

The impacts identified as requiring consideration are listed in EIAR Appendix 8.2, Table 8.2/1. Information on the nature of the impact (i.e. temporary/permanent direct/indirect physical and setting) is also described.

The assessment covers all potential impacts identified through scoping, as well as any further potential impacts that have been highlighted as the assessment progressed. It should be noted that impacts are not necessarily relevant to all stages of the proposed development.

The assessment of potential effects on the historic environment has been undertaken using a structured methodology consistent with best practice and relevant guidance and is set out in EIAR Appendix 8.2. This approach considers both the nature and extent of potential impacts, including direct physical effects and changes to the setting of heritage assets. The approach to assessment is based on ORCA's bespoke methodology that draws on best practice and guidance set out in the scoping report and in line with the *Environmental Impact Assessment Handbook* (NatureScot and Historic Environment Scotland 2018¹).

Two study areas have been used for this assessment. A 1km study area offset from the site boundary that considers heritage assets that could be directly (physically) impacted by the proposed development; and a study area based on the proposed development's Zone of Theoretical Visibility (ZTV) (as set out in EIAR Chapter 7: Landscape, Seascape and Visual) that considers potential setting impacts on those designated heritage assets that have been short-listed by ORCA and agreed in consultation with Historic Environment Scotland.

A set of topic-specific criteria has been developed to determine the value of heritage assets. These criteria are informed by statutory designations, professional judgement, and the asset's contribution to understanding the past. The value assigned to each asset is then considered alongside the predicted magnitude of impact resulting from the proposed development.

The magnitude of impact is assessed based on the scale, extent, and duration of change (short-term (temporary) and long-term (permanent)), as well as the degree to which the asset's heritage value may be altered. While example criteria are used to guide this process, they are not applied mechanistically. Instead, professional judgement plays a central role in interpreting the likely effects, allowing for flexibility where the context or character of an asset warrants a nuanced approach.

The combination of asset value and impact magnitude informs the assessment of the overall consequence of effect. This consequence is then used to determine the significance of the effect as shown in Table 8.1, taking into account the anticipated effectiveness of embedded design and mitigation measures. The final assessment reflects the residual effect – i.e. the effect remaining after mitigation has been applied.

Table 8.1: Assessment of significance of effect

Effect	Description	Significance of Effect
Positive	Positive – to be encouraged.	Significant
Major	Highly significant and requires immediate action. May be intolerable risk or significance.	Significant
Moderate	Significant – may require additional control measures and/or management where possible.	Not significant
Minor	Not significant – however may require some management to ensure it remains within acceptable levels.	Not significant
Negligible	Not significant	Not significant

¹ Available online: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=6ed33b65-9df1-4a2f-acbb-a8e800a592c0> [accessed 02/07/2025]

Effects assessed as having a major or moderate significance are considered 'material' or 'likely to be material' in the planning decision-making process. These are regarded as 'significant' for the purposes of the EIA Regulations.

The assessment of setting effects follows a consistent approach, evaluating how changes in the surrounding environment may influence the character, experience, or understanding of the heritage asset.

8.4 BASELINE CONDITIONS

8.4.1 Archaeological and historic background

The following is a brief outline of the archaeological and historic background of the 1km study area, and the wider environs of the study area.

A detailed summary of the archaeological and historic background is provided in EIAR Appendix 8.1, Annex 2, Section 5 and the locations of heritage assets within the 1km study area are shown on Figure 8.1, and designated assets subject to setting impact assessment are shown in Figure 8.2.

