# Appendix 12G
# Outline Construction Environment Management Plan

October 2024

**Document number:** 62281580-WSPE-RP-OY-00008_P03

# Appendix 12G
# Mitigation Measures (for inclusion in CEMP)

## Introduction

This appendix presents some of the key embedded mitigation proposed to address potential water effects of the Proposed Development and supplements the description of the mitigation measures presented in **EIA Report Chapter 12: Geology, Hydrology and Hydrogeology**.

## Track Design

On areas of peat depths greater than 1m, floating roads of a set minimum length are proposed. In a floating road, the weight of the road is supported by the peat beneath, thereby avoiding the need to construct foundations extending through to the underlying solid stratum. The floating roads would be constructed in line with the good practice guidance produced by FCS and SNH (2010) and SR, SNH, SEPA, FCS, HES, MSS and AEECoW (2019), and would include the use of geogrids and geotextiles. The geotextile used would be selected to maintain load distribution, ensure separation of aggregate and peat, and prevent peat rutting, erosion and drainage. Aggregate choice would be sensitive to peat geochemistry and would be of sufficient grade to allow infiltration through to the geotextile, as shown in **EIA Report Chapter 4: Description of the Proposed Development**, **Figure 4.11**.

Even with floating roads, some interruption of surface and near-surface flows can occur. The track layout has therefore been designed to minimise the total track length, and to avoid, where possible, intersecting catchment areas in a manner that could significantly interrupt flow paths. Cross-drainage would be provided in areas where access tracks unavoidably intersect dominant flow pathways, as discussed below.

On areas of steeper gradient or where there are concerns about slope stability, the use of floating roads may not be appropriate and cut tracks would be considered. These would need to be cut all the way through the peat, thereby potentially increasing disturbance of the local hydrology. However, there is little coincidence of steep slope and deep peat on the Development Site, so the extent of these access tracks would be minimised.

## Track Drainage Design

The need for drainage on the access track network would be considered for all parts of the track network separately since slope and wetness vary considerably across the Development Site. In flat areas, drainage of floating roads is not required as it can be assumed that rainfall on to the access track would infiltrate to the ground beneath the access track or along the verges. Track-side drainage would be avoided where possible, to prevent any local reductions in the water table or influences on the access track structure and compression (the latter can occur where a lower water table reduces the ability of the peat to bear weight, increasing compression).

Where access tracks are to be placed on slopes, lateral drainage would be required on the upslope side of the access track. The length of drains would be minimised, to prevent either pooling on the upslope side or, at the other extreme, creating long flow paths along which rapid run-off could occur. Regular cross-drains would be required to allow flow to pass across the access track as recommended in SR, SNH, SEPA, FCS, HES, MSS and AEECoW (2019) guidance, with a preference for subsequent re-infiltration on the downslope side, rather than direct discharge to the drainage network.

Check dams may be implemented in drainage ditches where necessary to reduce flow velocities to aid in the sedimentation of silt from suspension and to also direct water into the cross drains so that natural flow paths are maintained as far as possible.

The ditch design would be considered in line with the recommendations of the SR, SNH, SEPA, FCS, HES, MSS and AEECoW (2019) guidance, including the use of flat-bottomed ditches to reduce the depth of disturbance.

Cross-drainage may be by culverts or pipes beneath the access track, again in line with the SR, SNH, SEPA, FCS, HES, MSS and AEECoW (2019) guidance. Drainage would be installed before or during access track construction, rather than afterwards, to ensure that the access track design is not compromised. The cross drainage would flow out into shallow drainage, which would allow diffuse re-infiltration to the peat on the downslope side. The cross drains would flow out at ground level and not be hanging culverts. The avoidance of steep gradients for the access tracks would also reduce the risk of erosion occurring at cross-drain outflows.

In instances of drainage close to surface watercourses, discharge from the drainage may be to surface water rather than re-infiltration. In these situations, best practice control measures including sediment settlement would be undertaken before the water is discharged into surface water systems. The discharges would be small and collected from only a limited area, rather than draining a large area to the same location. Sufficient attenuation storage would also be incorporated into site drainage systems to ensure that discharge rates to watercourses do not exceed pre-development rates and taking into account potential increases in peak rainfall intensity due to climate change i.e. allowing for up to the 1% AEP event including the appropriate allowances for climate change covering the lifetime of the Proposed Development.

Although drainage would be provided in areas of disturbance as required, areas of hardstanding would be minimised so that this need is reduced. This includes careful design of construction compounds and minimising the size of crane hardstandings at each turbine location.

The details of proposed site drainage measures would be set out in the WMP for the Development Site, which would accompany the CEMP. As the Development Site area considerably exceeds 4ha, discharges from construction phase site surface water drainage systems would be subject to a CAR construction run-off licence from SEPA. The WMP would be subject to approval by SEPA through the CAR licence application process.

