EIA Report Chapter 7: Hydrology

Monan Repower

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Table of Contents

7 Hydrology

7.1 Introduction

Understanding surface and groundwater environments is critically important to designing a successful project. Surface water includes watercourses, water bodies, and precipitation runoff. It provides an important resource for: potable and other uses, amenity, aesthetic value, conservation, ecological environments, and for recharge to groundwater systems. Groundwater is also an important resource. It provides more than a third of the potable water supply in the UK and includes all water stored in permeable underground strata (or aquifers). In addition, it provides essential baseflow to rivers and wetland areas, often supporting important ecological systems.

The risk of pollution or disruption of watercourses, groundwater bodies, and private water sources, within or near the Site, needs to be assessed and appropriately mitigated where necessary. Potential impacts could include:

- Erosion and sedimentation
- Impacts to surface runoff characteristics
- Impacts on surface water quality
- Impacts on river flows and flooding
- Impacts on groundwater dependent terrestrial ecosystems (GWDTE)
- Impacts on soils
- Impacts on peat hydrological regime
- Chemical pollution of groundwater
- Disruption or fouling of private water supplies
- Impacts on public water supplies and abstractions
- Modifications to hydrogeological regime
- Peat Slide Risk

This chapter presents the impact assessment of the Proposed Development on the hydrology and hydrogeology environments.

The report is supported by the following figures associated with this chapter and within the Ecological Impact Assessment (EcIA) by IMT Ecology Ltd:

- Appendix 8.1 – Habitats & National Vegetation Classification Survey; Figure 7: The GWDTE classifications map within the Ecological Survey Area (ESA), and
- Figure 7.1: Hydrological Context Map; and
- Figure 7.2: Peat Depth Map.

7.2 Guidance

Statutory, general, national, and local guidance consulted during this assessment is listed below.

Table 7.1 - Policy, Legislation & Guidance

Retained European Legislation	Freshwater Fish Directive 2006/44/EC Water Framework Directive (WFD) 2000/60/EC Dangerous Substances Directive 76/464/EEC
Scottish Government Policy, Advice and Legislation	The Housing Scotland (Act) 1987 (Sect 86) National Planning Framework 4 (NPF4) PAN 79: Water and Drainage, 2006 Planning Advice Note (PAN) 61: Planning and SUDS, 2001 Scottish Government (2017) Peat Landslide Hazard and Risk Assessments, Best Practice Guide for Proposed Electricity Generation Developments Water Environment and Water Services (Scotland) Act 2003 The Flood Risk Management (Scotland) Act 2009 The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations, 2017 The Public and Private Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2017 The Pollution Prevention and Control (Scotland) Regulations, 2012
SEPA Guidance	GPP1 'Understanding your environmental responsibilities – good environmental practices' GPP 2 Above Ground Oil Storage Tanks PPG 3 Use and design of oil separators in surface water drainage systems GPP 4 Treatment and disposal of wastewater where there is no connection to the public foul sewer GPP 5 Works and maintenance in or near water PPG 6 Working at Construction and Demolition Sites GPP 8 Safe Storage and Disposal of Used Oils GPP 13 Vehicle washing and cleaning GPP 21 Pollution Incident Response Planning GPP 22 Dealing with spills Managing River Habitats for Fisheries, 2002 Special Requirements for Civil Engineering Contracts for the Prevention of Pollution, Version 2, SEPA, 2006 Culverting of Watercourses, WAT-PS-06-02, 2015 Natural Flood Management Handbook, 2015 Indicative River & Coastal Flood Map (Scotland) Planning advice on wastewater drainage, 2011 Temporary Construction Methods, WAT-SG-29, 2009

	Water Run-Off from Construction Sites, WAT-SG-75, 2021 SEPA Flood Risk and Planning Briefing Note, 2009 Groundwater Protection Policy for Scotland, v3, 2009 SEPA Position Statement 'The role of SEPA in Natural Flood Management', 2012 Technical flood risk guidance for stakeholders, SS-NFR-P-002, 2015 SEPA Regulatory Position Statement – Developments on peat, 2010 Engineering in the water environment: good practice guide - River crossings, 2010 Environmental Standards for River Morphology, WAT-SG-21, 2012 The Water Environment (Controlled Activities) (Scotland) Regulations 2011 - A practical guide, Version 8.3 February 2019 Land Use Planning System SEPA Guidance Note 31: Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, 2017 Land Use Planning System SEPA Guidance Note 4: Planning guidance on onshore windfarm developments, 2017 SEPA Water quality classification interactive database (2019 data)
Other Guidance	CIRIA C515 Groundwater Control - Design and Practice CIRIA C532 Control of Water Pollution from Construction Sites CIRIA C648 Control of Water Pollution from Linear Construction Projects CIRIA C689 Culvert Design and Operation Guide CIRIA C741 Environmental Good Practice on Site CIRIA C753 SUDS Manual A handbook on environmental impact assessment - Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland. NatureScot, 2018 River Crossings and Migratory Fish: Design Guidance, A Consultation Paper, The Scottish Executive Good Practice During Windfarm Construction, 2019 (4th Edition), Scottish Renewables (SR), NatureScot, SEPA, Forestry Commission Scotland (FCS), Historic Environment Scotland and Marine Scotland Science NatureScot, (2023) Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Online version. Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, online version only Forestry & Water Scotland (2018) Protecting Private Water Supplies During Forestry Activities

7.3 Methodology

The assessment of the potential impact of the proposal on hydrology and hydrogeology was carried out by the general method described in the following Sub-Sections.

7.3.1 Study Area

Given the scale of the development, a conservative study radius of 1.2km around the proposed turbine locations has been used for the assessment. The criteria for defining the study area have been established based on professional judgement, experience regarding expected working areas, relevant SEPA guidance, and other relevant guidance on hydrological assessment.

7.3.2 Identification of Baseline Conditions

The purpose of the baseline study is to identify:

- Land use across the Site
- Topography and surface water hydrology, including water courses, springs, and drains
- The extent of river catchments and all flooding risk
- Geological and hydrogeological conditions of the Site
- Any current dewatering, abstraction, or foul drainage
- Private drinking water abstractions and private water supplies
- The extent of habitats across the Site, particularly any GWDTE

Baseline conditions within the Site are established through a desktop survey and later through a site visit. The following sources have been consulted:

- Ordnance survey 1:10,000 and 1:50,000 map data
- Ordnance survey digital terrain model (DTM)
- BGS – Geology of Britain Viewer https://www.bgs.ac.uk/map-viewers/geology-of-britain-viewer/
- BGS – Hydrogeological Map 1:625,000
- BGS – Groundwater Vulnerability Map 1:625,000
- Scotland's soils, Carbon and Peatland 2016 Map https://map.environment.gov.scot/Soil_maps/?layer=10
- Scotland's Environment Map https://map.environment.gov.scot/sewebmap/?layers=riverClass
- Consultation with statutory and non-statutory organisations, including SEPA, NatureScot, Scottish Water, and the Council's Environmental Health Department.
- SEPA Flood Maps https://map.sepa.org.uk/floodmap/map.htm
- SEPA River Basin Management Plan (RBMP) interactive Map https://www.sepa.org.uk/data-visualisation/water-environment-hub/
- NatureScot Sitelink https://sitelink.nature.scot/map
- Outer Hebrides Fisheries Trust https://www.outerhebridesfisheriestrust.org.uk/
- Western Isles District Salmon Fisheries Board https://www.widsfb.org/#:~:text=WIDSFB%20is%20a%20statutory%20body,Salmon%20Fishery%20Boards%20in%20Scotland.