Figure 8.1: Location of HER assets within 1km of the proposed development

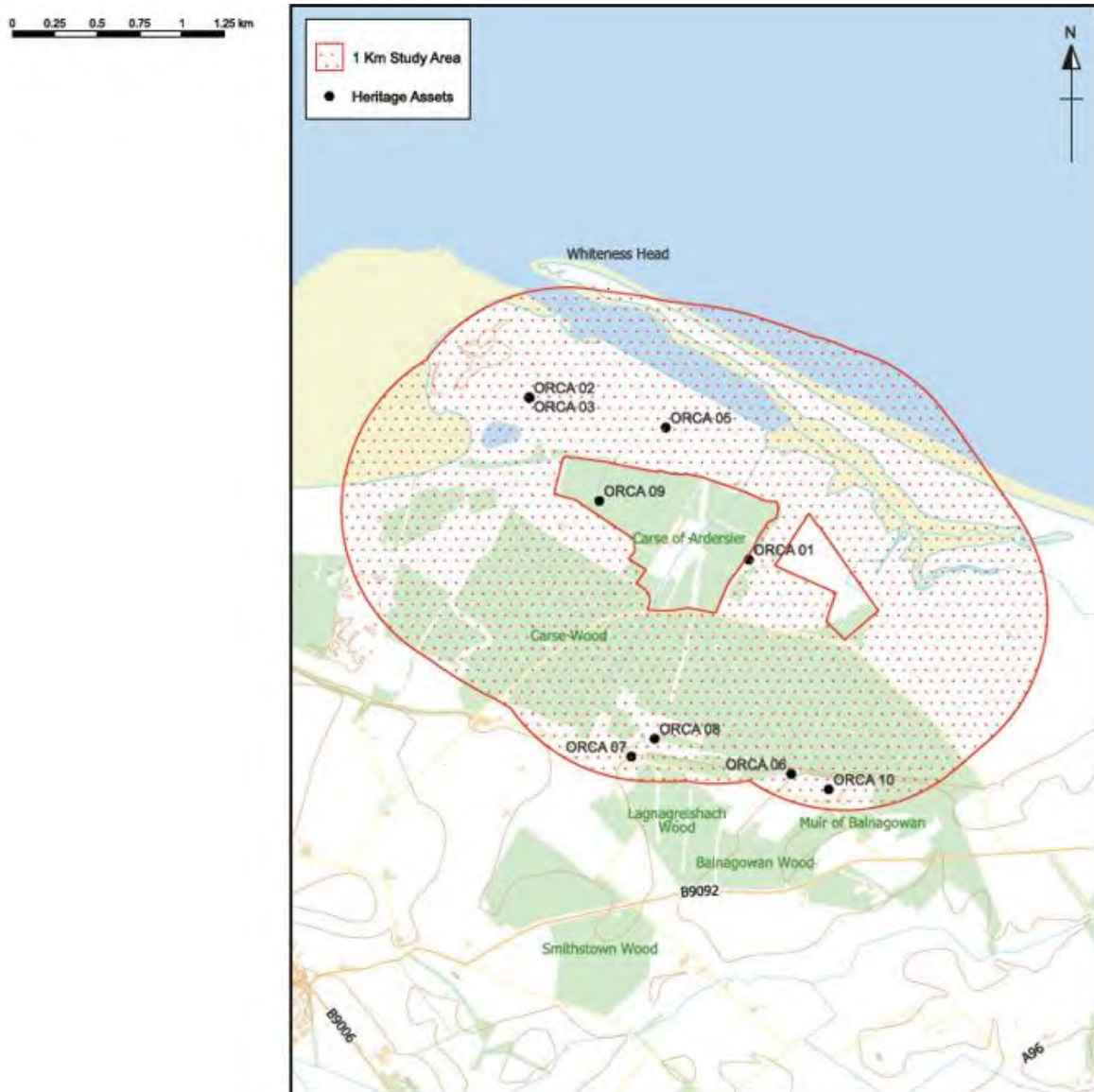
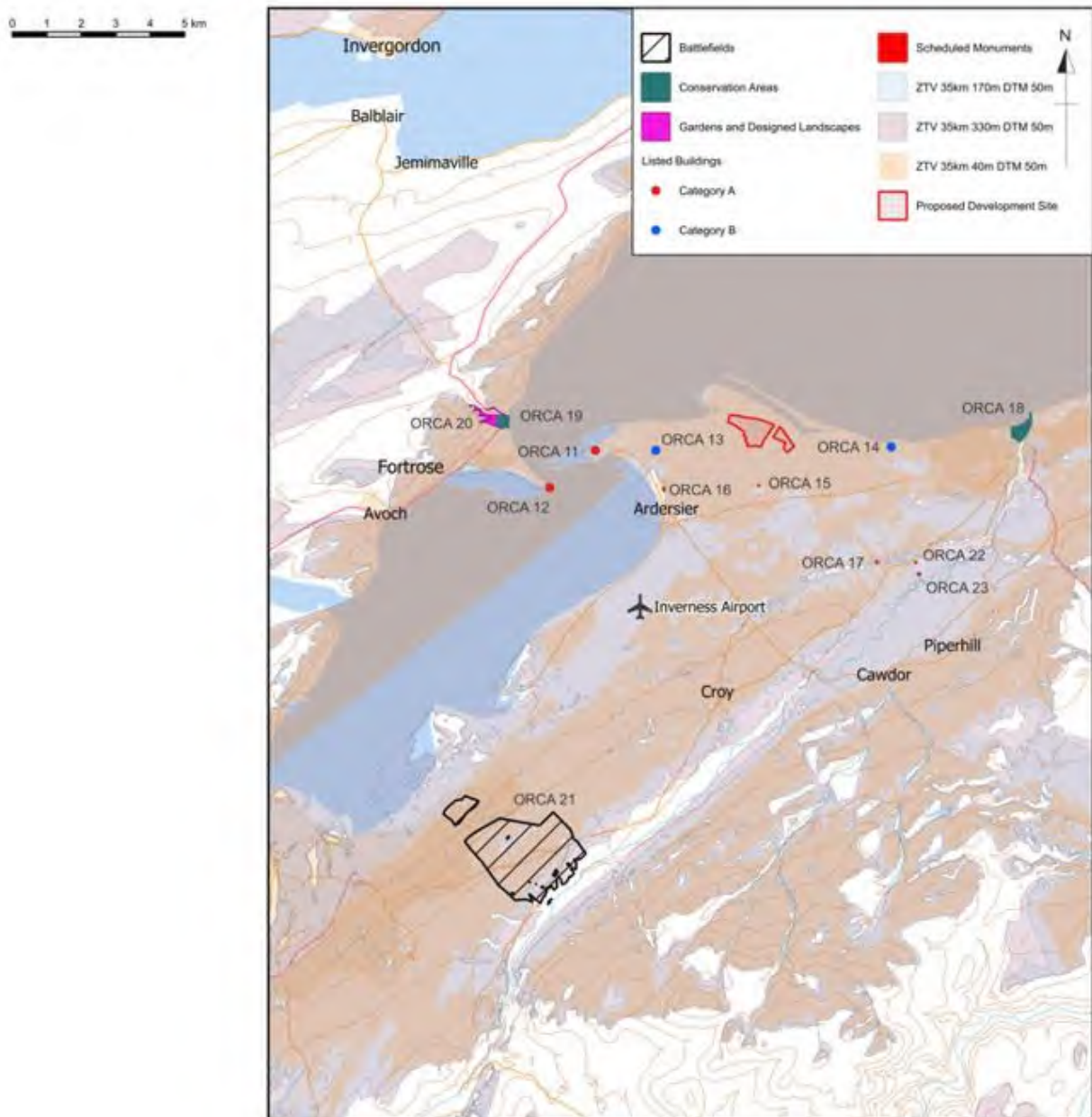


Figure 8.2: Designated heritage assets subject to setting impact assessment



A review of existing records indicates that while no direct evidence of prehistoric activity has been identified within the proposed development site itself, the surrounding landscape contains numerous sites indicative of early settlement and land use.

The early Holocene period (c. 11,700–8,200 years ago) was characterised by significant climatic changes following the Last Glacial Maximum, resulting in rising sea levels and shifting coastal landscapes that would have influenced early human activity in the Ardersier area.

While no direct archaeological evidence of early Holocene occupation has been recorded within the study area, findings from nearby Culbin Sands (10km to the east of the proposed development site) indicate

that Mesolithic hunter-gatherers were active along the Moray Firth coastline. These communities would have exploited the area's marine resources, woodlands, and freshwater sources, making the dynamic coastal environment well-suited for seasonal occupation and subsistence activities. The proximity of such evidence at Culbin Sands suggests that similar patterns of coastal exploitation may have occurred along the Ardersier coastline, particularly in relation to fishing and foraging practices.