## Cable Trench Design

Cables would be run alongside access tracks wherever possible. The trenches would be installed at the minimal depth practical, although this may reach 0.5 – 1m deep, a typical cable trench cross section being displayed in **EIA Report Chapter 4: Description of the Proposed Development, Figure 4.10.** These would be dug and left open for the minimum time possible to ensure that they do not create open drainage routes. The cables would be laid directly into the trenches and a sand surround applied prior to the overburden being replaced. The trenches would be backfilled as far as possible with excavated peat, to minimise the change to flow paths. Where other material is used to backfill the trenches, clay cut-off barriers would be installed across the trench to prevent them creating preferential flow paths.

Cable laying methods that do not require a dug trench would be considered at the post-consent detailed design stage. FCS and SNH (2010) suggest that it may be possible to inset the cable in peat flanks alongside the edges of the floating roads, so that they are protected but do not need to be dug into the ground, disturbing the peat and associated flow paths.

## Watercourse Crossings

The number of watercourse crossings has been minimised as far as reasonably practicable. However, due to the large number of watercourses within the Development Site and preferential flow pathways, and limitations regarding access locations, it is not possible for the Proposed Development to take place without a relatively large number of watercourse crossings. 57 existing crossings would likely require upgrading to facilitate the Proposed Development (their condition / suitability for wind farm related traffic would be assessed ahead of construction) and a further 35 new crossings would be required. Of these, two existing bridges may need upgrading, with another two new bridges required.

Given the number of watercourse crossings, the mitigation of potential effects is particularly important. Adherence to WAT-SG-25 (SEPA, 2010)[i], River Crossings and Migratory Fish: Design Guidance (Scottish Government, 2012) and CIRIA Report C786: Culvert, Screen and Outfall Manual (2019) helps to minimise potential hydrological (including morphological) effects. All watercourse crossings would be designed to convey a 1 in 200-year return period flood event with an allowance for climate change, and each watercourse / flow pathway crossing has been considered individually with respect to topography and hydrology. The proposed locations of watercourse crossings are shown in **EIA Report Chapter 4: Description of the Proposed Development**, **Figures 12.1**, **12.4a**, **12.4b**, **12.5a** and **12.5b** and summarised in **Table 0G-1**.

### Table 0G-1 Types of watercourse and flow path crossings

| Crossing no. / receptor code | Location | Easting | Northing | Type | Comments |
|---|---|---|---|---|---|
| **WC01** | On existing track crossing an unnamed forest drain | 204600 | 704493 | Simple culvert | Existing |
| **WC02** | On existing track crossing an unnamed forest drain | 204613 | 704509 | Simple culvert | Existing |
| **WC03** | On existing track crossing an unnamed forest drain | 204776 | 704744 | Simple culvert | Existing |
| **WC04** | On existing track crossing an unnamed forest drain which is confluent with Douglas Water | 204879 | 705013 | Simple culvert | Existing |
| **WC05** | On existing track crossing the Allt Tom a' Challtuinne | 204668 | 705512 | Simple culvert | Existing |

| | | | | | |
|---|---|---|---|---|---|
| | which is confluent with Douglas Water | | | | |
| **WC06** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 204607 | 705689 | Simple culvert | Existing |
| **WC07** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 204557 | 705916 | Simple culvert | Existing |
| **WC08** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 204554 | 706103 | Simple culvert | Existing |
| **WC09** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 204528 | 706582 | Simple culvert | Existing |
| **WC10** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 204367 | 706760 | Simple culvert | Existing |
| **WC11** | On existing track crossing the Allt Fearna which is confluent with Douglas Water | 204087 | 707065 | Simple culvert | Existing |
| **WC12** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 204061 | 707091 | Simple culvert | Existing |
| **WC13** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 203936 | 707280 | Simple culvert | Existing |
| **WC14** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 203936 | 707301 | Simple culvert | Existing |
| **WC15** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 203942 | 707360 | Simple culvert | Existing |
| **WC16** | On existing track crossing Douglas Water | 203916 | 707601 | Bridge | Existing |
| **WC17** | On existing track crossing an unnamed watercourse | 204191 | 707680 | Culvert | Existing |

