Chapter 6 – Water Environment

Neven Point Pier EIA Report

Neven Point Wind Limited

Prepared by:

SLR Consulting Limited

The Tun, 4 Jackson's Entry, Edinburgh, EH8 8PJ

SLR Project No.: 405.065664.00001

12 August 2025

Revision: 02

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
01	10/06/2025	CH	JAS	MN
02	12/08//2025	JAS	MN	MN

Table of Contents

6. Water Environment 6-1
6.1 Executive Summary 6-1
6.2 Introduction 6-2
6.3 Legislation, Policy & Guidance 6-2
6.4 Consultation 6-3
6.5 Assessment Methods & Significance Criteria 6-4
6.6 Baseline 6-7
6.7 Scope of the Assessment 6-10
6.8 Assessment of Potential Effects 6-12
6.9 Mitigation 6-16
6.10 Assessment of Residual Effects 6-19
6.11 Assessment of Cumulative Effects 6-20
6.12 Summary 6-20
6.13 References 6-26

Tables

Table 6-1: Criteria for Assessing Receptor Sensitivity 6-5
Table 6-2: Criteria for Assessing Impact Magnitude 6-6
Table 6-3: Criteria for Assessing Effects 6-7
Table 6-4: Extreme Sea Levels at Neven Point 6-9
Table 6-5: Receptor Sensitivity 6-11
Table 6-6: Summary Table 6-22

Supporting Figures (EIA Report Volume 2)

Figure 6.1: Hydrological Overview

Acronyms and Abbreviations

BGS	*British Geological Survey*
CAR	*Controlled Activities Regulations*
CEMP	*Construction and Environmental Management Plan*
DEFRA	*Department for Environment Food and Rural Affairs*
EIA	*Environmental Impact Assessment*
EnvCoW	*Environmental Clerk of Works*
GPP	*Guidance for Pollution Prevention*
LDP	*Local Development Plan*
mAOD	*Metres above ordnance datum*
MHWS	*Mean High Water Spring*
NPF4	*National Planning Framework 4*
OEMD	*Operational Environmental Management Document*
PPC	*Pollution Prevention and Control*
RBMP	*River Basin Management Plan*
SEPA	*Scottish Environment Protection Agency*
SSF	*Scottish Sea Farms*
SuDS	*Sustainable Urban Drainage Systems*
WFD	*Water Framework Directive*

6. Water Environment

6.1 Executive Summary

6.1.1 This section of the EIA Report considers potential impacts of the Proposed Development upon the water environment, including hydrology, flooding, hydrogeology and water quality and was undertaken in accordance with relevant best practice guidance.

6.1.2 The assessment process involved an initial desk-based review of available information including water quality, geology, surface water features and flood risk, identification of sensitive receptors, potential impacts during construction, operation and decommissioning, potential impact magnitude and mitigation measures.

6.1.3 The assessment identified the following receptors as sensitive to potential impacts on the water environment: the coastal waters and sediment of Bay of Backaland and the commercial fish farm.

6.1.4 During the construction phase the main potential impacts are considered to be on water and sediment quality during land reclamation construction. Given the limited intertidal footprint of the reclamation, noting the low impact construction methods and materials of the landing point, combined within the residual southern direction of movement of tidal flow within the Bay of Backaland, it is considered the effects would be of medium significance prior to mitigation within the immediate coastal waters and negligible out with this area (including adjacent fish farm). Following implementation of sediment management measures such as installing a silt boom / curtain offshore prior to infilling to capture fines and having a banksman to review sediment movements during construction, the residual effect within the immediate coastal water is considered to be negligible.

6.1.5 During construction, operation and decommissioning a risk of pollution from spillages or leakages from fuels and oils was identified primarily to the immediate coastal waters. Undertaking storage, refuelling of oil, fuel and site vehicles in line

with GPP guidance, the site CEMP and associated pollution prevention plan, reduces the residual effects to be negligible.

6.1.6 Overall, the assessment concluded that the residual effects of the Proposed Development are considered to be negligible, and accordingly no significant effects on the water environment have been identified.

6.2 Introduction

6.2.1 This chapter of the EIA Report provides an assessment of the implications of the Proposed Development on the water environment. The water environment is considered to encompass hydrology, flooding, hydrogeology and water quality.

6.2.2 An assessment of the potential impact of the Proposed Development on the coastal processes encompassing tides, waves and sediment transport processes is provided in **Chapter 7: Coastal Processes** of this EIA Report.

6.2.3 The Water Framework Directive (WFD) (Council Directive 2000/60/EC) aimed to protect and enhance water bodies within Europe and covered all estuarine and coastal waters out to 1 nautical mile. This required that there is no deterioration in the quality of surface or groundwater bodies and aimed to achieve good ecological status or potential. Implementation of the WFD directive remained effective post Brexit and any reference to the WFD within this assessment will be to the regulation and not the directive The regulations of the WFD must be considered when assessing this project and the details of how compliance will be achieved provided in the EIA Report.

6.2.4 Details of the site and the Proposed Development are provided in **Chapter 3: Proposed Development Description.** The assessment will identify sensitive issues within the site by establishing the current baseline and examining the Proposed Development within this context.

6.3 Legislation, Policy & Guidance

6.3.1 The assessment for the water environment has been undertaken with reference to the following relevant planning policy, legislation and guidance presented below.

Legislation

6.3.2 Relevant legislation and guidance documents have been reviewed and taken into account as part of this assessment. Of particular relevance are:

- Water Framework Directive (WFD) 2000/60/EC of the European Parliament;
- Water Environment and Water Services (Scotland) Act 2003;
- Flood Risk Management (Scotland) Act 2009;
- Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended (CAR);
- Water Environment (Miscellaneous) (Scotland) Regulations 2017;

- The Conservation (Natural Habitats, &c.) Regulations 1994 (N.0 2716) The Marine Works (Environmental Impact Assessment) Regulations (Scotland) 2017; and
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017.