Within 4km of the proposed development site, recorded archaeological features include shell middens, cropmarks, and settlement remains at Hilton of Delnies (2.5km to the east of the proposed development site) and Easter Delnies (3.5km to the southeast of the proposed development site). Additionally, evidence of enclosures and pit circles has been documented at Wester Delnies (HER MHG7294 ²) and Easter Delnies (HER MHG7284 ³) approximately 3.5km to the southeast and east of the proposed development site.

Further afield, additional sites of prehistoric significance are recorded. A burial, likely of prehistoric origin, has been identified within Balnagowan Wood (ORCA 15, Figure 8.2), while a henge and cairn are documented within Lagnagreishach Wood. Numerous cropmark sites, indicating former habitation and activity, include features such as hut circles, enclosures, pits, ring ditches, cultivation remains, souterrains, roundhouses, and barrows.

The Pictish period (approximately 300AD to 900D) was a time of significant power, culture and religious influence, with the Highlands serving as a key centre. The Kebbuck Stone, a later Pictish cross-slab near Wester Delnies, dates to the 8th or 9th century, and although worn, its intricate interlace designs suggest religious and artistic significance, and nearby finds indicate human activity in the area at the time.

Cromal Mount (ORCA 16, Figure 8.2), a motte, would have had timber defences and served as a centre of local authority is located just over 2km to the southwest of the proposed development site. Close by, Ardersier Old Parish Church (ORCA 13, Figure 8.2), dating to at least 1227, was rebuilt multiple times, with its late 18th-/early 19th-century graveyard still visible is located approximately 3km to the southwest of the proposed development site.

The post-medieval period saw substantial changes in land use, industry, and settlement patterns in the environs of the proposed development. The area was predominantly agricultural, with grain production and cattle grazing forming the core of local economic activity. Fishing was also a significant industry, evidenced by the Easter Delnies fishing station (ORCA 14, Figure 8.2), located near the proposed development site within Nairn Golf Course. Remains of the ice house, constructed in 1877, and the bothy, added in 1904, survive within the landscape, providing physical testimony to the area's maritime heritage.

In terms of military influence, the construction of Fort George (ORCA 11, Figure 8.2 located 3.5km to the west of the proposed development) in the 18th century marked a major strategic development following the Jacobite Rising of 1745. The fort functioned as a key military stronghold, prompting economic growth, improvements in transport infrastructure, and changes in local population dynamics.

The 19th and 20th centuries saw further industrialisation, most notably with the establishment of the Ardersier oil rig fabrication yard in the 1970s. As one of the largest oil rig construction sites in the UK, it provided significant employment until its closure in 2001.

8.4.2 Heritage assets within the study areas

The following lists heritage assets that have been identified within the 1km study area, and designated heritage assets that have been identified within the ZTV and have been shortlisted for setting impact assessment.

² Highland HER: <https://her.highland.gov.uk/Monument/MHG7294>

³ Highland HER: <https://her.highland.gov.uk/Monument/MHG7284>

1km Study Area

There are no scheduled monuments, listed buildings, conservation areas, inventory battlefields, world heritage sites or gardens & designed landscapes within the 1km study area.

There are nine undesignated heritage assets within the 1km study area listed in the Highlands Historic Environment Record (HER) and recorded during the walkover survey (Table 8.1: Assessment of significance of effect and Figure 8.1). Two of these assets ORCA 01 and ORCA 09 are located within the site boundary of the proposed development, and the remaining seven assets are located outside the site boundary. In addition to the heritage assets within the 1km study area, potential unknown heritage assets and potential deposits of palaeoenvironmental have been included. These have not been spatially located within the study area.

Heritage assets that are within the site boundary but not within areas that will be affected by construction, or are of negligible value, will not be considered further. Justification for scoping in or out of the assessment is provided in the table.

Table 8.1: Summary of the value of receptors within the 1km study area

Asset	Value	Scoped in/out of assessment
ORCA 01 MHG20808 ⁴ : farmstead, Carse of Ardersier, depicted on the 1st edition 6-inch OS map (1876).	Negligible. Located within the site boundary of the extension site, this asset no longer appears to survive. Any physical remains that exist would make a negligible contribution to our understanding or appreciation of the past	Out. The negligible value of the asset makes any impacts on it not significant.
ORCA 02 MHG489135: wreck, Comet.	Medium. If the wreck is present at this location, it has the potential to make a significant contribution to our understanding of mid-19th century cargo vessel design	Out. While the asset is within the site boundary, it is not within an area that would be disturbed by construction or dredging.
ORCA 03 MHG48721 ⁶ : wreck, Patriot.	Medium. If the wreck is present at this location, it has the potential to make a significant contribution to our understanding of mid-19th century cargo vessel design.	Out. While the asset is within the site boundary, it is not within an area that would be disturbed by construction or dredging..
ORCA 04 MHG52077 ⁷ : wreck, Bess.	Medium. If the wreck is present at this location, it has the potential to make a significant contribution to our	Out. While the asset is within the site boundary, it is not within an area that would be