| | | | | | |
|---|---|---|---|---|---|
| | which is confluent with Douglas Water | | | | |
| **WC18** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 204253 | 708027 | Simple culvert | Existing |
| **WC19** | On existing track crossing an unnamed watercourse which is confluent with Douglas Water | 204193 | 708065 | Simple culvert | Existing |
| **WC20** | On existing track crossing Eas nan Tarbh which is confluent with Douglas Water | 203110 | 708385 | Simple culvert | Existing |
| **WC21** | On existing track crossing unnamed watercourse confluent with Eas nan Tarbh which is confluent with Douglas Water | 203083 | 708403 | Simple culvert | Existing |
| **WC22** | On existing track crossing unnamed watercourse confluent with Allt Sron na h-Airighe Duibhe which is confluent with Douglas Water | 202897 | 708583 | Simple culvert | Existing |
| **WC23** | On existing track crossing Allt Sron na h-Airighe Duibhe which is confluent with Douglas Water | 202588 | 708569 | Simple culvert | Existing |
| **WC24** | On existing track crossing unnamed watercourse confluent with Allt Sron na h-Airighe Duibhe which is confluent with Douglas Water | 202351 | 708389 | Simple culvert | Existing |
| **WC25** | On existing track crossing unnamed watercourse confluent with Allt Sron na h-Airighe Duibhe which is confluent with Douglas Water | 202218 | 708284 | Simple culvert | Existing |
| **WC26** | On existing track crossing unnamed watercourse confluent with Douglas Water | 201995 | 708074 | Simple culvert | Existing |
| **WC27** | On existing track crossing unnamed watercourse confluent with Douglas Water | 201865 | 707991 | Simple culvert | Existing |

| | | | | | |
|---|---|---|---|---|---|
| **WC28** | On existing track crossing unnamed watercourse confluent with Douglas Water | 201545 | 707745 | Simple culvert | Existing |
| **WC29** | On existing track crossing unnamed watercourse confluent with Douglas Water | 201392 | 707510 | Simple culvert | Existing |
| **WC30** | On existing track crossing unnamed watercourse confluent with Douglas Water | 200861 | 707010 | Simple culvert | Existing |
| **WC31** | On existing track crossing unnamed watercourse confluent with Douglas Water | 200783 | 706764 | Simple culvert | Existing |
| **WC32** | On existing track crossing unnamed watercourse not directly confluent with any other watercourse (spreads to land) | 200556 | 706432 | Simple culvert | Existing |
| **WC33** | On existing track crossing unnamed watercourse confluent with Allt Nighinn which is confluent with Allt nan Sac and Abhainn a' Bhealiach | 199926 | 705928 | Simple culvert | Existing |
| **WC34** | On existing track crossing unnamed watercourse confluent with Allt Nighinn which is confluent with Allt nan Sac and Abhainn a' Bhealiach | 199331 | 705586 | Simple culvert | Existing |
| **WC35** | On existing track crossing unnamed watercourse confluent with Allt nan Sac and Abhainn a' Bhealiach | 198765 | 705221 | Simple culvert | Existing |
| **WC36** | On existing track crossing unnamed watercourse confluent with Abhainn a' Bhealiach | 198365 | 704662 | Simple culvert | Existing |
| **WC37** | On existing track crossing unnamed watercourse confluent with Abhainn a' Bhealiach | 198081 | 704516 | Simple culvert | Existing |
| **WC38** | On existing track crossing Allt nan Sac which is | 197857 | 704192 | Bridge | Existing |

| | | | | | |
|---|---|---|---|---|---|
| | confluent with Abhainn a' Bhealiach | | | | |
| **WC39** | On existing track crossing unnamed watercourse confluent with Abhainn a' Bhealiach | 197674 | 703771 | Simple culvert | Existing |
| **WC40** | On existing track crossing unnamed watercourse confluent with Abhainn a' Bhealiach | 197326 | 703498 | Simple culvert | Existing |
| **WC41** | On existing track crossing unnamed watercourse confluent with Abhainn a' Bhealiach | 197956 | 704659 | Simple culvert | Existing |
| **WC42** | On existing track crossing unnamed watercourse confluent with Abhainn a' Bhealiach | 197892 | 704854 | Simple culvert | Existing |
| **WC43** | On existing track crossing unnamed watercourse confluent with Abhainn a' Bhealiach | 197877 | 704946 | Simple culvert | Existing |
| **WC44** | On existing track crossing unnamed watercourse confluent with Abhainn a' Bhealiach | 197753 | 705286 | Simple culvert | Existing |
| **WC45** | New crossing of unnamed watercourse confluent with Allt Fearna which is confluent with Douglas Water | 203966 | 707067 | Simple culvert | New |
| **WC46** | New crossing of unnamed watercourse confluent with Allt Fearna which is confluent with Douglas Water | 203793 | 706855 | Simple culvert | New |
| **WC47** | New crossing of unnamed watercourse confluent with Allt Fearna which is confluent with Douglas Water | 202749 | 706503 | Simple culvert | New |
| **WC48** | New crossing of unnamed watercourse confluent with Allt Fearna which is confluent with Douglas Water | 202530 | 706440 | Simple culvert | New |

