme for maintenance of crossings (to prevent blockages and flooding) will be provided within the CMS.

3.5.6 Where it is necessary to cross watercourses or flowing drains, appropriately designed crossings and culverts will be installed, and licensed where appropriate, in consultation with SEPA.

3.5.7 Watercourse crossings are further detailed within **Appendix 8.7** (EIA Report, Volume 4).

3.6 Setback Distances

3.6.1 Another form of avoidance is locating turbines, tracks, and other construction disturbance a minimum buffer distance from water features. A set-back distance of 50 m from main watercourses is required by SEPA as a good practice measure for wind farm sites. Infrastructure within the Site has been located, in so far as possible, over 50 m from main watercourses or waterbodies (shown on 1:25,000 scale OS mapping) with the exception of where tracks approach watercourse crossings.

3.7 Track and Cable Trenching Design

3.7.1 Tracks which are orientated at 90 degrees to the slope contours may act to create rapid surface flows resulting in erosion of the tracks and provide a direct pathway for discharge to watercourses. Tracks have been oriented along contours where possible; however, some sections of on-site access track are at 90 degrees to the slope.

3.7.2 Accordingly, these will require standard design features such as cut off drains, spoon drains, or water bars etc. for tracks, and internal plugs for cables, to be installed such that water flow and sedimentation is minimised.

3.7.3 All tracks that will be excavated will have the material removed and replaced in the same manner, particularly the peat and the topsoil layer, in accordance with **Appendix 8.3** (EIA Report Volume 4).

3.8 Water Abstraction and Dewatering Activities

3.8.1 All dewatering activities will be managed through dewatering permits and method statements following SEPA guidance[5]. The ECoW will be consulted and associated mitigation measures will be agreed prior to commencement of works.

3.8.2 Suitable mitigation measures will be installed to minimise the volume of silt contained within pumped waters and to avoid or minimise the impact of the pumped water discharge on the water environment, including:

- Installation of upgradient cut off drains to reduce the volume of water entering excavations;
- To prevent disturbance from the base of excavations or from the bed of watercourses during abstraction, any pump intakes will be protected from sediment by raising the intake using a floating rose and a geotextile filter; and,
- The discharge of abstracted water through sediment control structures and over natural vegetation to filter and infiltrate.

[5] Water Environment (Controlled Activities) (Scotland) Regulations (CAR) 2011 (as amended) A Practical Guide, Version 9.3 June 2023

4. Good Practice Management of Sedimentation

4.1 Management of Track Construction

4.1.1 Loose track material generated during the use of access tracks will be prevented from reaching watercourses by adequate maintenance of the track. In dry weather, dust suppression methods will be employed.

4.1.2 Standard erosion control techniques and sediment control structures will be used across the Site during the construction period.

4.1.3 Drainage will be installed either side of tracks to enable appropriate management, capture, and discharge of clean, and potentially sediment laden runoff. Regular discharge of upgradient water to down gradient vegetation will be installed and appropriate sediment control structures to manage contact water.

4.1.4 Roadside drains likely to carry high sediment loads will not be allowed to discharge directly into watercourses but will discharge into sediment control structures or buffer areas of adequate width. The purpose of these drainage ditches is to collect track drainage, control run-off during intense rainfall events and mitigate erosion. These ditches will have filter check dams at intervals along their length to encourage infiltration and reduce velocity of flow within the channels. The drainage design will encourage run-off to leave access tracks quickly and prevent their acting as flow pathways and will also protect the Site's soils from erosion. Sediment control structures will be located at the end of all cross drains and cut off drains.

4.1.5 Forest felling will be undertaken in accordance with the Forest Research Practice Guidance[6].

4.2 Watercourse Crossings

4.2.1 The locations of watercourse crossings are presented in **Figure 8.6** (EIA Report Volume 3a). Watercourse crossings will be sized sufficiently to avoid overloading, blocking, or washout, and will be protected and well bedded to avoid settlement.

4.2.2 Where reasonably practicable, any engineered watercourse crossings will be designed to minimise erosion and to use soft engineering measures, rather than hard where erosion cannot be avoided (i.e. riprap rather than gabion baskets). All watercourse crossings will aim to leave the watercourse in as natural a condition as possible.

4.2.3 Main watercourse crossings will typically comprise of: cast in-situ concrete abutments with single span precast concrete beam deck or cast in-situ strip footings with precast concrete or galvanised corrugated steel arch segments, headwalls, if required, to be precast concrete.

4.2.4 Minor watercourse crossings will typically comprise of cast in-situ strip footings with precast concrete or galvanised corrugated steel arch segments/half-moon culverts will be used in preference to pipe culverts where reasonably practicable to retain the natural stream bed.