⁴ Highland HER: <https://her.highland.gov.uk/Monument/MHG20808>

⁵ Highland HER: <https://her.highland.gov.uk/Monument/MHG48913>

⁶ Highland HER: <https://her.highland.gov.uk/Monument/MHG48721>

⁷ Highland HER: <https://her.highland.gov.uk/Monument/MHG52077>

	understanding of mid-19th century cargo vessel design.	disturbed by construction or dredging.
Asset	Value	Scoped in/out of assessment
ORCA 05 MHG45951: Ardersier oil rig construction yard.	Negligible. The remains of the oil rig construction yard have been removed and nothing remains that would contribute to our understanding and appreciation of it.	Out. The negligible value of the asset makes any impacts on it not significant.
ORCA 06 MHG2818: natural feature, Glac Nan Ceannaichean. A natural hollow thought in local legend to have been a burial place of rival packmen.	Low. If the heritage is a burial site as suggested by folklore, then it has local value or interest for cultural appreciation.	Out. The asset lies outside the site boundary.
ORCA 07 MHG20826: farmstead, Upper Carse, depicted on the 1st edition 6-inch OS map (1876).	Low. A non-designated asset that is common to the area.	Out. The asset lies outside the site boundary.
ORCA 08 MHG20816: farmstead, Upper Carse, depicted on the 1st edition 6-inch OS map (1876).	Low A non-designated asset that is common to the area.	Out. The asset lies outside the site boundary.
ORCA 09 Unnamed building recorded by walkover survey. Depicted on the 2 nd edition OS map of 1906.	Low. Located within the site boundary of the extension site, this is a non-designated asset that is common to the area.	In. The asset is located within the site boundary and within an area that would be disturbed by construction.
ORCA 10 MHG20811: Muir of Balnagowan farmstead, depicted on the 1st edition 6-inch OS map (1876).	Low. A non-designated asset that is common to the area.	Out. The asset lies outside the site boundary.
Unknown historic environment assets	Low to Medium Any historic environment remains that exist would make a low or significant contribution to our understanding of deposits of palaeoenvironmental interest	In There is a potential for unknown historic environment assets within the site boundary.
Deposits of palaeoenvironmental interest	Negligible to Medium Any palaeoenvironmental deposits that exist would make a negligible, low or significant contribution to our understanding of deposits of palaeoenvironmental interest	In There is a potential for deposits of palaeoenvironmental interest within the site boundary.

35km ZTV study area

A wider study area was developed, based on the ZTV, to identify heritage assets, the settings of which could potentially be affected by the proposed development. After consultation with HES and undertaking a sifting process based on professional judgement, the following assets were identified for setting impact assessment. The locations of the assets are shown on Figure 8.2.

Table 8.2: Summary of the value of designated receptors short-listed for setting impact assessment

Asset	Value	Reasoning
Listed Buildings: Category A		
ORCA 11 LB1721: Fort George, excluding the interior and roof of the Junior Ranks Mess and Kitchen with the rear enclosure of North Stores Block. Located 3.5km to the west of the proposed development.	High	Category A listed building that is valued at a national level.
ORCA 12 LB31799: Chanonry Lighthouse, Keeper's House, Wall and Gatepiers. Located 5.5km to the southwest of the proposed development.	High	Category A listed building that is valued at a national level.
Listed Buildings: Category B		
ORCA 13 LB1720: Kirkton, Old Burial Ground and Watch-house. Located 3km to the southwest of the proposed development.	Medium	Category B listed building that is valued at a regional level.
ORCA 14 LB52544: Delnies Ice House and Bothy, The Nairn Golf Club, Nairn. Located 2.2km to the east of the proposed development.	Medium	Category B listed building that is valued at a regional level.
Scheduled Monuments		
ORCA 15 SM4737: Moor of Balnagowan, enclosure 250m SW of Located 2km to the south of the proposed development.	High	Scheduled monument that is valued at a national level.

Asset	Value	Reasoning
ORCA 16 SM2823: Cromal Mount, mound and earthworks Located 3.2km to the southwest of the proposed development.	High	Scheduled monument that is valued at a national level.
ORCA 17 SM11608: Easter Lochend, fort 350m WNW of Located 6km to the southeast of the proposed development.	High	Scheduled monument that is valued at a national level.
ORCA 22 SM11607: Ackron, three cairns 325m ENE of, Kinchyle 4.8km to the south of the proposed development	High	Scheduled monument that is valued at a national level.
ORCA 23: Hangman's Hill, cairn 380m E of Kinchyle 5km to the south of the proposed development	High	Scheduled monument that is valued at a national level.
Conservation Areas		
ORCA 18 Nairn Fishertown Located 9km to the east of the proposed development.	Medium	Valued at a regional level due as a good example of a traditional fishing community with a distinctive layout and character.
ORCA 19 Rosemarkie Located 7.5km to the west of the proposed development.	Medium	Valued at a regional level as a good example of a late 18 th /early 19 th century coastal village.
Gardens and Designed Landscape		
ORCA 20 GDL00357: The Fairy Glen Located 6.5km to the west of the proposed development.	High	Valued at a national level for its unique geological features, cultural associations and scenic beauty.
Inventory Battlefield		
ORCA 21 BTL6: Battle of Culloden Located 13.5km to the southwest of the proposed development.	High	Inventory Battlefield that is valued at a national level, holding deep cultural significance and serves as a place of reflection and remembrance.

8.5 POTENTIAL IMPACTS

The impacts identified as requiring consideration are listed in Table 8.3. Information on the nature of the impact (i.e. direct (physical), direct (setting) and short-term (temporary) and long-term (permanent) is also described.

Setting impacts on non-designated historic environment assets were not considered as none were highlighted by THC HET or HES during the scoping or early consultation phases and have therefore been scoped out of this assessment.

Table 8.3: Impacts requiring consideration in assessment

Potential Impact	Nature of Impact
Construction	
Loss of or damage to known marine archaeological remains	Direct (physical)
Loss of or damage to unknown marine archaeological remains	Direct (physical)
Loss of or damage to known historic environment assets	Direct (physical)
Loss of or damage to unknown historic environment assets	Direct (physical)
Loss of or damage to deposits of palaeoenvironmental interest	Direct (physical)
Short-term (temporary) changes to the setting of designated historic environment assets that reduces their value	Direct (setting)
Operation	
Long-term (permanent) changes to the setting of designated historic environment assets that reduces their value	Direct (setting)

8.5.1 Construction

Ground-breaking activities associated with the construction phase have the potential to result in damage or loss of known and unknown archaeological remains, terrestrial historic environment assets, and palaeoenvironmental deposits.

Key construction activities resulting in impacts on the historic environment include:

- Inner harbour deepening – Excavation works associated with the selected deepening of the inner harbour may disturb or remove marine archaeological deposits, including potential wreck sites and submerged heritage assets.
- Site clearance of extension lands – Tree felling, stump removal, and topsoil stripping in the site boundary could impact buried archaeological remains that have not been previously disturbed.
- Drainage installation – The installation of new drainage along the southern perimeter of the proposed development may cause ground disturbance, potentially affecting archaeological and palaeoenvironmental deposits.

8.5.2 Operation

There is a possibility that the proposed development could have long-term (permanent) effects on the setting of designated historic environment assets, affecting the way in which the asset is understood, appreciated and experienced, and thus the cultural significance of the asset.