Planning Policy

6.3.3 The Planning Statement associated with this planning (and marine licence) application sets out the planning policy framework that is relevant to the EIA Report. This section considers the relevant aspects of National Planning Framework 4 (NPF4), Planning Advice Notes, the Orkney Islands Council Local Development Plan (LDP) and other relevant guidance including Scotland's National Marine Plan 2015.

Guidance

6.3.4 Consideration has been taken of the following best practice guidelines/guidance:

- Guidelines for Water Pollution Prevention from Civil Engineering Contracts;
- Land Use Planning System (LUPS) SEPA Guidance 2025a: Climate change allowances for flood risk assessment in land use planning;
- LUPS-GU24. SEPA 2024: Flood Risk and Land Use Vulnerability Guidance;
- Guidance for Pollution Prevention (GPP) 1: Understanding your environmental responsibilities – good environmental practices;
- GPP 2: Above ground oil storage;
- GPP 3: Use and design of oil separators in surface water drainage systems;
- GPP 5: Works and maintenance in or near water;
- GPP 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;
- GPP 26: Safe storage - drums and intermediate bulk containers;
- WAT-SG-26: Good Practice Guide – Sediment Management; and
- WAT-SG-29: Good Practice Guide – Construction Methods.

6.4 Consultation

6.4.1 Pre-Application consultation has included for three public exhibitions and a subsequent consultation period to allow feedback from the local community. Additional direct consultation has been undertaken with key stakeholders, further details are presented in the accompanying Pre-Application Consultation (PAC) Report and in **Chapter 4: Approach to EIA**. Details of the consultation relating to

the coastal environment are detailed within **Chapter 7: Coastal Processes** of this EIA Report.

6.5 Assessment Methods & Significance Criteria

Study Area

6.5.1 The site is located at Backaland Bay, in the south east of the island of Eday. Eday Ferry Terminal is present to the west of the development which facilities the lifeline Ro-Ro ferry service to Orkney mainland.

6.5.2 A permanent causeway with concrete bank seat and rock armour revetment is proposed on the eastern edge of the existing ferry terminal (Backaland Pier). A hinged ramp will connect the causeway to a temporary floating pier which will be secured to the sea bed by a clump or steel chain weighted, non-piled anchor spread. This is referred to within this chapter as the Proposed Development. Refer to **Chapter 3: Proposed Development Description** for more information on the site, Proposed Development description and methods.

6.5.3 A 1km buffer has been applied to the Application Boundary, referred to as the 'Study Area', where the potential effects on the water environment have been considered, which include surface water hydrology, hydrogeology and water quality. In order to investigate the wider impacts of the development on designated sites, a 2km buffer has been applied to the Application Boundary. Effects beyond 2km have not been considered given the potential for dilution and dispersion at this distance.

Desk Study

6.5.4 The assessment follows standard EIA procedures which include:

- Desk based review of the design of the Proposed Development in relation to the local water environment;
- Consultation with key stakeholders to obtain relevant information and to ensure their concerns are addressed within the study;
- Establishing the existing baseline conditions:
    - Review topography, soils, geology and ground conditions at the site and wider study area;
    - Review of hydrology, catchment characteristics, and water quality conditions; and
    - Reporting of baseline conditions to provide a basis for assessment of the potential impact.
- Impact assessment:
    - Identification of sensitive receptors and environmental constraints;
    - Identification of potential impacts;
    - Assessment of impact magnitude;

- Identification and assessment of mitigation measures to reduce or avoid any potential impacts of the Proposed Development; and
- Statement of residual effects.

6.5.5 Potential impacts arising from the Proposed Development have been predicted and evaluated. The observed baseline data was used along with professional opinion to qualitatively assess the potential impacts and the significance to receptors.

Assessment of Significance

6.5.6 The assessment criteria set out in **Table 6-1** and **Table 6-2** has been used to develop a matrix to assess the significance of effects from the Proposed Development on the local water environment (**Table 6-3**). The assessment of residual effects also takes into consideration the probability of the effect occurring (certain, likely, possible or unlikely) and the duration of the effect (short (less than 2 years), medium (2 – 5 years), long term (more than 5 years) or permanent.

6.5.7 All direct and indirect impacts causing medium or major effects as identified in **Table 6-6** are considered to be significant in EIA terms.

Table 6-1: Criteria for Assessing Receptor Sensitivity

Receptor Sensitivity	Description
Low	Receptors with a high capacity to accommodate change, low value or poor condition and no significant uses, for example: • Receptor is not an internationally, nationally or locally designated site; • Not classified as a surface water body for the River Basin Management Plan (RBMP); • Surface water body not significant in terms of fish spawning and no other sensitive aquatic ecological receptors e.g. freshwater pearl mussels; • Surface water body not used for abstraction; • Surface water body not used for recreation directly related to water quality e.g. angling, swimming, watersports; • Surface water body not used by commercial or recreational vessels; and • Low or very low productivity aquifer with no identified abstractions.
Medium	Receptors with a medium capacity to accommodate change, medium value or condition and limited use, for example: • Receptor is not an internationally or nationally designated site. May be a locally designated site; • Salmonid species may be present and surface water body may be locally important for spawning. No other sensitive aquatic ecological receptors e.g. freshwater pearl mussels; • Surface water body used for private water supply or medium scale industrial/ agricultural abstractions; • Surface water body used for occasional or local recreation e.g. local angling clubs;

Receptor Sensitivity	Description
	• Navigable surface water body used by commercial or recreational vessels; • Medium productivity aquifer; and • Groundwater body supports identified private water supplies or medium scale industrial/ agricultural abstractions.
High	Receptors with a low capacity to accommodate change, high value or condition and significant use, for example: • Receptor is an internationally or nationally designated site; • Surface water body supports sensitive aquatic ecological receptors e.g. freshwater pearl mussels; • Surface water body used for public water supply or large scale industrial/ agricultural abstractions; • Surface water body important for recreation directly related to water quality e.g. swimming, watersports, angling; • High or very high productivity aquifer; and • Groundwater body supports public water supply or large scale industrial/ agricultural abstractions.