The findings of the desktop survey were confirmed and supported by a site walkover on 25th September 2023, which covered the footprint of the Proposed Development and the surrounding hydrological features within the Site. Where possible, this walkover included a visual assessment of the condition of the surrounding peatland, existing drainage systems, and ground conditions.

A National Vegetation Classification (NVC) and habitats survey was undertaken by IMTeco Ltd in May - September 2023. The aim of this survey was to identify and map the vegetation communities within the Monan site to identify the areas of greatest ecological interest, including potential Groundwater Dependent Terrestrial Ecosystems (GWDTE). The survey covered the entirety of the wind farm, extending out to 250m around each proposed turbine location and 100m from the proposed access track and existing tracks in each direction. Further details regarding the NVC study are presented in **Appendix 8.1 – Habitats & National Vegetation Classification Survey**.

7.4 Consultation

A Scoping Report was submitted to Comhairle Nan Eilean Siar in September 2023 (Application Reference: 23/00431_SCO_L), which received feedback from SEPA and Comhairle nan Eilean Siar in relation to the hydrological assessment. This feedback has been considered in detail and fed into the following assessment.

Table 7.2 – Scoping Responses and Associated Actions

Consultee	Comment	Action
SEPA	*"The key message will be peat will not be accepted as a waste product and cannot be used for general landscape or agricultural purposes.* *In relation to flood risk, it should be noted SEPA Future Flood Map layer should now be used in any future assessments in line with NPF4."* *"Whilst we agree with the proposed methodology in terms of peat probing we will wish to see demonstration the impact on peat volumes has been minimise as much as possible with alternative locations for the proposed turbines considered if found on deep peat and also an indication of expected volumes of peat to be excavated and a clear demonstration of where this extracted peat will be re-used in compliance with NPF4 Policy 5. The EIA should include an assessment of the receiving peatland in terms of condition and appropriateness for peat re-use."*	The results of the peat surveys have been a key consideration throughout the design process and the Proposed Development has been sited to avoid areas of deeper peat, as far as possible. The estimated peat excavation and potential reuse volumes are set out in **Appendix 7.1 – Outline Peat Management Plan.** This shows that all excavated peat will be reused within the Application Site Boundary and no peat will be removed from site. Additionally, SEPA's Future Flood Map layer has been utilised when identifying the hydrological baseline within the study area. This is set out in **Section 7.5.4.**
Comhairle nan Eilean Siar	*"The EIA report will be required to demonstrate that the impact on peat volumes has been minimised as much as possible with alternative locations for the proposed turbines considered if found on deep peat and also an indication of expected volumes of peat to be excavated and a clear demonstration of where this extracted peat will be re-used in compliance with NPF4 Policy 5. The EIA should include an assessment of the receiving peatland in terms of condition and appropriateness for peat re-use"*	The results of the peat surveys have been a key consideration throughout the design process and the Proposed Development has been sited to avoid areas of deeper peat, as far as possible. The estimated peat excavation and potential reuse volumes are set out in **Appendix 7.1 – Outline Peat Management Plan**. This shows that all excavated peat will be reused within the Application Site Boundary and no peat will be removed from site.

7.4.1 Assessment of Receptor Sensitivity

With the baseline established, sensitive receptors can be determined. The criteria set out in the Table below outlines the various factors considered in the assessment of the sensitivity of potential receptors.

Table 7.3 - Sensitivity Table

Sensitivity	Definition
High	Receptor of high quality, rarity of a regional or national scale, and limited potential for substitution or replacement. This includes: • Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) or Special Area of Conservation (SAC) • SEPA Water Quality defined as High • Abstraction for public water supply • Private water supplies – 0 to 100m from construction activities • Designated salmonid fishery and/or salmonid spawning grounds present • Watercourse widely used for recreation, directly related to watercourse quality (e.g., swimming, salmon fishery) <1.2km downstream of development • Active flood plain area (important in relation to flood defence) • Groundwater - public drinking water supply • Groundwater aquifer productivity classed 1A or 2A in the BGS 1:625000 Hydrogeology Map • Geology that is rare or of national importance as defined by SSSI or Regional Important Geological Site (RIGS) • Groundwater dependent terrestrial ecosystems (GWDTE) defined as Class 1, and/or defined as 'High Conservation Value' by Ecologist • Peat defined as Class 1 and Class 2 • Peat Slide Risk likelihood of 'probable' or 'almost certain'
Medium	Receptor of medium quality, rarity of a local, regional, or national scale, and limited potential for substitution/replacement. This includes: • SEPA Water Quality defined as Good • Surface water abstractions for private water supply for more than fifteen people • Private Water Supplies – Surface water abstractions within 100 – 600m of construction activities, groundwater spring abstractions within 100 – 400m of construction activities, and groundwater borehole abstractions within 0 – 200m of construction activities • Designated salmonid fishery and/or cyprinid fishery • Watercourse widely used for recreation, directly related to watercourse quality (e.g., swimming, salmon fishery) >1.2km downstream of development • Groundwater aquifer productivity classed as 1B or 2B in the BGS 1:625000 Hydrogeology Map • Groundwater dependent terrestrial ecosystems (GWDTE) defined as Class 2, and/or defined as 'Medium Conservation Value' by Ecologist • Peat Slide Risk of 'Likely'
Low	Receptor of low quality, rarity of a local, regional, or national scale, and limited potential for substitution/replacement. This includes:

Sensitivity	Definition
	• SEPA Water Quality defined as Moderate or Poor • Occasional or local recreation (e.g., local angling clubs) • Conveyance of flow and material, main river <10 m wide or ordinary watercourse >5 m wide • Existing flood defences • Private Water Supplies – Surface water abstractions >600m from construction activities, groundwater spring abstractions within 400 – 800m of construction activities, and groundwater borehole abstractions within 200 – 600 m of construction activities • May be subject to improvement plans by SEPA • Designated cyprinid fishery, salmonid species may be present and catchment locally important for fisheries • Watercourse not widely used for recreation, or recreation use not directly related to watercourse quality • Groundwater aquifer productivity classed as 1C or 2C in the BGS 1:625000 Hydrogeology Map • Groundwater dependent terrestrial ecosystems (GWDTE) defined as Class 3, and/or defined as 'Local Conservation Value' by Ecologist • Peat Slide Risk of 'Unlikely'
Negligible	Receptor of low quality, rarity of a local scale, and limited potential for substitution/replacement. Environmental equilibrium is stable and is resilient to changes that are greater than natural fluctuations, without detriment to its present character. This includes: • SEPA water quality defined as Bad • Fish sporadically present or restricted, no designated features • Receptors not used for recreation, e.g., no clubs or access route associated with watercourse • Watercourse <5 m wide – flow conveyance capacity of watercourse low - very limited floodplain as defined by topography, historical information and SEPA flood map • Private Water Supplies – groundwater spring abstraction >800 m from construction activities, and groundwater borehole abstractions >600 m from construction activities • No public drinking water supplies • Groundwater aquifer productivity classed as 3 in the BGS 1:625000 Hydrogeology Map • Receptor heavily engineered or artificially modified and may dry up during summer months • Geology not designated under a SSSI or RIGS or protected by specific guidance • Peat defined as Classes 3, 4 and 5 • Peat Slide Risk of 'Negligible'

7.4.2 Assessment of Magnitude of Impact

The analysis of the significance of each impact is based on its magnitude. The magnitude of impact includes the timing, scale, size and duration of the potential impact. For the purposes of this assessment the magnitude criteria are defined as follows.