| | | | | | |
|---|---|---|---|---|---|
| **WC49** | New crossing of unnamed watercourse confluent with Douglas Water | 201973 | 706190 | Simple culvert | New |
| **WC50** | New crossing of Douglas Water | 201099 | 705921 | Culvert | New |
| **WC51** | New crossing of unnamed watercourse which discharges to Loch Dubh-ghlas and is confluent with Douglas Water | 200653 | 705835 | Simple culvert | New |
| **WC52** | On existing track crossing Allt Nighinn which is confluent with Allt nan Sac and Abhainn a' Bhealiach | 199501 | 705476 | Simple culvert | Existing |
| **WC53** | On existing track crossing unnamed watercourse confluent with Allt Nighinn which is confluent with Allt nan Sac and Abhainn a' Bhealiach | 199368 | 705504 | Simple culvert | Existing |
| **WC54** | New crossing of unnamed watercourse which is a tributary of Allt nan Sac and Abhainn a' Bhealiach | 199219 | 705831 | Simple culvert | New |
| **WC55** | New crossing of unnamed watercourse which is a tributary of Allt nam Muc and Abhainn a' Bhealiach | 199095 | 706158 | Simple culvert | New |
| **WC56** | New crossing of Allt nam Muc which is confluent with Abhainn a' Bhealiach | 198944 | 706360 | Simple culvert | New |
| **WC57** | On existing track crossing an unnamed watercourse which is confluent with Allt nan Sac which is a tributary of Abhainn a' Bhealiach | 198829 | 705454 | Simple culvert | Existing |
| **WC58** | On existing track crossing an unnamed watercourse which is confluent with Abhainn a' Bhealiach | 198532 | 705514 | Simple culvert | Existing |
| **WC59** | On existing track crossing an unnamed watercourse which is confluent with Abhainn a' Bhealiach | 198418 | 705552 | Simple culvert | Existing |

| | | | | | |
|---|---|---|---|---|---|
| **WC60** | New crossing of Allt Nam Muc which is a tributary of Abhainn a' Bhealiach | 198269 | 705802 | Simple culvert | New |
| **WC61** | New crossing of Allt Nam Muc which is a tributary of Abhainn a' Bhealiach | 198639 | 706094 | Simple culvert | New |
| **WC62** | New crossing of a tributary of Allt Nam Muc which is confluent with Abhainn a' Bhealiach | 198627 | 706306 | Simple culvert | New |
| **WC63** | New crossing of a tributary of Allt Lag a' Bhainne which is confluent with Abhainn a' Bhealiach | 198528 | 706731 | Simple culvert | New |
| **WC64** | New crossing of an unnamed watercourse which is confluent with Abhainn a' Bhealiach | 198263 | 705445 | Simple culvert | New |
| **WC65** | New crossing of Abhainn a' Bhealiach | 197538 | 703849 | Bridge / culvert | New |
| **WC66** | On an existing crossing of an unnamed tributary of Abhainn a' Bhealiac. | 197267 | 704343 | Simple culvert | Existing |
| **WC67** | On an existing crossing of an unnamed tributary of Abhainn a' Bhealiach | 197239 | 704464 | Simple culvert | Existing |
| **WC68** | On an existing crossing of an unnamed tributary of Abhainn a' Bhealiach | 197145 | 704723 | Simple culvert | Existing |
| **WC69** | New crossing of an unnamed watercourse which is confluent with Abhainn a' Bhealiach | 196884 | 704994 | Simple culvert | New |
| **WC70** | New crossing of an unnamed watercourse which is confluent with Abhainn a' Bhealiach | 196715 | 704811 | Simple culvert | New |
| **WC71** | New crossing of Allt nan Sac which is confluent with Abhainn a' Bhealiach | 198904 | 705028 | Simple culvert | New |
| **WC72** | New crossing of an unnamed tributary of Allt nan Sac which is confluent with Abhainn a' Bhealiach | 198948 | 704843 | Simple culvert | New |