Table 6-2: Criteria for Assessing Impact Magnitude

Receptor Sensitivity	Description
Negligible	Very light change from baseline conditions. Change barely distinguishable, approximating to the 'no change' situation.
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of the baseline condition will be similar to pre-development circumstances/patterns.
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post-development character/ composition/ attributes of baseline will be partially changed.
High	Total loss or major alteration to key elements/features of the baseline (pre-development) conditions such that post-development character/composition/attributes will be fundamentally changed.

Table 6-3: Criteria for Assessing Effects

		Magnitude of Impact			
		Negligible Impact	**Low Impact**	**Medium Impact**	**High Impact**
Receptor Sensitivity	**High Sensitivity**	Negligible Effect	Moderate Effect	Major Effect	Major Effect
	Medium Sensitivity	Negligible Effect	Minor Effect	Moderate Effect	Major Effect
	Low Sensitivity	Negligible Effect	Minor Effect	Minor Effect	Moderate Effect

Limitations to Assessment

6.5.8 This assessment on the water environment is primarily a qualitative assessment and is reliant on the design and available site information provided. It is however considered that the overall assessment on the water environment is robust.

6.6 Baseline

Current Baseline

6.6.1 There are no designated sites related to the water environment within 2 km of the Proposed Development. The site is shown in relation to water environment receptors in **Figure 6.1: Hydrological Overview** provided within **Volume 2** of this EIA Report.

6.6.2 An active commercial fish farm operated by Scottish Sea Farms (SSF) is located approximately 470m north west of the Proposed Development. More details are provided in **Chapter 7: Coastal Processes** of this EIA Report.

Topography

6.6.3 The site is located on the coastline of Eday, with a maximum elevation of approximately 5 metres above Ordnance Datum (mAOD). Within the study area (1 km) the ground slopes up from the coastline to a height of approximately 35 mAOD in the west and up to a maximum for 15 mAOD the south. In the wider study area the ground is typically higher to the west on the slopes of Ward Hill (102 mAOD), located approximately 2.1km to the west of the Proposed Development.

Geology and Hydrogeology

6.6.4 The online British Geological Survey (BGS) 1:50,000 map identifies that the site and surrounding headland is underlain by sandstone of the Upper Eday Sandstone Formation. Approximately 500m west, a band of the Upper Stromness

Flagstone Formation is present in a north-south orientation consisting of siltstone, mudstone and sandstone (BGS, 2025).

6.6.5 Superficial geology underlying the coastal edge of the south of the site as shown in BGS 1:50,000 mapping consists of Devensian Till (Diamicton). A small pocket of marine beach deposits is mapped to the west of the existing ferry terminal (BGS, 2025). Further details of littoral and sub-littoral sediment are provided in **Chapter 7: Coastal Processes** of this EIA Report.

6.6.6 The Soil map of Scotland indicates that soils in the vicinity of the site are poorly drained mineral gleys, derived from underlying sandstones (JHI, 1981). The Carbon and peatland 2016 map shows the vicinity of the site to be underlain by class 0 soils, Class 0 soils are mineral soils and peatland habitats are not typically found on such soils (SNH, 2016).

6.6.7 The online BGS 1:625,000 map identifies the site is underlain by a medium productivity aquifer of the Upper Old Red Sandstone formation, classified as a regionally important aquifer with medium yields of up to 5 L/s. Approximately 500m west of the Proposed Development, a medium productivity aquifer of the Middle Old Red Sandstone is present which yields small amounts of groundwater and is comprised of sandstones with siltstones, mudstones and conglomerates. (BGS, 2020).

6.6.8 Groundwater at the site is classified under the River Basin Management Plan (RBMP) as belonging to the Eday groundwater body (ID: 150472) and has an overall classification of ‘Good’ (SEPA, 2023).

Hydrology, Water Quality and Water Body Status

6.6.9 No mapped watercourses or surface water features are present within the application boundary. An extensive drainage network is mapped across the south east of Eday, draining the agricultural land downslope towards the coastline and into Bay of Backaland and Eday Sound. One culvert is mapped approximately 320m west of the Proposed Development, however it does not discharge into the application boundary or immediate vicinity. Numerous wells are also present on OS mapping within the Study Area.

6.6.10 There are no surface water features present within the study area that are classified as part of the WFD, however the application boundary lies within the Westray Firth coastal waterbody (ID: 200243) which has had an overall status of ‘Good’ and a ‘High’ status for Hydromorphology. The designation was previously ‘High’ for the period 2013 – 2015, however reduced to ‘Good’ in 2016 due to a

slight decline in water quality and some physico-chem and biological elements (SEPA, 2023).

Flood Risk

6.6.11 As no mapped watercourses are present within the vicinity of the Proposed Development, there is no risk of fluvial flooding as shown within SEPA flood maps (SEPA, 2025b).

6.6.12 Areas of surface water and small watercourse flood risk are identified within the study area within lower-lying areas, including small sections of the B9063 road to the west of the application site. The drains within the surrounding study area have small contributing catchment areas, which will limit flooding extents during high flows to the immediate watercourse corridor, with no associated risk considered to the Proposed Development.

6.6.13 SEPA flood maps (SEPA, 2025b) show coastal flooding is minimal, with a medium likelihood of flooding limited to the coastal fringe along the mean high water springs (MHWS) line.