Table 7.4 - Magnitude of Impact Table

Magnitude	Criteria	Description and Example
Large	Results in loss of attribute	• Fundamental (long term or permanent) changes to geology, hydrology, water quality and hydrogeology • Loss of designated Salmonid Fishery • Loss of national level designated species/habitats • Changes in WFD water quality status of river reach • Loss flood storage/increased flood risk • Pollution of potable source of abstraction compared to pre-development conditions
Medium	Results in impact on integrity of attribute or loss of part of attribute	• Material but non-fundamental and short to medium term changes to the geology, hydrology, water quality and hydrogeology • Loss in productivity of a fishery • Contribution of a significant proportion of the discharges in the receiving water, but insignificant enough to change its water quality status
Small	Results in minor impact on attribute	• Detectable but non-material and transitory changes to the geology, hydrology, water quality and hydrogeology
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity	• No perceptible changes to the geology, hydrology, water quality and hydrogeology • Discharges to watercourse but no loss in quality, fishery productivity or biodiversity • No significant impact on the economic value of the receptor • No increase in flood risk

7.4.3 Assessment of Significance of Impact

The sensitivity of the receptor together with the magnitude of impact defines the significance of the impact as outlined below.

Table 7.5 - Significance of Impact Matrix

		MAGNITUDE			
		LARGE	MEDIUM	SMALL	NEGLIGIBLE
SENSITIVITY	HIGH	Major	Major	Moderate	Negligible
	MEDIUM	Major	Moderate	Minor	Negligible
	LOW	Moderate	Minor	Minor	Negligible
	NEGLIGIBLE	Negligible	Negligible	Negligible	Negligible

The significance of any identified effects will be assessed in terms of Major, Moderate, Minor or Negligible. The matrices should not be used as a prescriptive tool but will allow for the exercise of professional judgement.

Any effects that are classified as Major or Moderate, will be considered to be equivalent to likely significant effects referred to in the EIA Regulations. Where an effect is deemed to be significant, mitigation will be employed to reduce those impacts to a non-significant level.

7.4.4 Mitigation & Assessment of Residual Impact

There are recognised best practices and measures to mitigate and eliminate predicted impacts. These may be grouped in decreasing order of preference as follows: Avoid; Cancel; Reduce; and Remediate/Compensate. Consideration will also be given to potential enhancement measures, and the possibility of creating a net environmental benefit.

Once each predicted impact is associated with a mitigating measure, the residual magnitude is derived. The sensitivity of the receptor together with the residual magnitude of impact defines the significance of the post-mitigation impact, as outlined in Table 7.5.

7.5 Baseline

7.5.1 Site Overview

The Proposed Development is located on and around the eastern flanks of Cnoc Leathan (250m AOD), approximately 0.8km to the north-east of the Hamlet of Bun Abhainn Eadarra on North Harris, Outer Hebrides. The Proposed Development is comprised of three turbines, that will be erected to replace the operational turbines within Monan Wind Farm as a proposed repowering project.

The study area and the wider setting is predominantly comprised of banket bog and shrub heathland habitats, that are intercepted by rocky outcrops and various lochs. The Site also has a history of human activities, with the operational Ceann an Ora Quarry located directly to the west of the site entrance, and the presence of the existing turbines at Monan Wind Farm. The A859 passes through the southern-eastern section of the study area, connecting the various rural settlements from Stornoway to Rode.

The terrain within the study area ranges from an elevation of 3-390m AOD. The topography features several raised peaks, including: the northern flanks of Sgaoth Iosal (531m AOD) and the Tarsabhal (376m AOD), which then descend to the south-west to meet the coastline at Loch Bun Abhainn Eadarra.

The Proposed Development is discussed further in detail within Chapter 2 - Proposed Development and Design Evolution.

7.5.2 Hydrology overview

The study area is fully situated in the Lewis and Harris Coastal catchment of the Scotland River Basin District[1].

The raised terrain within the study area enables water to flow in several directions. The northern section of the study area is drained by the Abhainn Thorabraidh. This watercourse travels in a south-western direction and merges with several unnamed burns that drain the surrounding heathlands to form the Abhainn Eadarra watercourse. The Abhainn Eadarra then flows in a southern trajectory before passing underneath the B887 and dispelling into Loch Bun Abhainn Eadarra at the south-western corner of the study area. This is illustrated within Figure 7.1 – Hydrological Context Map.

The Abhainn Glaic a Choin duinn stems from the south-eastern flanks of Cnoc Lethan within the centre of the study area. This watercourse flows in a south-west direction and merges with several unnamed drains before also passing underneath the B887 and emptying into the Loch Bun Abhainn Eadarra.

There are several small drains that drain the southern flanks of the Tarsabhal within the eastern study area that pass underneath the A859 and dispel into Loch a' Mhorghain. The outfall from Loch a' Mhorghain flows through a dam system and feeds into Loch Sgeireagan Beag and then Loch na Sgeireagan Mor. An outfall from Loch na Sgeireagan Mor then flows west towards Ceann an Ora beach, whilst merging with several unnamed watercourses

[1] https://map.environment.gov.scot/sewebmap/ (Last Accessed 23/06/2023)

that drain the surrounding heathland, before flowing underneath the B887 and dispelling into the Loch Bun Abhainn Eadarra.

There are also some unnamed standing waterbodies within the study area that are associated with topographical low points.

The study area lies within the boundary of the Western Isles District Salmon Fishery Board[2] and the Outer Hebrides Fishery Trust. Bun Abhainn Eadarra is known for a variety of fish, such as haddock, dab, and whiting fish. Beyond this, the catchment as a whole is known for its Salmon and Sea Trout fishing, primarily within the lochs[3] and is a popular recreational fishing destination.

7.5.3 Surface & Groundwater Classification

SEPA has classified the quality of all significant waterbodies in Scotland under the Water Framework Directive (WFD) (2022)[4]. The nearest classified surface water bodies are the Abhainn Eadarra (ID: 20776) and Loch a Siar (ID: 200169).

The Abhainn Eadarra river is approximately 5.9km in length and intersects the northern and western section of the study area. It was awarded an overall status of 'Good' for the year 2022, with no limiting parameters.

The Loch a Siar coastal waterbody is c.46.4km^2 in area and characterises the coastal area along the western fringes of the study area. This waterbody also received a status of 'Good' in 2022 for its overall status, with no limiting parameters noted.

SEPA have also classified the quality of all groundwater bodies in Scotland under the Water Framework Directive (WFD)[5]. The study area lies within the Lewis and Harris groundwater unit (ID: 150695). The map illustrates that the groundwater has an overall status, chemical status, and water quality status of 'Good' for the year 2022.

7.5.4 Flood Risk

SEPA's Flood Hazard and Risk Map illustrates the indicative flood extents of high likelihood (1 in 10-year probability), medium likelihood (1 in 200-year probability), or low likelihood (1 in 1000-year probability) of coastal, surface and river floods[6].

The flood map illustrates that the Abhainn Eadarra, Abhainn Thorabraidh, Loch a' Mhorghain, Loch Sgeireagan Beag, Loch na Sgeireagan Mor and its outfall stream all have a high likelihood of river flooding. However, it is worth noting that the flood risk is contained mostly within the extent of the watercourse and the lochs. SEPA's future flood maps also identified some river flooding extents associated with the Abhainn Thorabraidh and Abhainn Eadarra that are slightly wider than the current flood extents.