| | | | | | |
|---|---|---|---|---|---|
| **WC73** | New crossing of an unnamed tributary of Allt nan Sac which is confluent with Abhainn a' Bhealiach | 198958 | 704569 | Simple culvert | New |
| **WC74** | On an existing crossing of an unnamed tributary of Allt nan Sac which is confluent with Abhainn a' Bhealiach | 198649 | 704214 | Simple culvert | Existing |
| **WC75** | On an existing crossing of an unnamed tributary of Allt nan Sac which is confluent with Abhainn a' Bhealiach | 198582 | 704147 | Simple culvert | Existing |
| **WC76** | On an existing crossing of an unnamed tributary of Allt nan Sac which is confluent with Abhainn a' Bhealiach | 198559 | 704127 | Simple culvert | Existing |
| **WC77** | New crossing of an unnamed tributary of Abhainn a' Bhealiach | 198341 | 703794 | Simple culvert | New |
| **WC78** | New crossing of an unnamed tributary of Abhainn a' Bhealiach | 198226 | 703611 | Simple culvert | New |
| **WC79** | New crossing of an unnamed tributary of Abhainn a' Bhealiach | 198331 | 703553 | Simple culvert | New |
| **WC80** | New crossing of an unnamed tributary of Abhainn a' Bhealiach | 198191 | 703216 | Simple culvert | New |
| **WC81** | New crossing of an unnamed tributary of Abhainn a' Bhealiach | 198013 | 703049 | Simple culvert | New |
| **WC82** | New crossing of a watercourse connecting Lochan Gaineamhach and Loch nan Sac which is confluent with Allt nan Sac and Abhainn a' Bhealiach | 199927 | 704375 | Culvert | New |
| **WC83** | New crossing of a watercourse connecting Lochan Gaineamhach and Loch nan Sac which is confluent with Allt nan Sac and Abhainn a' Bhealiach | 199961 | 704371 | Culvert / bridge | New |

| | | | | | |
|---|---|---|---|---|---|
| **WC84** | On an existing crossing of a tributary of Douglas Water | 203968 | 707658 | Simple culvert | Existing |
| **WC85** | New crossing of unnamed watercourse confluent with Douglas Water | 201181 | 707179 | Simple culvert | New |
| **WC86** | New crossing of unnamed watercourse confluent with Douglas Water | 201124 | 707001 | Simple culvert | New |
| **WC87** | New crossing of unnamed watercourse confluent with Douglas Water | 200802 | 706779 | Simple culvert | New |
| **WC88** | New crossing of unnamed watercourse confluent with Douglas Water | 200796 | 706796 | Simple culvert | Existing |
| **WC89** | New crossing of unnamed watercourse confluent with Douglas Water | 200902 | 706599 | Simple culvert | New |
| **WC90** | New crossing of unnamed watercourse confluent with Douglas Water | 200746 | 706393 | Simple culvert | New |
| **WC91** | New crossing of an unnamed tributary of Abhainn a' Bhealiach | 198704 | 705491 | Simple culvert | New |
| **WC92** | New crossing of Allt nan Sac which is confluent with Abhainn a' Bhealiach | 198919 | 704988 | Simple culvert | New |

The new culvert structures would likely comprise simple culvert type constructions using circular pre-cast culvert sections in concrete or structured wall plastic (**Chapter 4 - Description of the Proposed Development** and **Figure 4.12**), with cross sectional areas that would not impede flow of water. The design of culverts would be to at least CIRIA Report C786: 'Culvert, Screen and Outfall Manual' (2019) standard and the culvert structure would not affect either the channel or banks. The existing alignment of the watercourses would remain unchanged.

Bridges are the preferred solution for the larger crossings due to their lesser hydrological and ecological effects and are particularly suited to higher flow watercourses. Bridge construction would be unlikely to interfere with the watercourses and can be built over the existing alignment of the river without the need for diversion. Foundations would be required on both banks (down to a competent bearing stratum) at each bridge location in order to support the bridge deck. A typical bridge section is discussed in **Chapter 4 - Description of the Proposed Development** and shown in **Figure 4.13**.

The culverts and bridges would require some level of authorisation under CAR. According to CAR, a Practical Guide (2023), registration is required for *"single-track roads and single-track railways, footpaths and / or cycle routes, where the affected watercourse is not more than 2m wide"*. Registration is also required for bottomless arch culverts over wider watercourses where no part of the structure encroaches on the channel bed and provided the total length of structures on both banks does not exceed more than 20m. Pipe or box culverts and / or a bridge for watercourses exceeding 2m in width would require a Simple Licence.

All turbine cables need to lead to the control building and substations. This means that the turbine cables would need to be brought to these facilities alongside the tracks crossing watercourses. This may require cable trenching to leave the access tracks to cross the watercourses. The WAT-SG-25 (SEPA, 2010) discusses cable crossings and identifies boring beneath the channels as having the least impact on watercourses. Directional drilling would therefore possibly be required to pass the cable beneath these burns and to ensure that there is no influence on the watercourses. CAR GBR7 would be adhered to in laying the cable beneath the watercourses. A full geotechnical assessment would be undertaken at the detailed design stage following consent.

## Excavations and Associated Drainage

**EIA Report Chapter 4 - Description of the Proposed Development** identifies that excavations for turbine foundations are likely to be 25m in diameter and 3-4m in depth (**Figure 4.3**), with the depth of excavation for crane hardstanding and other infrastructure considerably less. Where possible, excavations required to facilitate the construction of foundations for the wind turbines, service trenches and each crane base would be designed so that they can freely drain by gravity. Cut-off drains would be installed around the excavation areas to prevent surface run-off entering the excavations, or nearby watercourses in the case of infrastructure in the vicinity of T2, T4, T6, T9 and T13.