6.6.14 Standard tidal levels are outlined within **Chapter 7: Coastal Processes** of this EIA Report. Extreme sea levels have been predicted around the whole UK coastline and published by the Environment Agency and Department for Environmental Food and Rural Affairs (DEFRA), (Environment Agency, 2018). These extreme sea levels include the effect of both tides and storm surges but not the effect of amplification within estuaries or sea lochs. It is noted that the Proposed Development is situated inshore of the estuary limit of the extreme sea level predictions for Eday Sound, and therefore predictions from the Coastal Flood Boundary dataset cannot be applied directly to the site. In order to provide better estimates around the Scottish coastline, the coastal estimates have been updated to account for amplification within estuaries. A suitable estuary CFB datapoint is available approximately 1 km east of the Proposed Development.

6.6.15 Extreme sea levels are predicted at an estuary point approximately 1km offshore, east of the Proposed Development and are summarised in **Table 6-4.** The 1 in 200-year return period event level is 2.66 mAOD, whilst the 1 in 1,000-year return period event level is 2.77 mAOD (Environment Agency, 2018). SEPA recommend a 2100 climate change uplift of 0.93m for coastal levels around Orkney (SEPA, 2025a). Therefore the 1 in 200 year return period plus climate change event at the prediction location has a level of 3.59 mAOD and the 1 in 1000 year return period plus climate change event has a level of 3.7 mAOD.

Table 6-4: Extreme Sea Levels at Neven Point

Return Period	Ordnance Datum (mAOD)	Chart Datum (mCD)
1 in 5 year RP	2.35	3.75
1 in 10 year RP	2.41	3.81
1 in 50 year RP	2.56	3.96

Return Period	Ordnance Datum (mAOD)	Chart Datum (mCD)
1 in 200 year RP	2.66	4.06
1 in 1000 year RP	2.77	4.17

6.6.16 The Proposed Development is a water compatible land use, requiring to be sited in this location for operational reasons, in line with SEPA flood risk and land use vulnerability guidance (SEPA, 2025a), and therefore considered suitable for development in this location. Flood risk is therefore not considered further in this assessment.

Future Baseline

6.6.17 Future climate projections and the effects of climate change on mean sea levels are outlined within **Chapter 7: Coastal Processes** of this EIA Report.

6.6.18 The SEPA Climate Change Allowances Report (SEPA, 2025a) indicates that the peak rainfall intensity allowance for Orkney is a total change of 30% to the 2050's (using the 50th percentile), and 63% to 2080 (using the 95th percentile).

6.7 Scope of the Assessment

Spatial Scope

6.7.1 The spatial scope considered within this assessment comprises the application site, and a 1km buffer where the potential effects on the water environment have been considered, which include surface water hydrology, hydrogeology and water quality. As detailed within **Section 6.5**, no designations are present within 2km of the application boundary.

Temporal Scope

6.7.2 The temporal scope of this assessment considers the construction and operational phases of the development. It will also consider impacts of removing the floating pier when not in use during the operation of the wind farm, and the potential removal of the proposed marine landing point, as described below.

6.7.3 The Applicant is seeking in-perpetuity consent for the Proposed Development. The temporary floating pier will be demobilised when not in use during the operational phase of the wind farm. The proposed marine landing point will be decommissioned concurrently with the wind farm, unless it is identified as having an ongoing use or requirement by the Orkney Islands Council (OIC) or other relevant stakeholders. In such cases, and subject to agreement with the planning authority or other relevant consenting bodies, the permanent causeway may remain in place. Otherwise, the applicant is committed to its full removal as part of the decommissioning process.

Receptors Requiring Assessment

6.7.4 On the basis of the baseline assessment, the sensitive receptors to potential impacts on the water environments outlined in **Table 6-5** have been identified as

the coastal waters and sediments of Backaland Bay, and the commercial fish farm.

6.7.5 Consideration of sensitive receptors for coastal processes are included within **Chapter 7: Coastal Processes.**

Table 6-5: Receptor Sensitivity

Receptor	Sensitivity	Comment
Coastal waters and sediment of the Bay of Backaland	Medium	No designated sites within 2km; WFD designation of 'Good';
Commercial Fish Farm	High	Commercial industry of high economic value and importance to Eday

Environmental Measures Embedded into the Development Proposals

6.7.6 Embedded mitigation proposals are those mitigation measures that are inherent to the Proposed Development. Embedded mitigation includes all mitigation usually assumed to be in place during construction, operation and decommissioning, and is generally regarded as industry standard or Best Practice. Construction and environmental management plans are introduced in **Chapter 3: Project Description.** A Construction Environmental Management Plan (CEMP) will be provided by the marine contractor and approved by OIC and OIC Marine Services as the Statutory Harbour Authority, prior to the commencement of construction works.

6.7.7 As noted in **section 6.8** below, throughout all stages of the development there is a risk of pollution incidents from spillage or leakage of fuel, oil or leakage from vehicle. Best practice should be followed for storage, refuelling and maintenance in line with SEPA GPP documents, CEMP and sites pollution prevention plan.

6.7.8 The proposed design has been iteratively developed to minimise potential environmental impacts, including to coastal processes. The land reclamation extent has been kept to a minimum, restricted to the intertidal zone, whilst the remainder of the pier will consist of low impact structures in the form of a floating

pier or barge secured by weighted anchors. The design avoids the requirement for potentially more impactful construction activities such as dredging and piling.

6.8 Assessment of Potential Effects

Potential Effects

6.8.1 This section identifies the potential environmental impacts on the water environment, at and around the site during the construction, operational and decommissioning phases of the Proposed Development.

6.8.2 The proposed works will involve the following key activities which have the potential to impact the water environment within the site and environs:

- Construction activities (land reclamation (permanent causeway), rock armour construction, installation of floating pier);
- Site operations;
- Site compound and welfare facilities; and
- Site decommissioning activities.

6.8.3 The potential impacts on the water environment include:

- Contamination of coastal water, sediment and fish farm through spillages, leakages and/or sediment transfers (oils, fuel, welfare facilities and suspended solids); and
- Hydrological alteration of overland flow patterns including increased runoff.