The dam associated with Loch a' Mhorghain and Loch Na Learga situated in the central study area have been identified as areas with a high likelihood of surface water flooding. These flood areas are illustrated as being mostly confined to their extents and immediate surroundings. The map also highlights scattered patches at high likelihood of surface water flooding along the Abhainn Thorabraidh and Abhainn Eadarra water channel.

There are also several small areas across the study area that are highlighted to be at a high risk of surface water flooding, which appear to be either periodic pools or areas of standing water that are associated with topographical low points.

[2] https://www.widsfb.org/ (Last Accessed 21/07/2023)
[3] https://www.outerhebridesfisheriestrust.org.uk/angling (Last Accessed 21/07/2023)
[4] https://www.sepa.org.uk/data-visualisation/water-classification-hub/ (Last Accessed 14/02/2024)
[5] https://www.sepa.org.uk/data-visualisation/water-classification-hub/ (Last Accessed 14/02/2024)
[6] https://map.sepa.org.uk/floodmap/map.htm (Last Accessed 29/06/2023)

There are no 'Potentially Vulnerable Areas' noted within the Study Area, i.e. no potential impacts of flooding on potentially vulnerable areas of people, properties, community services and specific environmental sites.

7.5.5 Hydrogeology

The British Geological Survey Map (BGS) 1:50,000 indicates that the study area is predominantly underlain with the metamorphic gneisses of the Lewisian Gneiss Complex. This bedrock was formed between the Archean Eon and the Proterozoic Eon[7].

There is also an area of Amphibolite of the Lewisian Complex on the southern fringes of the study area, and there are two pockets of Ultramafic Rock of the Lewisian Complex within the centre and the southern section of the study area, which is an igneous bedrock[8].

Within the northern section of the study area, there is a small area of Granite of the Uig Hills - Harris Igneous Complex[9]. This igneous bedrock was laid down during the Paleoproterozoic Era.

The superficial geology information within the study area was also obtained from the 1:50,000 BGS mapping. The superficial deposits for the study area are situated in the northern portion and consist of Diamicton (Till). These sedimentary deposits consist of a variety of clay, sand, gravel, and boulders that vary in size and shape[10].

The BGS Hydrogeology 1:625,000 map classifies the potential for bedrock to supply groundwater and describes the potential for groundwater flow mechanism. The study area is located upon the Lewisian Complex unit, which is noted to be a low productivity aquifer (2C). The flow for this unit is described as being virtually all through fractures and other discontinuities, with groundwater only present in near surface weathered zone and secondary fractures[11].

7.5.6 Private Water Supplies

From discussions with the Environmental Health Team at Comhairle Nan Eilean Siar in July 2023, it was identified that there are no known Private Water Supplies (PWS) within 3km of the Proposed Development. It was also noted that all the nearby properties are believed to be on mains water supplied by Scottish Water.

7.5.7 Peat

The NatureScot Carbon and Peatland Map (2016) identifies the study area to be predominantly underlain with Class 2 peat, which is noted as "peatland or areas with high potential to be restored to peatland"[12]. This is also intersected with pockets of Class 1 peat within the central and northern areas as shown in **Figure 7.1 - Hydrological Context Map**. Class 1 and Class 2 peat are considered to be nationally important carbon-rich soils that are likely to be of high conservation value. However, it was also noted during the hydrological walkover that there are several areas of bare peat and peat hags within the vicinity of the Proposed Development, as illustrated below.

The remainder of the study area is underlain with areas of Class 3 peat (predominantly peaty soil with some peat soil), Class 4 peat (predominantly mineral soil with some peat soil), Class 5 peat (no peatland vegetation), and mineral soils.

[7] https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=L (Last Accessed 14/02/2024)
[8] https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=L (Last Accessed 14/02/2024)
[9] https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=UIGH (Last Accessed 14/02/2024)
[10] https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=TILL (Last Accessed 14/02/2024)
[11] https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.166655162.589823250.1708008227-725116081.1708008227 (Last Accessed 14/02/2024)
[12] https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/ (Last Accessed 14/02/2024)

Photo 7.1 – Peat hag present within the vicinity of the Proposed Development

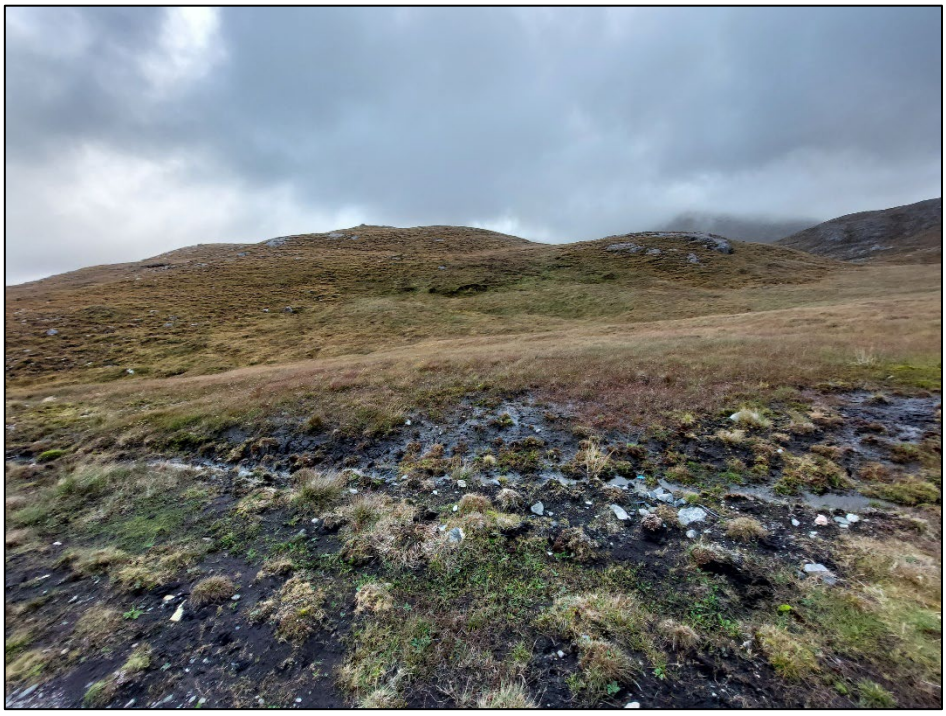

Photo 7.2 – Bare peat present within the vicinity of the Proposed Development

Peat probing was carried out across the Site. The recorded peat depths and the estimated peat excavation volumes are detailed within Appendix 7.1 – outline Peat Management Plan and Figure 7.2 – Peat Depth Map.

The National Soil Map of Scotland identified the main soil type encompassing the north and south of the study area is Peaty Podzols, comprised of peaty gleyed podzols with dystrophic semi-confused peat[13]. The central strip is characterised by Peaty Gleys, with component soils of peaty gleys with dystrophic semi-confused peat. The eastern corner of the study area is underlain with montane soils formed of subalpine podzols with dystrophic blanket peat.

7.5.8 Designated Habitats

There are three statutory ecological designations that traverse the north-western fringes of the study area: the North Harris Special Conservation Area (SAC) and Site of Special Scientific Interest (SSSI), and the North Harris Mountains Special Protection Area (SPA). The West Coast of the Outer Hebrides SPA is also partially encompassed within the southern section of the study area. North Harris has been noted for hosting nationally and internationally important species and habitats and being of exceptional value for nature conservation[14]. The North Harris Mountains SPA is part of a range of steep rocky hills on the west coast of Harris, which supports a nationally important breeding population of golden eagle[15].