4.2.5 Minor ephemeral drains will be twin wall UPVC or precast concrete pipe culverts or half-moon culverts where reasonably practicable to retain the natural stream bed.

4.3 Excavation of Turbine Foundations and Cable Trenches

4.3.1 Turbine bases and their earthworks are located at least 50 m away from any watercourse mapped on the 1:50,000 scale and 1:25,000 scale Ordnance Survey mapping and recorded on Site during surveys.

4.3.2 Soil movement will be undertaken with reference to good practice guidelines[7]. Subsoil from the foundation excavations would be primarily replaced around the foundations following pour and curing. Any remaining soil would be used to fill borrow pits or spread in areas that are not environmentally sensitive as agreed by landowners and relevant consultees. Topsoil and turfs will be stored so as to maintain their vitality and used to re-cover the foundation. This will help to maintain surface hydrological characteristics in terms of near surface infiltration and run-off regimes.

4.3.3 The installation of the electrical cables will be within small trenches. Where trenches are dug on steep slopes they will be dug in sections or plugs of soil may be left in place at intervals to prevent them acting as preferential drainage pathways and increasing soil erosion. As indicated above, good practice cable installation means that the trenches will not remain open for long periods of time and will be restored by replacing the subsoil and topsoil removed earlier.

4.3.4 Run-off and discharge water from excavation sites will be discharged into sumps where sediment will be allowed to settle, and the drainage waters will be pumped out and discharged via vegetated soakaways

[6] Managing Forest Operations to Protect the Water Environment (Forest Research, 2019).
[7] Good Practice Guide for Handling Soils (Defra, MAFF, 2000)

to a vegetated area or infiltration trench down gradient of the excavation site. The exact method of site discharge will be confirmed with SEPA prior to the commencement of construction. These measures are also designed to reduce soil erosion by controlling discharges from the excavations.

4.3.5 In the event of shuttering collapse during a concrete pour it is unlikely that material will escape as the excavation required to erect the shuttering will be below ground and of a larger volume than the shuttering capacity. However, in this unlikely event, actions as defined below would be put in place. When the concrete has solidified, it would be dug out and disposed of appropriately.

4.4 Management of Soil Stockpiles

4.4.1 Careful consideration will be given to the location of topsoil and subsoil storage areas for all facilities during construction, either by siting in a flat dry area away from watercourses or by the addition of cut-off drains above the storage, which will help to maintain a buffer from streams. The areas will be regularly inspected to ensure that erosion of the material is not taking place.

4.4.2 Settlement lagoons and silt traps will be inspected regularly especially after periods of heavy rainfall. This inspection period will be agreed with SEPA during the development of the CMS. Maintenance will be carried out in periods of dry weather where practicable.

5. Good Practice Management of Oils, Fuels, and Chemicals

5.1.1 Fuel and oil spillages are potential sources of contaminants. Tracks, the compound, the car park where vehicles are re-fuelled and areas where chemicals and fuel are stored, are potential sites of contamination. The construction compound will have provision for the storage of fuel, oil and chemicals in designated areas, together with areas for vehicle compounds, refuelling sites, waste depots, and on-site sewage systems.

5.1.2 Good Practice will be in accordance with GPP1[8], GPP2[9], GPP4[10], GPP5, GPP6, GPP8[11], GPP21[12], and GPP26[13].

5.1.3 Good practice will be adopted for handling potentially polluting substances (such as fuel, oil, cement, and concrete additives) including:

- Designated facilities designed and used for storage and refuelling, located away from watercourses;
- Fuel, oils, and chemicals will be stored on an impervious base within a bund able to contain at least 110 % of the volume stored. Rainwater will not be allowed to accumulate within the bund and in any way compromise the required 110 % volume capacity;
- Interceptor drip trays will be positioned under any stationary mobile plant to prevent oil contamination of the ground surface or water;
- A site oil, chemical and product inventory;
- A site drainage plan, including notations of areas of highest sensitivity;
- A list of emergency procedures, responsive to a risk assessment of areas of high sensitivity;
- Site induction of all personnel on emergency spillage procedures and staff trained in emergency procedures;
- A contact list for emergency services, the relevant environmental regulators, the local water supply and sewerage undertakers, the Health and Safety Executive (HSE) and specialist clean up contractors, if required; and
- Emergency response equipment will be available at appropriate locations.

5.1.4 In the event of an accidental spillage, a predefined ‘Procedure in the event of a contaminant spillage' will become effective.