6.8.4 The potential impacts on the coastal processes are assessed within **Chapter 7: Coastal Processes** and interaction between the water environment and ecology are assessed within **Chapter 8: Marine Ecology and Biodiversity.**

6.8.5 The following section considers the potential impacts and provide an assessment of likely level of significance.

Construction Effects

6.8.6 The greatest effects are considered to occur during the construction phase. The potential impacts are identified as changes to hydrology, water quality and sediment quality.

Hydrology

6.8.7 During construction there is a potential to increase runoff rates due to the introduction of an impermeable and semi-permeable surface arising from site access, land reclamation and floating pier construction. Flow pathways of surface runoff that previously discharged directly into the bay could also be altered by the construction of the proposed infrastructure.

6.8.8 No watercourses, drains or outlets are present within the application boundary and those present in the vicinity are either located upslope or along the coastline from the Proposed Development and would therefore not be impacted during

construction. It is considered the direct surface runoff to the coastline at the site would be minimal due to gently sloping topography and the presence of roads infrastructure (B9063) upslope of the Proposed Development which would intercept the majority of the runoff. The footprint of the land reclamation (permanent causeway) area is also small therefore it is considered that minimal runoff would be generated from the site.

6.8.9 Due to minimal surface water runoff and absence of watercourses, drains and outfalls within the application boundary the surface water flow alteration and increased run-off to coastal waters (**medium sensitivity**) would be expected to be of a **negligible magnitude**, giving rise to effects of **negligible significance** prior to mitigation.

Water and Sediment Quality

Land Reclamation (Permanent Causeway)

6.8.10 The proposed causeway reclamation fill (inert stone) could potentially result in plumes of suspended soils and a reduction in water quality with a potential resultant impact on aquatic life and the neighbouring fish farm.

6.8.11 The imported fill material will comprise of clean (screened) inert stone material and as such will be free of organic soils or fine materials (such as clays and sand). The stone material if dry could however generate some fine dust particles when laid and on contact with water. Construction methods will advance the land reclamation bund first ahead of core infill being placed to minimise the generation of fines and suspended solids. As infill advances a geotextile membrane will also be secured to the exposed slope profile between MHWS and the seabed to stabilise the structure and minimise erosion of material, with rock armour eventually constructed to permanently secure the geotextile membrane in place.

6.8.12 As noted within **Chapter 7: Coastal Processes,** the direction of tidal currents are in a north west to south east direction during a flood tide within the Bay of Backaland, with the ebb tide in the opposite direction. Currents are typically relatively weak, with the flood tide typically stronger than the ebb tide, with the residual direction of tidal current, and therefore sediment transport, towards the south, south-east, in the opposite direction to the fish farm which is located north west of the Proposed Development.

6.8.13 It is considered that due to the clean coarse nature of the infill material to be used during construction and the weak tidal currents present within the Bay of Backaland, particularly in the nearshore areas and intertidal zone, the spread and duration of any sediment plume would be limited, prior to application of mitigation measures. It is considered that the stronger south eastern flood tide and residual south eastern tidal current would mean that any limited plume generated would disperse in a south easterly direction.

6.8.14 It is considered that prior to mitigation the magnitude of impact of sediment discharge and dispersion reclamation works to coastal waters (**medium sensitivity**) and fish farm (**high sensitivity**) will be **low** within the immediate

vicinity of the reclamation area, and **negligible** out with this area, giving rise to effects of **medium and negligible significance** respectively, prior to mitigation.

Pollution Incidences

6.8.15 During construction there is a risk of the following pollution incidence affecting coastal waters within the Bay of Backaland and sediment from the following sources:

- Spillage or leakage from oils and fuels stored on site;
- Spillage or leakage of oils and fuels from construction machinery or site vehicles;
- Spillage or leakage of oils and fuels from vessels transporting materials;
- Spillage of oil or fuel from refuelling machinery on site;
- Spillage or leakage from on-site toilet facilities;
- Suspended solids from construction works; and
- The use of concrete in construction works.

6.8.16 The main risk is considered to be posed by refuelling activities. Oil or fuel spillages to the water environment would be detrimental to water/sediment quality and could affect fauna and flora.

6.8.17 Concrete (specifically the cement component) is generally highly alkaline and any spillage to the water environment and/or soils could be detrimental to water/sediment quality, fauna and flora. It should be noted that no concrete batching is proposed on the site, and batching will be contained within the construction compound of the associated wind farm or off island.

6.8.18 The effect of the potential pollution incidences during construction on water quality of the coastal waters (**medium sensitivity**) and fish farm (**high sensitivity**) would be dependent on the scale and nature of the incident, therefore the magnitude of impact prior to mitigation may range from **low to high**, giving rise to effects of **medium to major significance** prior to mitigation.

Operational Effects

6.8.19 During the operation phase the potential impacts identified are changes to hydrology and water and sediment quality.

Hydrology

6.8.20 As during construction, there is potential for increased run-off due to the presence of impermeable and semi-permeable surfaces. Due to the small contributing catchment, limited footprint and coastal location of the Proposed Development, the impact of surface water flow alterations and increased run-off would be of a

negligible magnitude to coastal waters (**medium sensitivity**), giving rise to effects of **negligible significance** prior to mitigation measures.

Water and Sediment Quality

6.8.21 There are unlikely to be any groundworks during the operational phase, and therefore the risk of sedimentation will be much lower than during construction. The land reclamation (permanent causeway) will be constructed in a stable manner using geotextile material and rock armour.

6.8.22 The potential risk of pollution as a result of spillages, will however remain during the operational phase. Additionally, there is the potential risk of contamination of surface water run-off from the permanent causeway, as well as contamination of coastal waters as a result of discharges from boats. It is considered that these potential risk of contamination could occur at the existing ferry terminal. The impacts on water quality of the coastal waters (**medium sensitivity**) and fish farm (**high sensitivity**) would therefore range from **low to high magnitude**, giving rise to effects of **medium to major significance** prior to mitigation measures.