Measures based on Best Practice guidelines from SEPA would be adopted during construction to prevent pollution, with all contractors aware of a pre-planned pollution incident response procedure, as detailed in GPP21. The turbine foundation design minimises excavation requirements in accordance with BS6031: 2009 Code of Practice for Earth Works.

Turbine construction would need to adopt mitigation measures to prevent contaminants entering the shallow groundwater system. The main potential groundwater effect arising from the construction of the wind turbine foundations and adjacent crane hardstandings is the risk of leaching concrete residues into the water environment. Given the dominant soil type and areas of peat distribution, the near-surface groundwater at the Development Site is likely to be acidic. Therefore, to minimise the potential of concrete leaching and alkaline pollution of groundwater, suitable sulphate-resistant concrete would be used. The foundation design would be checked with SEPA and, if necessary, the foundation excavations would incorporate an adequate barrier to prevent the mitigation of any on-site pollutants to the underlying groundwater.

Should ground conditions occur during excavation where gravity drainage is not possible (i.e. where low permeability rock or superficial deposits are present) the excavations would be dammed and drained by pumping. These dewatering activities would be undertaken in accordance with Best Practice (including WAT-SG-29 on Temporary Construction Methods), which would be detailed in the CEMP to be agreed by SEPA and the ECoW prior to commencement of construction works.

The design for the dewatering would ensure collection and settling of suspended sediment i.e. use of silt traps, fences, straw bales or lagoons. Any water removed from the excavation (including with respect to the crane hardstandings and blade laydown areas) would be treated and pumped to a bunded and vegetated settlement and infiltration swale, downgradient of the excavation and away from watercourses, and there would be no discharge of water directly into a watercourse. The potential for infiltration would need to be carefully assessed due to the prevalence of saturated conditions across the

Development Site. Should this be an issue, a number of these swales could be used with a wide spatial distribution to prevent oversaturation. If large volumes of water are expected from dewatering, other SuDS elements such as french drains could also be utilised (subject to ground conditions). Should local topography or ground conditions prove unsuitable for construction of either infiltration swales or settlement lagoons, the use of portable silt trap devices such as 'Siltbuster' type tanks could be considered for removal of elevated suspended solids from water pumped from excavations. These activities would be designed and implemented in consultation with SEPA on a foundation-specific basis following completion of detailed ground investigations and micro-siting prior to construction.

The locations of swales or settlement lagoons, where required, would be on stable areas of shallow slope, to reduce the risk of failure. The size of the settlement lagoons would be appropriate to the amount of dewatering, but if large quantities of dewatering are anticipated, the potential for more than one lagoon or the use of portable silt trap devices would be considered on a foundation-by-foundation basis. If any discharge to surface watercourses is required, the water would be treated beforehand and the need for any consent from SEPA agreed (it is expected that in most cases the activities would be covered by CAR GBR3 and / or GBR15).

Following erection of the turbines, the auxiliary crane hardstandings and blade laydown foundations depicted on **EIA Report Chapter 4 – Description of the Proposed Development**, **Figure 4.4** would be reinstated. This would involve removal of the geogrids and compacted gravel and placement of previous cover, thereby facilitating the reestablishment of the original drainage conditions with respect to infiltration and reduced surface run-off. This is of particular benefit in those turbine locations mentioned earlier where some limited encroachment of watercourse buffers is anticipated.

A number of borrow pits have been proposed within the Development Site to supply crushed aggregate and rock during the construction phase. Ground investigation at the borrow pit search areas will be undertaken to determine the presence and extent of any shallow soil contaminants, and the excavation and reworking of these pits and deeper excavations may require dewatering during rock removal. Based on the status of the aquifer (low permeability) any such dewatering is anticipated to involve small volumes of water with limited impacts to groundwater resources. Similar controls to those detailed above with respect to the turbine foundations would be employed to prevent contamination of surface waters with suspended sediment. The dewatering of excavations at greater than $10m^3$/day would require CAR Registration, while over $50m^3$/day would require a CAR licence. Abstractions smaller than $10m^3$/d would comply with GBR3.

## Peat Excavations and Storage

Surface run-off from stockpiles of excavated peat, whether temporarily stored prior to backfilling or permanent stored in peat storage areas, has the potential to affect surface water quality due to the transportation of suspended solids in surface water run-off. Therefore, Best Practice measures e.g., the SR, SNH, SEPA, FCS, HES, MSS and AEECoW (2019) ‘Good Practice guidance during Wind Farm Construction’ would be implemented to ensure that peat is appropriately stored.