North Harris has been designated as an SAC for its internationally important habitats and its natural history, such as its alpine and subalpine heaths, Freshwater pearl mussel, Atlantic salmon and its Blanket bog, which has been highlighted as a priority habitat[16]. The area has also been awarded a SSSI designation due to the presence of Subalpine wet health and its Bryophyte assemblage.

The West Coast of the Outer Hebrides SPA spans form the north of Harris to the south of Sandray and is designated for supporting a number of sea birds, including, but not limited to, Black-throated diver, Long-tailed duck, and Eider[17].

A site walkover and National Vegetation Classification (NVC) study was conducted by IMTeco Ltd (See **Appendix 8.1 – Habitat & National vegetation Classification Survey**). In addition to blanket bog habitat, some areas of the Site are comprised various grassland and heathland habitats, in addition to areas of standing water and ditch systems. With regards to hydrology, several areas of GWDTE were identified in mosaics across the Site. Present communities include:

- M15a *Scirpus cespitosus-Erica tetralix wet* heath*, Carex panicea* sub-community;
- M15c *Scirpus cespitosus-Erica tetralix* wet heath, *Cladonia spp*. sub-community;
- MG10a *Holcus lanatus-Juncus effusus* rush-pasture, typical sub-community;
- U5e *Nardus stricta-Galium saxatile* grassland;
- H10b *Calluna vulgaris-Erica cinerea* heath, *Racomitrium lanuginosum* sub-community; and
- M17b *Scirpus cespitosus-Eriophorum vaginatum* blanket mire, *Cladonia spp.* sub-community.

The above communities have been assigned varying degrees of groundwater dependency, based on the Scotland (GW) Dependency Score (UKTAG Guidance 5ab Annex 1).

The MG10a, M15a, and M15c communities within the study area are regarded as Class 2 GWDTE, with a moderate dependency on groundwater. Although it is worth noting that the groundwater dependency of the MG10a communities may be due to previous works associated with the operational wind farm disrupting the soils and drainage. Similarly, there is a possibility that there is no reliably available source of groundwater to feed the M15a

[13] https://map.environment.gov.scot/Soil_maps/?layer=1# (Last Accessed 14/02/2024)
[14] https://www.north-harris.org/?page_id=81 (Last Accessed 28/06/2023)
[15] https://www.north-harris.org/wp-content/uploads/2010/06/SPA-Citation.pdf (Last Accessed 28/06/2023)
[16] https://www.north-harris.org/wp-content/uploads/2010/06/SAC-Qualifying-Interests.pdf (Last Accessed 28/06/2023)
[17] https://sitelink.nature.scot/site/10484 (Last Accessed 28/06/2023)

and M15c sub-communities to due to the limited permeability of the underlying strata. It is considered likely that these communities rely on a combination of rainfall and surface runoff. However, the water source is unconfirmed, and the communities are conservatively assumed to be Class 2 GWDTE to ensure they are protected appropriately. All other communities on Site were categorised as Class 3 GWDTE.

Further details regarding GWDTEs and other vegetation communities present on the Site is available in **Appendix 8.1 – Habitat & National Vegetation Classification Survey**.

7.6 Sensitive Receptors

The Proposed Development is situated within the watershed Abhainn Eadarra and Loch a Siar that form part of the Lewis and Harris Coastal catchment. The catchment as a whole is known to support salmonid species and is a popular destination for recreational fishing, which could be impacted by reduced water quality from development activities. There are also several watercourses within the study area at risk of surface and river flooding, which has the potential to be elevated by the construction of the Proposed Development. Therefore, the Abhainn Eadarra, Loch a Siar, and their tributaries are considered as receptors with 'Medium' sensitivity.

From discussions with the Environmental Health Team at Comhairle Nan Eilean Siar in July 2023, it was identified that there are no known Private Water Supplies (PWS) within 3km of the Proposed Development. A such, PWS will not be include as a sensitive receptor.

The study area is located upon the Lewis and Harris groundwater unit, which was classified as having a 'Good' overall status in 2022. The various bedrocks underlying the Site can be mostly described as a low productivity aquifer (2C). There is limited potential for unmitigated contaminated groundwater to move outwith the vicinity of the Proposed Development. As such, they Lewis and Harris groundwater unit will be included as a receptor with a 'Medium' sensitivity.

The study area is predominantly underlain with Class 1 and Class 2 peatland, which are of national importance and conservation value. Due to the proximity, there is potential for Class 1 and Class 2 peat to be degraded by constructional activities and therefore, Class 1 and Class 2 peat will be included as sensitive receptors with a 'High' sensitivity.

The North Harris SSSI and SAC and the North Harris Mountains SPA are located c.1km to the west of the Proposed Development at its closest point and are separated from the Site by the Abhainn Glaic a Choin duinn and raised terrain associated with the Cleit nan Uan (122m AOD). Given the distance and topographical separation, it is not anticipated that the Proposed Development will have an adverse effect on the integrity of the qualifying features within the designated sites. Therefore, the North Harris SSSI and SAC and the North Harris Mountains SPA will not be included as sensitive receptors.

The West Coast of the Outer Hebrides SPA is situated 1.1km to the south-west of the Proposed Development at its closest point. The designation is located downhill from Site and several of the surrounding watercourses feed into the designated site downstream. As such, due to its hydrological connectivity, there is potential for unmitigated contaminated runoff to reach the West Coast of the Outer Hebrides SPA and the designated site will be included as a receptor with a 'High' sensitivity.

The NVC study identified several pockets of plant communities within the Site that are thought to be groundwater dependent (GWDTE), with these vegetation communities graded as Class 2 and Class 3. There is likely to be some dependency on groundwater discharge (as detailed within **Appendix 8.1 – Habitat & National Vegetation Classification Survey**). These habitats are of conservation value and may be impacted by constructional works on the Site. As such, the Class 2 GWDTEs are considered as receptors with 'Medium' Sensitivity. Given the spread of Class 2 and Class 3 GWDTEs on Site, the Class 3 GWDTE are taken to also be covered by the Class 2 review, providing a conservative element to the assessment.

The identification of sensitive receptors, considering baseline conditions, is summarised below.

Table 7.6 - Sensitive Receptors

Receptor	Sensitivity	Comment
Watercourses & Fisheries	Medium	The Abhainn Eadarra, Loch a Siar, and their tributaries form part of the Lewis and Harris Coastal catchment. Although the tributaries to these watercourses are also considered, for ease of reference these are referred to collectively as the Abhainn Eadarra and Loch a Siar respectively in the remainder of this assessment
Groundwater Unit	Medium	The Proposed Development is situated on the Lewis and Harris groundwater unit, which SEPA has awarded an overall status of 'Good' in 2022. This is generally classed as a low productivity aquifer (2C).
Peatland	High	The study area is predominantly underlain with Class 1 and Class 2 peatland.
Designated Sites	High	The West Coast of the Outer Hebrides SPA is located c.1.1km downstream of the Proposed Development.
GWDTE	Medium	The MG10a, M15a, and M15c communities within the study area are considered to be Class 2 GWDTE

7.7 Assessment of Predicted Impacts and Effects during Construction

7.7.1 Increase in Runoff

Replacing natural land cover with impermeable surfaces will reduce the rate of infiltration of rainwater into the underlying strata and increase runoff from the Site.