Key operational characteristics resulting in impacts on the historic environment include:

- The temporary presence of turbines under construction (maximum number of three), and the storage of floating bases.
 - Turbine assembly and storage will be temporary and will be present during operation at regular intervals over the lifetime of the development. The consented development already allows for turbines and tall structures.
- The permanent presence of the proposed port and buildings including manufacturing workshops assembly facilities (principally bases), storage, offices and business units.
 - The permanent buildings assessed take into account the presence of the already consented development that allows for buildings across the site. This assessment will only consider any change from the consented development.

8.6 MITIGATION AND ENHANCEMENT

8.6.1 Embedded mitigation

The proposed development design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the proposed design. This is referred to as embedded mitigation (or design interventions). The principles of the design and mitigation hierarchy outlined in EIAR Chapter 2 (Methodology) have been followed.

The first principle being to avoid potential adverse impacts, if at all practicable, before seeking to minimise or mitigate for any unavoidable impacts. Embedded mitigation for the proposed development is reported in EIAR Chapter 3 (Project Description) which also includes a description of the design alternatives that have been considered, including the environmental factors which have influenced the decision-making. Mitigation measures will seek to reduce impacts during both construction and operation phases. Any effects which cannot be mitigated or reduced are referred to as residual effects.

8.6.2 Mitigation

Mitigation is included in the Outline Construction Environmental Management Document (CEMD). The Outline CEMD will be developed into the Construction Environmental Management Plan (CEMP) for implementation during construction. Further information on the Outline CEMD is provided within EIAR Chapter 3 (Project Description). EIAR Chapter 15 (Schedule of Mitigation and Enhancements) provides a summary of the mitigations identified within this EIAR.

Mitigation relating to the historic environment will be set out in a Project Design (PD) ⁸ that will be agreed with The Highland Council's Historic Environment Team prior to construction proceeding. The agreed PD will also be included in the Outline Construction Environmental Document (CEMD).

8.6.3 Construction Mitigation Measures

Known historic environment assets

ORCA 09: Farmstead

Construction works will require the removal of ORCA 09, the ruins of a farmstead of post-medieval date. Prior to construction proceeding, remains of the building will be recorded in accordance with ALGAO Scotland's *Historic Building Guidance* (2013)⁹. This will ensure that a permanent record of the structure

⁸ In CifA's updated standards 'Project Design' has replaced 'Written Scheme of Investigation' as a universal term for the document that sets out how the archaeological work will be conducted.

⁹ Available at: https://www.alqao.org.uk/sites/alqao.org.uk/files/2023-08/ALGAO_Buildings_Guidance.pdf

is made. The level of recording will need to be agreed in advance with The Highland Council's Historic Environment Team (THC HET) and will need to be undertaken by suitably qualified professionals in accordance with an agreed PD. The final outputs will be archived with the appropriate local repository.

Unknown historic environment assets

The proposed method of woodland removal will be whole tree removal, where the tree and flat root system is pulled out in a single event. This introduces a risk of encountering previously unrecorded archaeological remains. It is therefore recommended that an archaeological watching brief is maintained during tree removal and ground clearance works in areas that will be agreed in consultation with THC HET and outlined in the PD. The watching brief will include:

- Recording any exposed archaeological features or artefacts.
- Protocols and provisions for halting works if significant archaeological remains are encountered.
- Provision of immediate advice on further mitigation if necessary.

A concise report will be produced summarising the results of the watching brief and any subsequent investigations. This will be submitted to THC HET and deposited with the Highland Historic Environment Record (HER).

Deposits of palaeoenvironmental interest

Boreholes have been taken across the proposed development site, and given the potential for early Holocene deposits and raised beaches it is recommended that these are analysed by an appropriately qualified specialist to identify areas of palaeoenvironmental potential.

If areas of palaeoenvironmental potential are identified by this analysis, a watching brief on these areas will be maintained during groundworks and would record and sample any exposed palaeoenvironmental contexts (e.g. buried soils, organic lenses).

The methodology for the assessment of the borehole logs and associated reporting along with specifications for the watching brief will be set out in the PD. The results will be set out in a specialist report detailing the sampling locations and methods, results and interpretation that would be incorporated into the overall reporting on the archaeological mitigation works. Archive samples and data would be submitted to a suitable repository.

This approach would ensure that any palaeoenvironmental deposits encountered during development are identified, recorded, and analysed in a proportionate manner. It complements the archaeological mitigation measures and contributes to a fuller understanding of the site's historic environment.

8.6.4 Operation Mitigation Measures

No specific operational mitigation measures are considered to be possible.

8.6.5 Enhancements

In line with best practice and planning policy objectives to maximise public value from development-led investigations, the PD should be designed to deliver meaningful public benefit. This could be realised through community engagement, where practicable opportunities can be explored to engage local communities with the findings of the archaeological investigations. This could include public talks and presentations delivered in collaboration with local heritage groups or community organisations.

Educational opportunities, supporting learning and education by using findings to develop curriculum-linked resources for local schools, exploring themes like archaeology, local history and climate change.

8.6.6 Monitoring

It is anticipated that THC HET may undertake monitoring visits during watching briefs.

8.7 ASSESSMENT OF SIGNIFICANT EFFECTS

The following lists those effects that have been identified as significant, or potentially significant in the case of unknown historic environment assets and deposits of palaeoenvironmental interest. All identified effects are set out in EIAR Appendix 8.1, Annex 2.

8.7.1 Construction

It is important to note that in EIA terms, the physical removal of archaeological remains represents a high magnitude of impact. Preservation by record through the watching brief and subsequent reporting, and deposition of an ordered archive in a suitable repository is considered a form of mitigation that compensates for the loss of the archaeological resource, rather than reducing the scale of impact. As such, residual effects will not change from those identified.

Loss of or damage to unknown historic environment assets

As outlined in the Desk-Based Assessment (EIAR Appendix 8.1), the proposed development site may contain evidence of human activity dating from the Mesolithic period onwards. While extensive forestry planting has taken place, particularly in the western part of the extension lands, which could have truncated or removed any archaeological remains, the potential exists for surviving deposits or features. The heritage value of any such finds could range from negligible to high, depending on their condition, context and cultural significance.

Given the low archaeological potential of the application site, these impacts should be considered to be unlikely, but possible, and would therefore require proportionate mitigation. As the application site would be cleared and covered with a platform, this would constitute a high magnitude of impact, resulting in a potential **minor to major** adverse effect (depending on the value of any assets), and this could therefore potentially be **significant**.