During the design phase of the Proposed Development, the selection of turbine locations has avoided, wherever possible, areas where substantial peat thicknesses (usually deeper than 1m) have been identified. This helps to reduce the volumes of peat excavated for the construction of concrete foundation slabs; and therefore the need to manage materials. However, it has not been possible to avoid all areas where peat overlies the solid geology. Consequently, mitigation measures would be adopted to prevent changes which have the potential to influence water quality.

Surface run-off from stockpiled materials excavated has the potential to affect surface water quality if these are inappropriately excavated and stored. The peat storage areas would not encroach watercourse buffers and would be contained to prevent sediment or nutrient run-off from eventually reaching downstream watercourses.

The storage of peat during construction would minimise slumping and maintain stratification, where possible using water derived from dewatering activities to keep the peat adequately saturated to prevent desiccation and degradation. It is anticipated that all excavated peat can be re-used on-site, and so it is not expected that any peat would need disposal or long-term storage by way of a waste management licence. Neither is it expected that there would need to be storage of peat spoil for a period greater than one year and thus no requirement for a permit in accordance with the Landfill (Scotland) Regulations 2003.

The upper levels of the peat and turf excavated for the turbine bases can be used for resurfacing following construction (in non-hardstanding areas), thus maintaining the hydrological and biological characteristics of the location. This resurfacing would aim to restore a flat surface around the turbine, preventing mounding. This would help to re-establish hydraulic continuity of the replaced peat and turf with surrounding saturation levels, thereby reducing the possibility of peat drainage and desiccation.

Peat protection and monitoring measures are described within the PMP presented in **EIA Report Chapter 6: Renewable Energy, Carbon Balance and Peat, Appendix 6A: Peat Management Plan**.

## Forest Felling

Detailed Construction Method Statements (CMSs) would be produced for all aspects of site work, including a series covering forestry activities. This documentation would require approval from ABC (following consultation with SEPA) prior to commencement of site works.

Forest operational planning at a site level is the key to ensuring that siltation and erosion are minimised. Before any harvesting operations commence, there would be a need to assess the vulnerability of the Development Site to erosion, including the upslope and downslope routing of water, the condition of watercourses, and any pre-existing deficiencies in the drainage system that are contributing to active erosion. A harvesting CMS, including contingencies for possible events such as severe weather, would be developed. The harvesting CMS would describe how the Development Site would be set out and worked to reduce the risk of adverse effects. This would cover the selection of the appropriate matching of harvesting machinery to ground conditions and the identification of techniques to minimise disturbance and afford protection to watercourses and previously unidentified GWDTEs. The timing of operations to avoid adverse weather and ground conditions, and mitigation measures as per the Forests and Water Guidelines, in support of the UK Forestry Standard, would be identified in the harvesting CMS. The Guidance includes many of the water management mitigation described elsewhere in this section. With respect to acidification of surface waters, and also in line with the UK Forestry Standard, no more than 20% of any catchment greater than 100 ha in a Nitrate Vulnerable Zone (NVZ) would be felled, as there are no NVZs in the area.

The harvesting CMS would also be informed by an agreed sediment loss CMS. Prior to felling, areas would be risk-assessed and mapped to identify the sensitivity of the ground to sediment generation and corresponding requirements for mitigation. The risk assessment criteria would include the 50m watercourse buffer, areas with high densities of watercourses, steep ground, poorly drained organic soils, proximity to water bodies and existing drains and plough lines. The main output from this risk assessment would be a sediment loss control map.

Prior to operations, priority areas would be marked on the ground, and all contractors would be required to undertake an induction detailing all aspects contained in the CMS. The operational controls to be employed would depend on the assessed compartment priorities, ranging from standard forestry best practice following the UK Forestry Standard on standard priority areas of relatively gentle and accessible slopes, with freely draining, mineral soils and comparatively few watercourses, to extensive operational controls (dry weather working, brash mats, band-tracks, drainage interception) on high priority areas of deep peat and / or steeper gradients, poorly draining soils and numerous watercourses. Contingency planning would also be put in place, and if necessary, silt traps would be used as a final backstop to address sedimentation of watercourses. These traps would be monitored twice daily when required, which should be sufficient for the specific cause of the sedimentation to be identified and any associated mitigation measures to take effect.

The harvesting CMS would also take account of a forest residue CMS. This CMS would include measures that would protect peat during tree harvesting. These measures include the use of brash mats to support harvesting and excavation machinery as well as to protect underlying peat from rutting, compaction and erosion, and where there is no infrastructure, the leaving of the mats and tree stumps in situ post-harvesting to minimise ground disturbance associated with their digging out.