Construction of access track and crane hardstandings will increase the impermeable footprint of the Site and result in localised changes to surface water hydrology. In addition, the cambered tracks may interrupt natural flow paths and will shed water more quickly than the existing ground cover.

An increase in runoff in the area can compound various other predicted impacts, such as sedimentation, erosion, chemical pollution, and flood risk.

However, the increase in runoff will be limited as the existing substation building and access tracks will be utilised, and the Proposed Development will only require the construction of a short section of new access track to provide access to Turbine 1. Additionally, the hardstanding areas will be constructed in place of the existing hardstanding areas and therefore, will only result in a small increase in the footprint of impermeable surfaces.

Table 7.7 - Impact of Increase in Runoff (without mitigation)

Receptor	Comment	Sensitivity	Magnitude of Impact	Significance of Impact
Watercourses & Fisheries	The topography on Site dictates that surface water runoff will be directed towards the Loch a Siar via its tributaries. However, this potential impact is limited to the construction of the new access track.	Medium	Medium	Moderate
Groundwater Unit	The extent of the impermeable surfaces proposed is limited in relation to the size of the catchment area.	Medium	Small	Minor

Receptor	Comment	Sensitivity	Magnitude of Impact	Significance of Impact
Peat	Due to the proximity, there is potential for any unmitigated runoff to degrade the surrounding Class 1 and Class 2 peatland. However, this is restricted by the limited increase in the impermeable footprint.	High	Medium	Major
Designated Sites	Due to the topography, there is potential for runoff to reach the designated site. However, this is tempered by the distance and the nature of the Proposed Development.	High	Small	Moderate
GWDTE	The topography on Site dictates that surface water runoff will be directed over GWDTE communities.	Medium	Medium	Moderate

7.7.2 Sedimentation & Erosion

Construction activities on or near the edges of watercourses can impact the structural integrity of the banks of watercourses, either through direct damage to bankside material or indirect loosening of soil structure. This can affect localised watercourse morphology and water quality through erosion or even collapse of the banks.

Construction works such as excavations for infrastructure can involve the relocation of peats and mineral soils, and the importation of new substrates such as aggregate for civil enabling works. This introduces the possibility for sediments to be washed out of materials before they are sufficiently compacted.

Poorly implemented drainage systems can create new runoff pathways that have the potential to erode rills into loosely aggregated substrates such as alluvial deposits.

Although the cable trenches proposed will require only shallow excavations, the action of cable-laying also has the potential to damage soils and introduce new drainage pathways which could generate silt laden runoff.

If erosion was to occur around the proposed infrastructure, an increased sediment load could lead to the constriction of the channels draining into the local river systems. This would negatively impact water quality and degrade habitat for any existing aquatic receptors.

However, it is worth noting that the Proposed Development will utilise the existing tracks and substation, which will limit the potential for sedimentation and erosion to occur.

The amount of suspended solids pollution will be greater during heavy rainfall events, although the dilution potential of the watercourses is also at its greatest during these periods.

Table 7.8 - Impact of Sedimentation & Erosion (without mitigation)

Receptor	Comment	Sensitivity	Magnitude of Impact	Significance of Impact
Watercourses & Fisheries	Due to the topography and proximity, there is potential for increased surface runoff to enable sediment and contaminants to reach the nearby watercourses. However, this is limited by the nature of the works and the existing drainage system associated with the existing access tracks.	Medium	Medium	Moderate

Receptor	Comment	Sensitivity	Magnitude of Impact	Significance of Impact
Groundwater Unit	Sedimentation from construction activities could result in silt-laden runoff entering the groundwater, if unmitigated. However, the potential impact is also tempered by the relatively large size of the groundwater body.	Medium	Small	Minor
Peat	Due to the proximity, there is potential for the Class 1 and Class 2 peatland to be impacted by any sedimentation of erosion from the Proposed Development. However, this is limited by the nature of the works.	High	Medium	Major
Designated Sites	Due to the topography, there is potential for sediment-laden runoff to reach the designated site. However, this is tempered by the distance and the nature of the Proposed Development.	High	Small	Moderate
GWDTE	Due to the proximity, these communities have the potential to be impacted if sediment-laden runoff is distributed over sensitive communities.	Medium	Medium	Moderate

7.7.3 Chemical Pollution

There are various sources of potential contamination during construction. Runoff from construction areas and excavations may become contaminated by construction material or spilt pollutants, which ultimately enter watercourses or groundwater. Concrete or cement brought onto Site for the construction of foundations may be spilt. Construction-related oil, grease, fuel, or foul water may also be accidentally leaked. Only small quantities of potential chemical pollutants will be brought on site; however, even a small amount of these pollutants can have a serious negative impact on water quality and aquatic ecosystems.

Table 7.9 - Impact of Chemical Pollution (without mitigation)

Receptor	Comment	Sensitivity	Magnitude of Impact	Significance of Impact
Watercourses & Fisheries	There is potential for contaminated runoff to reach nearby watercourses. However, this is limited by the nature of the works and the existing drainage system associated with the existing access tracks.	Medium	Medium	Moderate
Groundwater Unit	There is potential for chemical pollution given the nature of the development; however, the impact is tempered by the relatively large size of the groundwater body.	Medium	Small	Minor
Peat	Chemical pollution may lead to the loss of peatland vegetation cover, which would leave the underlying peat vulnerable to erosion.	High	Medium	Major

Receptor	Comment	Sensitivity	Magnitude of Impact	Significance of Impact
Designated Sites	Due to the topography, there is potential for contaminated runoff to reach the designated site. However, this is tempered by the distance and the nature of the Proposed Development.	High	Small	Moderate
GWDTE	Due to the proximity, unmitigated chemical pollution has potential to degrade GWDTE in the vicinity of the construction works	Medium	Medium	Moderate

7.7.4 Disruption to Flow Paths & Flood Risk

Construction of proposed infrastructure may interrupt natural flow paths and result in localised changes to surface water hydrology. This can result in the 'drying out' of hydrologically sensitive areas, or alternatively, result in an increase in flood risk that can see sensitive areas flooded and contaminated with mineral matter.

Table 7.10 - Impact of Disruption to Flow Paths & Flood Risk (without mitigation)

Receptor	Comment	Sensitivity	Magnitude of Impact	Significance of Impact
Watercourses & Fisheries	Due to their proximity, the construction of the new access tracks and crane hardstandings has the potential to interrupt surface water and groundwater flow paths to the waterbodies.	Medium	Medium	Moderate
Groundwater Unit	There is limited opportunity for the Proposed Development to interrupt groundwater flow paths, which is further tempered by the relatively large size of the groundwater body.	Medium	Small	Minor
Peat	Due to their proximity, the construction of the new access track, crane hardstandings, and turbine foundations may interrupt groundwater flow to the Class 1 and Class 2 peat.	High	Medium	Major
Designated Sites	Due to the distance, it is unlikely that the construction of the Proposed Development will impact the flow paths to the designated site. It is anticipated that if any tributaries are impacted upstream, the water level will have recharged by the time the watercourse reaches the coastal designation.	High	Negligible	Negligible
GWDTE	Due to their proximity, the construction of access track and hardstanding areas may interrupt groundwater flow to the GWDTE communities.	Medium	Medium	Moderate

7.7.5 Dewatering & Abstraction

Given what is known about the ground conditions in the area and the expected extent of the excavation works, there is potential for groundwater to enter excavations. If so, dewatering will be required to temporarily lower the water table for larger excavations, such as those for the turbine foundations. This can result in the temporary 'drying out' of hydrologically sensitive areas.