Loss of or damage to deposits of palaeoenvironmental interest

The site clearance of extension lands, including tree felling and vegetation removal, and dredging activities have the potential to disturb or destroy deposits of palaeoenvironmental interest.

As outlined in the EIAR Appendix 8.1, Annex 2 the study area contains known early Holocene deposits and raised beaches that may preserve evidence of past environmental conditions and early human activity. However, previous development, including the construction of the Ardersier oil rig fabrication yard, as well as historical dredging and land redevelopment, may have removed or disrupted any surviving deposits of cultural significance within those areas as opposed to the extension areas.

Given the low archaeological potential of the extension lands for deposits of palaeoenvironmental interest, these impacts should be considered to be unlikely, but possible and would therefore require proportionate mitigation. If palaeoenvironmental remains are present in the extension areas, their heritage value could range from negligible to medium, depending on their condition, context, and significance. Construction activities could have a low to medium magnitude of impact (depending on location), resulting in a potential **minor to major** adverse effect (depending on the value of any deposits of palaeoenvironmental interest) and this could therefore potentially be **significant**.

Table 8.4: Summary of assessment of significant effects during construction

Receptor	Value	Potential impact (in the absence of mitigation)	Mitigation	Residual effect ¹⁰
Unknown historic environment assets	Low to Medium	Loss of or damage to receptor	Watching brief	Minor to Major (potentially significant)
Deposits of palaeoenvironmental interest	Low to Medium	Loss of or damage to receptor	Assessment and analysis of borehole logs and watching brief	Minor to Major (potentially significant)

8.7.2 Operation

Long term changes to the setting of designated historic environment assets that reduces their value

This assessment takes into account the fact that there is extant consent for the assembly of turbines along with the temporary presence of floating bases, and for the construction of the consented development that would comprise buildings immediately adjacent to the proposed development site. This assessment therefore assesses the change from the consented development.

There is a possibility that the proposed development could have long-term (permanent) effects on the setting of designated historic environment assets, affecting the way in which the asset is understood, appreciated and experienced, and thus the cultural significance of the asset.

An assessment of the potential impact from the proposed port and offshore wind related buildings including manufacturing workshops, assembly facilities (principally bases), storage, offices and business units has been undertaken on designated heritage assets that have been identified by ORCA for assessment and subsequently agreed in consultation with Historic Environment Scotland.

Those designated assets where significant effects have been identified below. A full description of all the assets and potential effects is provided in EIAR Appendix 8.1, Annex 3: Setting Impact Assessment.

ORCA 11: Fort George, Category A Listed Building (LB1721)

See EAR Chapter 7 (Landscape, Seascape and Visual), Figure 7.5.4a, Viewpoint 4, taken from the Duke of Cumberland's Bastion.

The proposed development is located approximately 3km to the northeast of Fort George and would introduce both temporary and permanent changes to its setting in the following ways:

Wind Turbines and floating bases (Short-term (temporary), static): The proposed development has extant consents in place for tall turbine structures. The proposed development includes for the fabrication of offshore turbines, and the storage of floating turbine bases. Although the turbines will not be operational or moving during their time on land, their exceptional height means they are likely to be visible from elevated positions within Fort George, particularly from the Duke of Cumberland's Bastion, the north casement curtain, and the Ravelin. Their scale alone may draw visual attention and contrast with the historic and natural character of the setting. However, their temporary and non-operational nature, along with their eventual removal, limits the duration and permanence of this impact. Although temporary and

¹⁰ The mitigation proposed compensates for the loss of the archaeological resource, rather than reducing the scale of impact. As such, residual effects remain the same after mitigation is accounted for.

non-operational, the turbines height would introduce a medium magnitude of change to the setting. Given Fort George's high value, this would result in a major short-term adverse effect.

Permanent Buildings (Long-term (permanent)): The proposed permanent buildings would be seen within a complex of already consented buildings that would be behind a tree belt along the southwestern boundary of the proposed development site. While the proposed permanent buildings would add to the existing massing of the consented buildings, they would not significantly change the setting within the fort's wider visual envelope, and the tree belt would also provide some screening in views from the southwest. Their potential visibility from sensitive viewpoints within Fort George would therefore result in a negligible long-term adverse effect.

Overall, and taking into account that it would not be possible to fully mitigate the impacts, it is assessed that there would be a **major** short-term (temporary) adverse effect on the Fort George during periods of turbine construction, which is **significant**; and a **minor** long-term (permanent) adverse effect from the presence of the permanent buildings, which is not significant.

Table 8.5: Summary of assessment of significance of effect during operation

Receptor	Value	Potential impact (in the absence of mitigation)	Mitigation	Residual effect ¹¹
Fort George (ORCA 11, LB1721)	High	- Short-term (temporary) presence of wind turbines under construction that introduces a notable change to the setting of the asset. - Long-term (permanent) presence of buildings that introduces a notable change to the setting of the asset.	None proposed	Major short-term (temporary) adverse Minor long-term (permanent) adverse

8.8 STATEMENT OF SIGNIFICANCE

The assessment has identified the following significant effects on the historic environment.

¹¹ The mitigation proposed compensates for the loss of the archaeological resource, rather than reducing the scale of impact. As such, residual effects remain the same after mitigation is accounted for.

8.8.1 Construction Phase

Unknown Historic Environment Assets

Ground-breaking activities within the extension lands may result in the loss of or damage to previously unrecorded archaeological remains. While the archaeological potential of the site is assessed as low, the magnitude of impact from construction would be high where such remains are present. The residual effect, following mitigation through archaeological watching brief and preservation by record, is assessed as minor to major adverse depending on the value of any assets encountered. This is considered to be **potentially significant**.

Deposits of Palaeoenvironmental Interest

The presence of early Holocene deposits and raised beaches within the extension lands introduces the potential for palaeoenvironmental remains of archaeological interest. Although previous development has likely disturbed some areas, undisturbed deposits may survive. The residual effect, following mitigation through borehole analysis and targeted watching brief, is assessed as minor to major adverse, and is therefore **potentially significant**.