Forest felling of some 142.6ha (1.5% of the total Forestry Study Area (FSA) of 9,699.9 ha) would take place in advance of the baseline felling plan around areas of infrastructure ((**EIA Report Appendix 4A: Forestry Report**)), but restocking would take place to minimise the area of forestry lost in the longer term as a result of the Proposed Development. Buffer zones (‘key-holes’) of 85m radius around the turbines, 30m along access tracks and 10m around other infrastructure would be employed to minimise woodland loss, and so help maintain the baseline water environment. In this manner, the additional open ground as a result of the Proposed Development would be limited to 81.7ha 0.8% of the FSA). Furthermore, forestry close to watercourses that is removed would not be replaced where it would otherwise detrimentally affect water flow and quality in terms of wind throw, shade and needle cast.

SEPA’s guidance on GBRs and the Forests and Water Guidelines and UK Forestry Standard set out an extensive range of guidelines for ensuring risks to the aquatic environment from forestry operations are minimised. The Guidance includes many of the water management mitigation measures described elsewhere in this section. However, whilst the UK Forestry Standard also references the need for watercourse buffer zones (20m width for larger watercourses, less than the 50m being adopted for the Proposed Development), these buffers are not exclusion zones, so much as managed forest standoff zones. These zones aim to ensure that later forest management practices, such as pesticide application, do not affect the water environment.

## Site Working Practices

Site activities during construction and operation have been identified to have potential effects on the water environment. These can be controlled by the implementation of pollution prevention and control measures and Best Practice, based on the guidance outlined earlier.

The site induction for contractors would include a specific session on good practice to prevent and control water pollution from construction activities. Contractors would be made aware of their statutory responsibilities under CAR. A PPP and PIRP would be prepared for the Proposed Development, the latter in line with GPP 21, and all contractors would be briefed on these plans, with copies made available on-site. Equipment to contain and absorb spills would also be readily available.

Fuel and oil may enter the groundwater by migration vertically into the underlying groundwater or by run-off into nearby surface waters, if accidentally released or spilled during storage and refuelling. To minimise potential releases into the water environment, fuel would be stored in either a bunded area or a self-bunded above-ground storage tank (AST) kept on-site during the course of the construction phase in accordance with CAR and other SEPA Pollution prevention guidelines, and GBR9. The bunded area would have a capacity of 110% of the fuel tank. All stores would be located at least 50m from any watercourses.

In areas where there is a potential for hydrocarbon residues from run-off / isolated leakages, such as in plant storage areas and around fuel storage tanks and in refuelling zones in the proposed temporary site compound, surface water drainage would be directed to a hydrocarbon interceptor prior to discharge. The interceptor would filter out hydrocarbon residues from drainage water and retain hydrocarbon product in the event of a spillage to prevent release into surface waters at the discharge point and deterioration of downstream water quality.

Plant and machinery used during the construction phase would be maintained to minimise the risks of oils leaks or similar. Maintenance and refuelling of machinery would be undertaken off-site or within designated areas of temporary hardstanding. In these designated areas contingency plans would be implemented to ensure that the risk of spillages is minimised. Placing a drip tray beneath a plant and machinery during refuelling and maintenance would contain small spillages.

A temporary on-site concrete batching plant would be required for the foundation works, and this would be located either adjacent to one of the borrow pits or adjacent to one of the site compounds. A number of mitigation measures would be employed to minimise any effect on the water environment, including concrete batching on an impermeable designated area at least 50m from any watercourse, the washing of equipment and vehicles on a designated area that has been specifically designed to contain wet concrete / wash water and the discharge offsite of all excess wash water that cannot be reused.

The main potential hydrological effects during the operational phase of the Proposed Development relate to the servicing of the turbines and storage of oils and lubricants typically involved in the process which may be accidentally released into the water environment.

At the control building the small quantity of sewage arising from the infrequent visits of maintenance staff would be discharged into a septic tank connected to a soakaway. Water extraction for welfare facilities (non-potable) would be provided via mains water supply where available, and if not by a water harvesting and UV filter system. A rainwater collection system would be installed to provide water for flushing which, if necessary, would be topped up with water brought to site by tanker delivery in dry periods. Excess rainwater falling on the roof of the building would be discharged to an infiltration drain or other SUDS around the substation.

The potential risks posed to surface water and groundwater quality, specifically related to the operational period, are likely to be limited and localised based on the planned works and the nature and volume of substances required. Any potential risk to the environment would be identified by the operator prior to servicing being undertaken. The operator would ensure a site-specific risk assessment is completed and that control measures are implemented to ensure all environmental risks are minimised. However, as a pre-requisite, the storage, use and disposal of oils would be done in accordance with Best Practice and SEPA guidance (GPP 8).