Decommissioning Effects

Water and Sediment Quality

Removal of Permanent Causeway

6.8.23 Decommissioning effects would refer to demobilising and full removal of the permanent causeway concurrently with decommissioning of the wind farm. It is assumed that the removal of the permanent causeway will occur in reverse to the construction. Finer inert stone material would therefore be removed first, whilst the surrounding reclamation bund remains in place, minimising the potential for the release and dispersion of sediment into the Bay of Backaland.

6.8.24 It is considered that similar risk of sedimentation to the construction phase could occur. Therefore, prior to mitigation the magnitude of impact of sediment discharge and dispersion from decommissioning works to coastal waters (**medium sensitivity**) and fish farm (**high sensitivity**) will be **low** within the immediate vicinity of the permanent causeway, and **negligible** out with this area, giving rise to effects of **medium and negligible significance** respectively, prior to mitigation

Pollution incidents

6.8.25 It is considered that similar risk of pollution to the construction phase could occur to the coastal water of the Bay of Backaland and sediment. This would mainly be from spillage or leakage from oils and fuels on sire, from construction machinery and vessels. No concrete will be used in the decommissioning works.

6.8.26 The impacts on water quality of the coastal waters (**medium sensitivity**) and fish farm (**high sensitivity**) would be dependent on the scale and nature of the

incident, therefore the magnitude of impact prior to mitigation may range from **low to high**, giving rise to effects of **medium to major significance** prior to mitigation.

6.9 Mitigation

6.9.1 Mitigation aims to avoid, manage, control and further minimise environmental impacts and is discussed within the following sections.

Construction Phase Mitigation

General Management

6.9.2 A Construction Environmental Management Plan (CEMP) will be developed to ensure that the mitigation measures outlined in the EIA Report are followed during the proposed construction works. The CEMP includes surface water management and pollution prevention measures (e.g. Pollution Prevention Plan), and will be in place during construction and operation. The CEMP will remain a live document and will be continually updated as the work progresses. The CEMP is a practical tool to facilitate the management of environmental mitigation measures and to provide a clear roadmap of the key roles and responsibilities during construction. A CEMP will be provided by the marine contractor and approved by OIC and OIC Marine Services as the Statutory Harbour Authority, prior to the commencement of construction works.

6.9.3 A suitably qualified Environmental Clerk of Works (EnvCoW) will monitor the construction works to ensure that the CEMP and associated mitigation measures are being implemented effectively.

6.9.4 Best practice will be adopted throughout all phases of development, following current guidance. The programme of works will be planned, monitored and managed to minimise the potential negative environmental impacts.

6.9.5 A Pollution Incident Response Plan will be developed relating to the construction of the Proposed Development, statutory requirements and identification of areas of highest sensitivity. This will provide site spill response procedures, emergency contact details and equipment inventories and their location. All staff will be made aware of this document and its content during site induction. A copy will be available in the site office at all times.

6.9.6 All activities above Mean High Water Springs (MHWS) with potential to affect the water environment require to be authorised under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR). The level of authorisation required is dependent on the anticipated environmental risk posed by the activity to be carried out. These activities could include construction

drainage. Construction activities below MHWS with potential to affect the water environment require to be authorised under a Marine Licence.

Drainage

6.9.7 The surface water drainage will be designed during detailed design phase by a marine contractor to ensure that there are no untreated surface water discharges directly to surrounding coastal waters. It is proposed to replicate natural drainage and to use source control to deal with rainwater in proximity to where it hits the ground in line with current Sustainable Drainage Systems (SuDS) guidance.

Sediment Mitigation

6.9.8 As noted within **Section 6.8**, the marine landing point will be infilled with clean (screened) inert rock and will be stabilised with a geotextile membrane and rock armour. Prior to infilling, a silt boom / curtain will be moored seaward of the development and will be in place to capture migration of any fine sediment generated during the construction process.

6.9.9 A banksman will be present to review any sediment or material movement during construction. Any additional mitigation measures will be recommended such as required due to changing weather or changes in wave and tidal conditions. A suitably qualified Environmental Clerk of Works (EnvCoW) will also monitor the construction works to ensure that the CEMP and associated mitigation measures are being implemented effectively.

6.9.10 It is recommended that inert rocks could be wetted at source prior to transportation or infill to avoid generation of dust into the coastal waters.

Concrete Management

6.9.11 No concrete batching is proposed to be undertaken on site. The following mitigation is proposed for concrete handling and placement:

- Pouring of concrete will take place within well shuttered pours to prevent egress of concrete from the pour area.
- Pouring of concrete during adverse weather conditions (i.e. high rainfall etc) will be avoided.
- A visqueen membrane would be placed ahead to contain/prevent the spread of any material to surrounding tidal areas.

6.9.12 The CEMP will include a Pollution Incident Response Plan, and drivers of vehicles carrying concrete will be informed so as to raise awareness of potential effects of concrete and of the procedures for clean-up of any accidental spills.

6.9.13 Concrete acidity (pH) will be as close to neutral (or site-specific pH) as practicable as a further precaution against spills or leakage. The concrete acidity for the site

will be confirmed post-consent with the principal contractor involvement and detailed in the relevant CEMP.

Oil, Fuel, Site Vehicle Use and Storage

6.9.14 The risk of oil contamination will be minimised by good site working practice (further described below) but should a higher risk of oil contamination be identified then installation of an oil separator will be considered.

6.9.15 The storage of oil is considered a Controlled Activity which will be deemed to be authorised if it complies with the Regulations. The mitigation measures to minimise any risk of contaminant release are in line with SEPA GPP documents and include the following:

6.9.16 Storage:

- Storage for oil and fuels on site will be designed to be compliant with GPP2 and GPP8;
- The storage and use of loose drums of fuel on site will not be permitted; and
- Bunded tanks will provide storage of at least 110% of the tank's maximum capacity.
- Any fuel or oil held on-site would only be of an amount sufficient for the plant required.
- There would be no long-term storage of lubricants or petrochemical products on-site at the Proposed Development.