8.8.2 Operational Phase

Fort George (ORCA 11, LB1721)

The temporary presence of offshore wind turbines under construction and floating bases would result in a major short-term (temporary) adverse effect on the setting of Fort George, a Category A Listed Building. This is considered **significant**.

The permanent presence of port-related buildings, when assessed against the baseline of already consented development, would result in a minor long-term (permanent) adverse effect, which is **not significant**.

No other significant effects on designated or non-designated heritage assets have been identified. All other effects are either not significant or have been scoped out of the assessment based on professional judgement and consultation with statutory consultees.

8.9 CUMULATIVE EFFECTS

It is necessary to consider whether the effects of other schemes in conjunction with the proposed development would result in an additional cumulative change on the settings of heritage assets, beyond the levels predicted for the proposed development alone.

The cumulative assessment will have regard to the guidance on cumulative effects on heritage assets as set in the Environmental Impact Assessment Handbook¹² and will utilise the criteria for assessing setting impacts as set out in EIAR Appendix 8.2. The assessment of cumulative effects will consider whether there would be an increased impact, either additive or synergistic, on the setting of heritage assets as a result adding the proposed development to a baseline, which may include operation, under construction, consented or proposed developments within the planning system.

¹² NatureScot and HES (2018) <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=6ed33b65-9df1-4a2f-acbb-a8e800a592c0>

In determining the degree to which a cumulative effect may occur as a result of the addition of the proposed development into the cumulative baseline a number of factors are taken into consideration:

- The overall character of the heritage asset and its sensitivity to change in setting.
- The siting, scale and design of the baseline schemes.
- The way in which the heritage asset is experienced.
- The contribution of the cumulative baseline schemes to the significance of the effect, excluding the proposed development being assessed, on the setting of the heritage asset under consideration.

Given the emphasis placed by NatureScot and HES in their EIA Handbook on significant effects, and the requirements of the EIA Regulations, cumulative effects have only been considered in detail for those heritage assets where the effects on setting from the proposed development, alone, have been judged to be an effect of moderate adverse level or greater. Where effects on the setting of heritage assets would be of less than moderate adverse level, cumulative effects are unlikely to reach the threshold of significance.

As set out above, cumulative impacts relating to the historic environment are for the most part limited to effects on the setting of heritage assets; however, given possible significant effects have been identified for unknown historic environment remains and deposits of palaeoenvironmental interest, these are also considered.

A list of operational, consented and within-planning developments within 15km of the proposed development has been prepared, and this is provided in EIA R Chapter 14 (Cumulative Effects). With regard to the likely significant cumulative effects on heritage assets, the assessment considers operational, consented and within-planning developments at distances up to 5km from the proposed development. The location of cumulative developments is shown on Figure 14.1. Cumulative effects from the following developments are considered:

- 18/00514/FUL: Land 270m SE of Fort George, Ardersier:
 - The installation of a Multi-Use Games Area with 3m high fencing (5m at goal ends) to include paths and ground drainage.
- 20/01116/S37: Land 585m SE of Kirkton, Ardersier:
 - New span of 11kV overhead line to link existing spurs to reinforce network for new wastewater treatment works. Permission implemented and operational.

Potential Cumulative Effects

Neither of the developments identified above would have significant adverse effects on the setting of Fort George, and therefore no significant cumulative effects are predicted.

Neither of the developments identified above would have significant adverse effects on unknown historic environment remains, or deposits of palaeoenvironmental interest, and therefore no significant cumulative effects are predicted.

ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION



November 2025



Chapter 9 Hydrology and hydrogeology

Ardersier Port Extension

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9 HYDROLOGY AND HYDROGEOLOGY

9.1 INTRODUCTION

This chapter presents information required by the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 to be provided in the Environmental Impact Assessment Report (EIAR) to enable the identification and assessment of likely significant effects on hydrology and hydrogeology which is considered to encompass hydrology, flooding, drainage, soils, hydrogeology and water quality.

The approach to this assessment follows the methodology set out in the EIA Scoping Report (SCOP-0062) and is in accordance with the Scoping Opinion (25/00226/SCOP) produced by The Highland Council (THC). EIAR Chapter 4 (Consultation) contains further information on how each of the matters raised in the Scoping Opinion have been addressed.

The overarching legislation, policy and guidance relating to hydrology and hydrogeology in Scotland and relevant to this assessment of the proposed development are presented in EIAR Appendix 9.1.

The assessment has been undertaken in accordance with guidance and methodology relating to hydrology and hydrogeology. The assessment relating to coastal processes (tides, waves, and sediment transport) and geomorphology is outlined in EIAR Chapter 10 (Coastal Processes and Geomorphology). The methodology used in the assessment is presented in EIAR Appendix 9.2 which includes the study area, data sources reviewed and the assumptions and limitations of the assessment. Chapter 3 (Project Description) contains a detailed description of the proposed development.

This chapter is supported by the following EIAR Appendices:

- EIAR Appendix 9.1: Legislation, policy and guidance
- EIAR Appendix 9.2: Assessment Methodology
- EIAR Appendix 9.3: Flood Risk Assessment
- EIAR Appendix 9.4: Drainage Impact Assessment

9.2 CONSULTATION

Responses in relation to the statutory consultation undertaken are presented in EIAR Chapter 4 (Consultation). Following production of the EIA Scoping Report the following consultation has been undertaken.

Table 9.1: Consultation Response Summary

Organisation	Request	Response and where addressed
Scottish Environment Protection Agency (SEPA)	SEPA were contacted to provide any information that they hold relating to existing Controlled Activities Regulations (CAR) licences, including abstractions and discharges, registered within 2 km of the application site.	SEPA confirmed that an abstraction is present within the application site. Abstractions are addressed within section 9.4.6 of this chapter.

Organisation	Request	Response and where addressed
THC	THC were contacted to provide any information they hold on private water supplies within 2 km of the application site.	THC confirmed that no PWS are present within 2km of the application site. These have therefore been scoped out of this assessment.

An online technical pre-application meeting was held on 27 May 2025 to discuss flood risk, involving SEPA and THC. Both SEPA and THC agreed that the proposed approach to flood risk assessment, and specifically proposed mitigation (in the form of diversion of land drainage by newly created watercourse features), was appropriate. THC advised that diversion watercourse design should ensure no health and safety risk to users of the public road along the site's southern boundary is posed by the created watercourse, which should be set back from the road as much as practicable, with appropriate screening.