SEPA guidance specifies that the potential zone of dewatering impact can be up to 250m from excavations that exceed 1m in depth, and 100m from excavations less than 1m in depth. Once construction activities within the excavation are complete and the excavations are reinstated the groundwater table is expected to recover in a matter of days.

Table 7.11 - Impact of Dewatering & Abstraction (without mitigation)

Receptor	Comment	Sensitivity	Magnitude of Impact	Significance of Impact
Watercourses & Fisheries	Due to the proximity, the watercourses within the study area have the potential to be impacted by any temporary dewatering activities.	Medium	Small	Minor
Groundwater Unit	There is limited potential for dewatering activities to significantly impact the groundwater table, particularly given the size of the groundwater body, and any dewatering activities being temporary.	Medium	Small	Minor
Peat	Due to the proximity, dewatering has the potential to temporarily dry the peat mass in the vicinity of the works.	High	Small	Moderate
Designated Sites	It is not anticipated that any required dewatering works will affect the designated site as it is located c1.1km to the south-west of the Proposed Development.	High	Negligible	Negligible
GWDTE	Dewatering may temporarily affect groundwater in the vicinity of these communities.	Medium	Small	Minor

7.7.6 Foul Drainage

The site compound facilities (sinks and toilets) will be self-contained. No foul drainage is proposed.

As such, there is no potential impact from foul drainage at the construction stage.

7.8 Assessment of Predicted Impacts and Effects during Operation

The access track, crane hardstandings, and substation will remain in-situ during operation requiring some basic maintenance and resulting in localised changes to the surface water hydrology for the duration of the project.

Regular on-site activities will be required during operation of the Proposed Development relating to regular maintenance and repair of the equipment. During these activities there will be a need to bring small quantities of oil, greases, and other materials on to the Site.

For the purposes of this assessment, the potential unmitigated impacts are as discussed for Construction Impacts in Section 7.7. This is considered a conservative approach due to the operational phase requiring less on-site activities.

7.9 Assessment of Predicted Impacts and Effects during Decommissioning and Restoration

It is envisaged that detailed method reports, in compliance with relevant current legislation, will be drawn up prior to decommissioning. The following is based on the standards at time of writing.

No new infrastructure will be added to the site during decommissioning and the required removal of infrastructure would decrease the impermeable footprint of the Site. Infrastructure such as access tracks and hardstandings will remain in situ, while foundations would only have the top 1m removed.

Any earthworks or landscaping undertaken as part of the decommissioning may provide scope for sedimentation or erosion to occur. However, the scope of the required works is predicted to be significantly reduced relative to that of the construction phase.

There will be no new excavations opened during the decommissioning phase of the development, so no dewatering or abstraction activities will take place.

For the purposes of this assessment, the potential unmitigated impacts are as discussed for Construction Impacts in Section 7.7. This is considered a conservative approach due to the decommissioning and restoration phase requiring less on-site activities.

7.10 Mitigation

Proposed mitigation measures can be grouped under three headings:

- Mitigation built into the design. The design process has aimed to reduce environmental impacts through careful siting of proposed infrastructure.
- Adoption of Best Practice during construction, including further micro-siting where required.
- Restoration and enhancement of the site post-construction.

7.10.1 Mitigation through Design

Avoidance of Sensitive Areas

The proposed layout has been designed to avoid sensitive areas wherever possible. This includes adhering to appropriate separation distances from watercourses as much as possible and avoiding the sensitive habitats on site.

SEPA's standard scoping advice for wind farm developments states that a buffer zone of at least 50m should be established between infrastructure and watercourses to minimize the risk of sediment-loaded runoff entering the aquatic environment. The final layout has followed guidance and, where possible, the proposed infrastructure has been sited at least 50m from a watercourse. There is a section of access track that approaches T3 that is briefly

sited <50m from Abhainn Glaic a Choin duinn however, this is utilizing an existing track and should not require any upgrading. The hardstanding area for T1 also traverses the buffer of a standing pool however, this area is angled to follow the contours on the site and it is considered that the infrastructure is sited at a location that will minimise the cut and fill requirements based on the topography of the site which, in turn, will limit the construction-related pollutants and sedimentation-laden runoff to enter the waterbodies.

Peat surveys were carried out across the Site to determine the depth and structure of the actrotelmic and catotelmic peat on Site. Peat probes were collected across a 10m grid within the development footprint. This survey revealed that the proposed hardstanding of T3 was initially sited upon some areas of deeper peat (i.e. peat depth of 3m+). Following this survey, the hardstanding was reoriented to the south-west in order to minimise any unnecessary disturbance to the peat. This avoidance of deeper peat is in accordance with the mitigation hierarchy from recognised best practices and measures, as discussed in Section 7.4.4. An outline Peat Management Plan (PMP) is also submitted alongside the EIA Report to ensure that the potential impacts on peatland have been properly assessed and that any excavated peat is properly handled (see Appendix 7.1).

Clean water cut-off ditches

Clean water cut-off ditches are proposed for the access track and hardstandings at all turbines. This system will allow clean discharge from ground uphill of the track to pass into the ground downstream, to maintain existing conditions and prevent drying out.

Ditches will be located on the 'high-side' of the relevant infrastructure and will be installed immediately ahead of construction. Stone check dams will be employed to slow water flow along the ditches.

Surface runoff will be collected in the ditches and passed through regularly spaced dedicated piped culverts under the access track to reduce the volumes of flows in the ditch and provide a more even redistribution on the downhill side.

Discharge points will be designed to encourage sheet flow, rather than as a single point discharge, in order to slow and spread the flow and minimise potential scour. Clean discharge will thus infiltrate into the existing vegetation in close proximity to its origin.

The presence of cut-off ditches will also restrict capacity build-up of infiltration trenches adjacent to the relevant infrastructure.

Access Track Sizing, Camber, and Cross-drains

All tracks will be constructed with a camber sufficient to minimise ponding and prevent the track becoming a conduit for runoff. The track will be constructed using a relatively large aggregate size, enabling runoff to percolate through the track. A large aggregate size also minimises the amount of fine sediment in the construction material.

Low verges will be constructed, allowing surface water to drain naturally and diffusely. Any runoff will be collected in adjacent infiltration trenches.

Infiltration trenches

V-Ditches with check dams will also be installed alongside the hardstanding and access tracks to collect any runoff. The check dams will be constructed from clean, granular materials or straw bales. This will help sediments and pollutants will be filtered from the water and will also slow water flow along the ditches.

Where infrastructure lies in close proximity to sensitive hydrological features such as watercourses, runoff will be diverted into a settlement pond to remove any potential contaminants prior to discharge into the environment.

7.10.2 Mitigation during Construction

Excavations

Prior to excavations, an end-use will be identified for the excavated material and an appropriate storage solution determined accordingly. Stored materials will be kept away from surface water bodies to minimise the possibility for sediments entering the aquatic environment.

Soils will be stripped to avoid cross contamination between distinct horizons. Stripped materials will be side- cast or stockpiled for use in the same area as they are excavated from, or they will be stored in appropriately designed and clearly defined separate stockpiles for re-use elsewhere.

Where peat excavations are unavoidable, the resulting volume of excavated peat is expected to be small and will be re-used onsite for redressing track, crane pad, and hardstanding verges.

Peat bunds may be used to help stop drainage from the surrounding peatland.