6.9.17 Refuelling and maintenance:

- Fuelling and maintenance of vehicles and machinery, and cleaning of tools, will be carried out in a designated area where possible in line with GPP13;
- Multiple spill kits will be kept on site;
- Drip trays will be used while refuelling;
- Regular inspection and maintenance of vehicles, tanks and bunds will be undertaken;

6.9.18 As an emergency procedure the Pollution Incident Response Plan will include measures to deal with accidental spillages.

Operational Phase Mitigation

General Management

6.9.19 An Operational Environmental Management Document (OEMD) will be in place throughout the operational phase. Best practice will be followed throughout the operational phase, with reference to the SEPA GPPs and best practice guidance.

Surface Water Management

6.9.20 Details of the operational surface water management proposals and methodology will be included within the OEMD and will be submitted to SEPA's operations team for agreement consent. Plans of the surface water management system will be

made available and circulated to contractors with foul water systems clearly marked.

6.9.21 Where a site use or development proposal is such that it will require a Pollution Prevention and Control (PPC) authorisation from SEPA, then specific processes, techniques and technologies will be included within the surface water management system in that location in order to meet the requirements of the PPC authorisation. Such measures would be in line with best practice guidance.

Oil, Fuel, Site Vehicle Use and Storage

6.9.22 The Proposed Development's Pollution Incident Response Plan will be updated for the operational phase of the development, taking full consideration of best practice, statutory requirements and identification of areas of highest sensitivity. It will provide site spill response procedures, emergency contact details and equipment inventories and their location. All operation staff will be made aware of this document, and its contents, and it will be available in the site office. Appropriate spill kits and absorbent materials will be stored in a suitable location which is easy to access. Staff/contractors will be trained in the use of spill kits and other pollution control equipment and the operation of pollution control devices.

Decommissioning Phase Mitigation

Sediment Mitigation

6.9.23 It is assumed that similar sediment management measures to the construction phase will be followed. This would include installing a silt boom / curtain seawards prior to decommissioning of the permanent causeway, to capture any migration of fine sediment.

6.9.24 A banksman and EnvCoW will also be present to review any sediment or material movement during decommissioning, similar to the construction phase.

Oil, Fuel, Site Vehicle Use and Storage

6.9.25 During decommissioning, similar mitigation effects relating to oil, fuel, vehicle use and storage to the construction phase will be followed.

6.10 Assessment of Residual Effects

6.10.1 The residual effects expected to arise during construction, operation and decommissioning following implementation of the mitigation measures described above are summarised in **Table 6-6.** These residual effects reflect receptor sensitivity, significance of effect pre-mitigation, mitigation measures and the

resultant effect on each receptor post-mitigation, following assessment criteria outlined in **Section 6.5.**

6.10.2 The residual effects during construction, operation and decommissioning on the water environment are considered to be **negligible** and accordingly no significant effects on the water environment in terms of EIA have been identified.

6.11 Assessment of Cumulative Effects

6.11.1 With the exception of the existing ferry terminal which is considered in this assessment, no existing or proposed developments are present within the vicinity of the Proposed Development for consideration within this assessment.

6.11.2 This chapter has considered the potential for significant combined effects on water environment associated with the new onshore wind farm, situated 1.9km west of the landing point to ensure the combined all project effects have been properly identified. The Wind Farm is proposed on the western side of Eday and mapped OS watercourse features within the Wind Farm Boundary do not discharge or connect to ditches in the vicinity of the Proposed Development. Watercourses would also typically discharge into Bay of Greentoft and Fall of Warness coastal waterbody and would therefore not result in any impact on the Bay of Backaland and fish farm on the eastern side of the Island. The cumulative effects would therefore be of negligible significance

6.12 Summary

Introduction

6.12.1 This section of the EIA Report considered potential impacts of the Proposed Development upon the water environment, including hydrology, flooding, hydrogeology and water quality. The assessment was undertaken in accordance with relevant best practice guidance, by experienced hydrologists.

6.12.2 The assessment process involved an initial desk-based review of available information including water quality, geology, surface water features and flood risk. The impact assessment included identification of sensitive receptors and environmental constraints, identification of potential impacts, and assessment of potential impact magnitude. Mitigation measures to reduce or avoid potential impacts were identified and assessed where appropriate.

Impact Assessment and Significance of Effects

6.12.3 The assessment identified the following sensitive receptors to potential impacts on the water environment: the coastal waters and sediment of Bay of Backaland and the commercial fish farm. Sensitivity of each receptor was assessed, and the potential impacts on each were assessed, for the construction, operational and decommissioning phases of the Proposed Development.

6.12.4 During the construction phase due to the small overland flow catchment draining to the site, the absence of watercourses, and the limited site footprint, the surface

water flow alteration and increased runoff to coastal waters would be of negligible significance. The main potential impact on water and sediment quality is considered to be from land reclamation construction. Following review of the construction methods and materials of the landing point, combined with the residual southerly direction of tidal flow and sediment within the Bay of Backaland, it is considered the effects would be of medium significance prior to mitigation within the immediate coastal waters and negligible outwith this area (fish farm).

6.12.5 During construction, operation and decommissioning a risk of pollution from spillages or leakages from fuels and oils and concrete handling was identified. Following mitigation these effects are considered to be negligible

6.12.6 Overall, the assessment concluded that the residual effects of the proposed development are considered to be negligible, and accordingly no significant effects on the water environment have been identified.