[8] GPP1: Understanding your Environmental Responsibilities – Good Environmental Practices version 1.2 (SEPA, DAERA, NRW & NIEA, June 2021) replaces PPG1: General guide to the prevention of pollution (EA, SEPA & EHSNI, published 2013, withdrawn December 2015)
[9] GPP2: Above ground oil storage tanks (SEPA, NIEA & NRW, January 2018)
[10] GPP4: Treatment and disposal of sewage where no foul sewer is available (SEPA, DAERA, NRW & NIEA, 2021)
[11] GPP8: Safe storage and disposal of used oils (SEPA, DAERA, NRW & NIEA, July 2017);
[12] GPP21: Pollution incidence response planning, version 1.1 (SEPA, DAERA, NRW & NIEAEA, June 2021)
[13] GPP26: Storage and handling of drums and intermediate bulk containers, version 1.2 (SEPA, DAERA, NRW & NIEA, 2017June 2021)

5.2 The Management and Movement of Liquid Concrete

5.2.1 Concrete foundations will adhere to a specific code of practice for concrete design to ensure that the concrete mix is designed to withstand concrete attack. Concrete for the turbine bases will be batched on-site. As provided in **Chapter 2** (EIA Report Volume 2), the concrete batching plant would be located within one of the temporary construction compounds or borrow pit search area.

5.2.2 A discharge licence from SEPA may be required in respect of this activity, and this possible requirement will be monitored.

5.2.3 Within the emergency spillage procedure actions, contingency measures are described which would address major events such as a concrete spill. Machine operators will carry a supply of absorbent material in their cabs, and there would be a central stock of material stored within the construction compounds.

5.3 Disposal of Waste Materials

5.3.1 On-site engine and hydraulic oil waste will be stored in an appropriately constructed compound and storage bund.

5.3.2 Waste oils will be stored at the construction compounds in an above ground tank within a concrete bunded area to prevent oil escaping to the environment in the event of leakage from the main tank. The bund will be 110 % of the storage tank capacity. The bund will be emptied by a specialist company. Procedure for storage, removal and accidental spillage will be defined in the 'Pollution Incident Response Plan' with spill kits available adjacent to the bunded area.

5.3.3 The following additional measures will also be implemented:

- Drip trays will be provided for machinery;
- Machinery will be repaired and maintained, where practicable, in suitable designated locations;
- Facilities will be provided to ensure appropriate waste management;
- Wheel washing facilities where required will be located away from watercourses; and,
- Should dewatering be required pumped water will be discharged via settlement ponds or filter strips prior to direct discharge into a watercourse.

6. Design Optimisation

6.1.1 Subsequent to consent, if approved, further detailed ground investigations will be undertaken to support the detailed design of the Proposed Development. 100 m micro-siting is being sought, to permit the optimum orientation of crane hard standings, exact location of turbine bases, and adjustment of other infrastructure including track alignments within this buffer zone. Micro-siting will marry the best line for engineering purposes with the maximum avoidance of sensitive receptors where possible. Any micro-siting will be documented and undertaken in consultation with the ECoW and relevant statutory consultees, as set out in an appropriately worded planning condition.

6.1.2 Further investigations will include sub surface drilling to obtain further information on the formations across the infrastructure, additional detailed habitat mapping and further baseline surveys.

7. Monitoring

7.1 Baseline Monitoring

7.1.1 To monitor for any changes during the construction and operational phases of the Proposed Development, baseline information on the existing conditions will be required.

7.1.2 Prior to commencement of any invasive investigations or site works, a strategic set of water sampling locations will be identified. Any samples taken will be analysed for a suite of typical parameters used by SEPA for their water quality assessments in freshwater rivers and updated to include any requirements arising from the Water Framework Directive or Scottish Water requirements.

7.2 Monitoring During Construction

7.2.1 Monitoring will be required, as determined through consultation with the THC and SEPA. Water samples during construction will be collected from the same locations as during baseline sampling and taken at intervals agreed with SEPA. Sampling locations will include some control points outside the influence of the construction. These will be analysed for a suite of typical parameters used by SEPA in order to ensure that there is no negative effect on surface water quality during the construction phase.

7.2.2 In addition, temporary drainage features, access track drainage channels, drainage crossings on tracks, silt traps, sediment lagoons etc. will be inspected on a regular basis to ensure they are clear and capable of performing their functions.

7.3 Monitoring During Operation

7.3.1 Periodic inspection of the river beds and banks will be undertaken during the operational phase of the works. Streams and drains will be inspected to ensure they are operating correctly, and they will be cleaned of silt or vegetation if required.

7.4 Monitoring During Decommissioning

7.4.1 In the decommissioning phase, monitoring will be undertaken to the same level and frequency as for the construction phase as activities and risks to receptors are similar.