Any surplus peat following redressing can be used to reinstate existing drainage ditches that would become redundant following construction. This would encourage peat regeneration in areas that are currently degraded and reduce surface runoff rates onsite. An outline Peat Management Plan (oPMP) is provided in Appendix 7.1.

Where appropriate, temporary silt fences will be installed to filter runoff that is potentially carrying silt from excavations or stockpiles. This will be effective in protecting surface water quality in adjacent watercourses and eliminate the possibility for silt laden runoff to enter them.

Reinstatement

Early reinstatement of excavated materials is required to minimise visual impact, to reduce time required for temporary storage/stockpiling of soils, and to encourage vegetation and habitat restoration as early as possible.

As far as is reasonably practical and achievable, excavated material horizons will be replaced in sequence and depths similar to those recorded prior to excavation, or similar to the surrounding undisturbed ground at the point of reinstatement.

Any detailed reinstatement and restoration proposals will consider and mitigate all residual risks to environmental receptors.

Dewatering

Dewatering shall be avoided where possible to minimise impacts on sensitive habitat. However, formation of the turbine foundations would likely involve dewatering to temporarily lower the water table and enable work in the excavated areas. Gravity foundations are proposed, which will limit depths of excavations and associated impacts.

Details of the pre-construction ground investigation will include an assessment of the ground permeability and water potential; the results will be used to inform any dewatering required on site.

Where dewatering is required, it shall comply with the Abstraction Regime of CAR General Binding Rule (GBR) 2 and GBR 15.

Details of how dewatering will be managed shall be provided within a Construction Method Statement (CMS) prior to construction of the proposed project. Mitigating measures will include: using an irrigation sprinkler head to maintain moisture in the upper soil horizons of nearby GWDTE; and, keeping the foundation construction duration as short as possible. This will maintain a continuous water supply to sensitive habitats and minimise the overall impact of dewatering.

Enhanced sedimentation control

To avoid potential impacts on sensitive habitats, any potential runoff will be appropriately treated prior to discharge into the natural environment. This will keep clean and contaminated runoff separate to avoid further contamination and maintain the SuDs capacity, which will mitigate the possibility of contaminants entering watercourses and impacting the aquatic environments.

These mechanisms of clean water cut-off ditches, sediment capture, and infiltration trenches, are intended to reduce the speed of flow, filter runoff, and allow suspended silts and particulates to settle out naturally thus minimising the potential impacts upon downstream aquatic environments, nearby PWS, or GWDTEs.

If the standard system is not proving to be effective, then a 'Siltbuster' system of control via settlement tanks will be employed. The 'Siltbuster' system is regularly used on construction sites situated close to waterways or in extreme situations where the combination of soil stripping and wet weather has given rise to normal silt control methods being overrun.

General Site Pollution Control

The proposed mitigation for the construction of the access roads will continue to function through the life of the project. Routine maintenance for the roads will be carried out in summer months when the tracks are dry. Operational best practice procedures will continue to be adopted, with the risk of water pollution from such activities considered to be negligible.

With regard to vehicles, fleet vehicles entering the site will be regularly checked and maintained to prevent leakage of contaminants. Concrete will be premixed offsite and delivery wagons will only be washed out in areas where suitable control measures are in place. The concrete used will be of a high grade that is not prone to leaching alkalis. The number of onsite vehicles will be highest during construction. The ongoing risk of pollution on the site after construction is considered to be very low.

Best practice procedures in the handling, use and storage of fuel, oils, and chemicals will be adhered to at all times.

Prior to construction, an Environmental Management Plan (CEMP) and a Pollution Prevention Plan (PPP) will be put in place, adhering to the standards set out by SEPA and Comhairle Nan Eilean Siar. These documents will outline mitigation measures to reduce or nullify potential impacts on the ground and surface water environment.

The CEMP and PPP will address the following issues:

- Reinstatement and Restoration
- Decommissioning
- Contractor Duties
- Tool Box Talks
- Pollution Prevention and Mitigation
- COSHH
- Pollution Monitoring & Controls
- Site Waste Management Plan

7.10.3 Mitigation during Restoration

Early reinstatement of excavated materials is required to minimise visual impact, to reduce time required for temporary storage/stockpiling of soils, and to encourage vegetation and habitat restoration as early as possible.

As far as is reasonably practical and achievable, excavated material horizons will be replaced in sequence and depths similar to those recorded prior to excavation, or similar to the surrounding undisturbed ground at the point of reinstatement.

Any detailed reinstatement and restoration proposals will consider and mitigate all residual risks to environmental receptors.

7.10.3.1 Biodiversity Enhancement

Certain biodiversity enhancement measures are proposed for the proposed Monan Repower Site, including enhancing the current bog habitat. Within the Site, there are several areas of exposed bare peat and peat hags along the existing access tracks, as discussed in Section 7.5.7.

The aim of these restoration measures will be to reduce the area of bare peat soil present within the Site by re-profiling of exposed peat hags along existing drains and revegetating the exposed peat surface. This will also include revegetating bare peat in the vicinity of the Proposed Development.

These measures are set out in greater detail within Appendix 8.3 – Outline Biodiversity Enhancement Management Plan.

7.11 Summary of Impacts and Effects

The following section provides a summary of the initial and residual impacts during the construction, operational and decommissioning stages of the development.

The Residual Overall Impacts are outlined below.

Table 7.12 - Residual Impacts

Receptor	Sensitivity	Impact	Significance without mitigation	Significance with mitigation
Watercourses & Fisheries	Medium	Increased Runoff	Moderate	Negligible
		Sedimentation & Erosion	Moderate	Negligible
		Chemical Pollution	Moderate	Negligible
		Disruption to Flow Paths & Flood Risk	Moderate	Negligible
		Dewatering & Abstraction	Minor	Negligible
Groundwater Unit	Medium	Increased Runoff	Minor	Negligible
		Sedimentation & Erosion	Minor	Negligible
		Chemical Pollution	Minor	Negligible
		Disruption to Flow Paths & Flood Risk	Minor	Negligible
		Dewatering & Abstraction	Minor	Negligible
Peat	High	Increased Runoff	Major	Negligible
		Sedimentation & Erosion	Major	Negligible
		Chemical Pollution	Major	Negligible
		Disruption to Flow Paths	Major	minor
		Dewatering & Abstraction	Moderate	Negligible
Designated Sites	High	Increased Runoff	Moderate	Negligible
		Sedimentation & Erosion	Moderate	Negligible
		Chemical Pollution	Moderate	Negligible
		Disruption to Flow Paths	Negligible	Negligible
		Dewatering & Abstraction	Negligible	Negligible
GWDTE		Increased Runoff	Moderate	Negligible
		Sedimentation & Erosion	Moderate	Negligible
		Chemical Pollution	Moderate	Negligible
		Disruption to Flow Paths	Moderate	Minor
		Dewatering & Abstraction	Minor	Negligible

7.12 Summary of Impacts and Effects

A desk-based study and site walkover were conducted to establish the baseline hydrological environment of the Site, whereby potential impacts from the development were identified.

It was determined that there were five categories of sensitive receptor within the study area, these being: Surface Water Features, including the Abhainn Eadarra and Loch a Siar and their tributaries; Class 1 and Class 2 peat; the Lewis and Harris Groundwater Unit; the West Coast of the Outer Hebrides SPA; and, Class 2 and 3 GWDTE communities.

It is anticipated that careful design of the site layout, and the implementation of the mitigation methods proposed, will ensure that any potential risks identified are avoided and the associated risk is reduced to acceptable levels.

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