Proposed Mitigation Measures

6.12.7 The assessment identified suitable mitigation measures which aim to avoid, manage, control and further minimise impacts from the proposed development on the water environment. During the construction phase a Construction Environmental Management Plan (CEMP) will be developed to ensure that the mitigation measures outlined in the EIAR are followed during the proposed construction work. The CEMP will include surface water management and pollution prevention measures which follow best practice and comply with SEPA guidance (including GPPs). A suitably qualified Environmental Clerk of Works (EnvCoW) will monitor the construction works to ensure that the CEMP and associated mitigation measures are being implemented effectively.

6.12.8 During construction, sediment management measures will be undertaken such as installing a silt boom/curtain offshore prior to construction of the outer bund and subsequent infilling to capture fines and having a banksman to review sediment movements during construction, applying additional mitigation measures where necessary.

6.12.9 During the operational phase an Operational Environmental Management Document (OEMD) will be in place, and this will include surface water management and pollution prevention measures which follow best practice and comply with SEPA guidance.

6.12.10 During decommissioning, sediment management measures will be undertaken such as installing a silt boom/curtain offshore prior to removal of the causeway infill material and outer bund and having a banksman to review sediment movements during decommissioning, applying additional mitigation measures where necessary.

Table 6-6: Summary Table

Description of Effect	Receptor	Significance of Potential Effect		Mitigation Measures	Significance of Residual Effect	
		Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
	During Construction					
Changes to Hydrology	Coastal waters of Bay of Backaland	Negligible	Adverse	Install drainage in line with SuDS guidance and replicate natural drainage	Negligible	Adverse
Water and Sediment Quality – Land Reclamation	Coastal waters and sediment of Bay of Backaland	Medium	Adverse	Clean (screened) inert rock infill and bund core material. Installation of a silt boom/curtain prior to infilling and monitoring from Banksman.	Negligible	Adverse
	Fish Farm	Negligible	Adverse	Clean (screened) inert rock infill and bund core material. Installation of a silt boom/curtain prior to infilling and monitoring from Banksman.	Negligible	Adverse

Description of Effect	Receptor	Significance of Potential Effect		Mitigation Measures	Significance of Residual Effect	
		Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
Water and Sediment Quality – Pollution Incidences	Coastal Waters and sediment of Bay of Backaland	Medium – Major	Adverse	Storage, refuelling of oil, fuel and site vehicles in line with GPP guidance. Mitigation for concrete handling and placement.	Negligible	Adverse
	Fish Farm	Medium	Adverse	Storage, refuelling of oil, fuel and site vehicles in line with GPP guidance. Mitigation for concrete handling and placement.	Negligible	Adverse
	During Operation					
Changes to Hydrology	Coastal waters of Bay of Backaland	Negligible	Adverse	Maintenance of drainage measures	Negligible	Adverse

Description of Effect	Receptor	Significance of Potential Effect		Mitigation Measures	Significance of Residual Effect	
		Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
Water and Sediment Quality – Pollution Incidences	Coastal waters and sediment of Bay of Backaland	Medium – Major	Adverse	Storage, refuelling of oil, fuel and site vehicles in line with GPP guidance.	Negligible	Adverse
	Fish Farm	Medium	Adverse	Storage, refuelling of oil, fuel and site vehicles in line with GPP guidance.	Negligible	Adverse
	During Decommissioning					
Water and Sediment Quality – Removal of Permeant Causeway	Coastal waters and sediment of Bay of Backaland	Medium	Adverse	Inert rock infill removed first and bund core material removed last. Installation of a silt boom/curtain prior to infilling and monitoring from Banksman.	Negligible	Adverse

Description of Effect	Receptor	Significance of Potential Effect		Mitigation Measures	Significance of Residual Effect	
		Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
	Fish Farm	Negligible	Adverse	Inert rock infill removed first and bund core material removed last. Installation of a silt boom/curtain prior to infilling and monitoring from Banksman.	Negligible	Adverse
Water and Sediment Quality – Pollution Incidences	Coastal waters and sediment of Bay of Backaland	Medium – Major	Adverse	Storage, refuelling of oil, fuel and site vehicles in line with GPP guidance.	Negligible	Adverse
	Fish Farm	Medium	Adverse	Storage, refuelling of oil, fuel and site vehicles in line with GPP guidance.	Negligible	Adverse
	Cumulative Effects					
From Wind Farm	Coastal waters and sediment of Bay of Backaland	Negligible	Adverse	-	Negligible	Adverse

6.13 References

Angus Council (2016). Angus Local Development Plan

BGS. (2020). Hydrogeology 1:625,000 scale. Retrieved from BGS GeoIndex Onshore: https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.124310602.1993510821.1742230389-948998788.1742230389

BGS. (2025). Geology Map. Retrieved from BGS Geology of Britain Map Viewer: https://geologyviewer.bgs.ac.uk/

Environment Agency. (2018). Coastal Design Sea Levels – Coastal Flood Boundary Extreme Sea Levels.

JHI. (1981). Soil map of Scotland. Retrieved from Scotland's Soils: https://map.environment.gov.scot/Soil_maps/?layer=2#

SEPA. (2023). Water Classification Hub. Retrieved from https://informatics.sepa.org.uk/WaterClassificationHub/

SEPA. (2025a). Climate change Allowances for Flood Risk Assessments in Land Use Planning (Vol. Version 6). Retrieved from https://www.sepa.org.uk/media/jjwpxuso/climate-change-allowances-guidance_v6.pdf

SEPA. (2025b). SEPA Flood Maps. Retrieved from https://scottishepa.maps.arcgis.com/apps/webappviewer/index.html

SNH. (2016). Carbon and Peatland 2016 map. Retrieved from Scotland's Soils: https://map.environment.gov.scot/Soil_maps/?layer=2#

Water Framework Directive (WFD) 2000/60/EC of the European Parliament

Water Environment and Water Services (Scotland) Act 2003

Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended (CAR)

Water Environment (Miscellaneous) (Scotland) Regulations 2017