9.3 METHODOLOGY

This section provides a summary of the assessment methodology with further detail provided in EIAR Appendix 9.2. This chapter is considered to encompass hydrology, flooding, soils, drainage, hydrogeology and water quality.

The methodology follows standard Environmental Impact Assessment (EIA) procedures, in accordance with the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, and involves the following:

- Consultation with key stakeholders;
- Desk based study establishing the existing baseline conditions;
- Identification of sensitive receptors and environmental constraints;
- Identification of potential environmental impacts including cumulative impacts;
- Assessment of impact magnitude;
- Identification and assessment of mitigation, enhancement, and monitoring measures; and
- Statement of significance of residual effects.

The criteria for assessing receptor sensitivity and the magnitude of impact is presented in EIAR Appendix 9.2. These criteria have then been used to develop a matrix to assess the significance of effects from the proposed development on the water environment as shown in Table 9.2

Table 9.2: 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

9.4 BASELINE CONDITIONS

This section describes the hydrology and hydrogeology baseline for the proposed development within the general 1km identified study area. Factors such as PWS, CAR, and designations have a larger study area as noted in EIAR Appendix 9.2.

9.4.1 Site Description

The proposed development comprises of an extension to the consented site of Ardersier Port to the southwest in the areas of forestry around the Carse of Ardersier and some works within the existing harbour. Works within the extension area include site clearance, land raising, platform creation and creation of new perimeter watercourse features, to facilitate the development of port and offshore wind related buildings including manufacturing, workshops, assembly facilities, storage, offices and business units. Works within the existing harbour will include dredging, construction of a quay wall and launch pocket, placement of rock armour and mattress and installation of mooring dolphins. Further detail on the proposed development is presented within EIAR Chapter 3 (Project Description) of this EIAR.

Further details on local designations (within 2km) relating to coastal features and the saltmarsh are outlined within EIAR Chapter 10 (Coastal Processes and Geomorphology) and EIAR Chapter 12 (Terrestrial Ecology).

9.4.2 Topography

Zenith Surveying undertook a LiDAR survey of the full site in May 2025, indicating that ground levels within the consented site (generally above 4 metres above Ordnance Datum (mAOD) and as high as 17 mAOD within material stockpiles) are higher than those in the extension site (generally below 3 mAOD, but ranging between 1.3 mAOD within land drainage channels and 5.7 mAOD in parts of the southern perimeter of the site). Overall, terrain within the extension site slopes gently down from south to north, although the gradient is shallow and features noticeable undulation.

A review of available LiDAR data for the wider area¹ indicates that the topography remains relatively flat across Carse Wood to the south and sand flats surrounding the foot of Whiteness Head spit. Beyond this, elevation increases towards Ardersier in the southwest, Balnagowan Wood in the south, and the agricultural lands surrounding Delnies in the southeast.

9.4.3 Geology, Hydrogeology and Soils

Geology and Soils

A review of British Geological Survey (BGS) 1:50k geology mapping² indicates that the proposed development and surrounding study area is wholly underlain by Devonian sedimentary bedrock of the Alves Formation, consisting of pebbly (gravelly) sandstone.

Underlying the proposed development, superficial deposits consist of mainly raised marine deposits (Holocene Age) comprising of sand and gravel. Small pockets of blown sand are present along the western and southern boundary of the western extension area, as well as the southeastern portion of the eastern extension area. Raised tidal flat and intertidal deposits are present in the northern portion of the eastern extension area, extending throughout the southern section of the existing harbour. To the north of the existing harbour, underlying Whiteness Head Spit, superficial deposits vary between beach deposits (sand and silt), blown sand, raised marine deposits, and intertidal deposits. Outwith the application site, raised marine beach deposits and tidal flat deposits are present to the west, blown sand deposits are

¹ Scottish Government, 2011. LiDAR (Phase I) dataset (2011 – 2012). Available at: <https://remotesensingdata.gov.scot/data/#/map>

² BGS, 2020. Geology of Britain Viewer. Available at: <https://geologyviewer.bgs.ac.uk/>

present to the south, and raised tidal flat deposits, saltmarsh deposits, and raised marine deposits extend to the east.

A review of BGS records³ highlights a historic borehole (NH85NW14) is present within the extension area at NH 80610 57320 drilled in 1972. This indicates medium dense grey silty fine sand to a depth of 60 feet underlain by layers of silt, sand and gravelly sand.

The National soil map of Scotland⁴ indicates that the proposed development is underlain by noncalcareous gleys of undifferentiated raised beach deposits. At the southern edge of the eastern extension area, some humus-iron podzols are mapped to be present, which extend east, south and west outwith the application site.

Hydrogeology

Review of the BGS Hydrogeology 1:625,000 scale map³ indicates that the site is situated upon a moderately productive aquifer of upper old red sandstone, considered to be regionally important and multi-layered, producing yields of up to 5L/s.

Groundwater at the application site, underlying the extension area, is classified under the Water Framework Directive⁵ (WFD) monitoring programme as belonging to the Inverness and Ardersier Coastal groundwater body (ID: 150807) and has an overall classification of 'Good'. The majority of the consented development overlies the Inverness groundwater body (ID: 150670), also classified as 'Good'. BGS groundwater vulnerability maps⁶ show that groundwater vulnerability at the application site is between class 4c (where groundwater is vulnerable to pollutants which are not readily absorbed or transformed) and class 5 (Vulnerable to most pollutants, with rapid impact in many scenarios).

Previous site investigations undertaken across the main area of the former fabrication yard noted that groundwater was encountered at typically 3 m below ground level (mbgl) and is likely to be tidally influenced within the vicinity of coastal waters.

9.4.4 Hydrology, Drainage and Water Quality

Hydrological receptors are shown in Figure 9.1. As per the scoping response from the THC no invasive non-native species (INNS) were recorded to be present within the NVC or phase 1 habitat survey undertaken by Botanaeco in August 2025 within the eastern extension area. No mapped or named watercourses are present within the application site or wider study area. No mapped or named watercourses are present within the application site or wider study area.

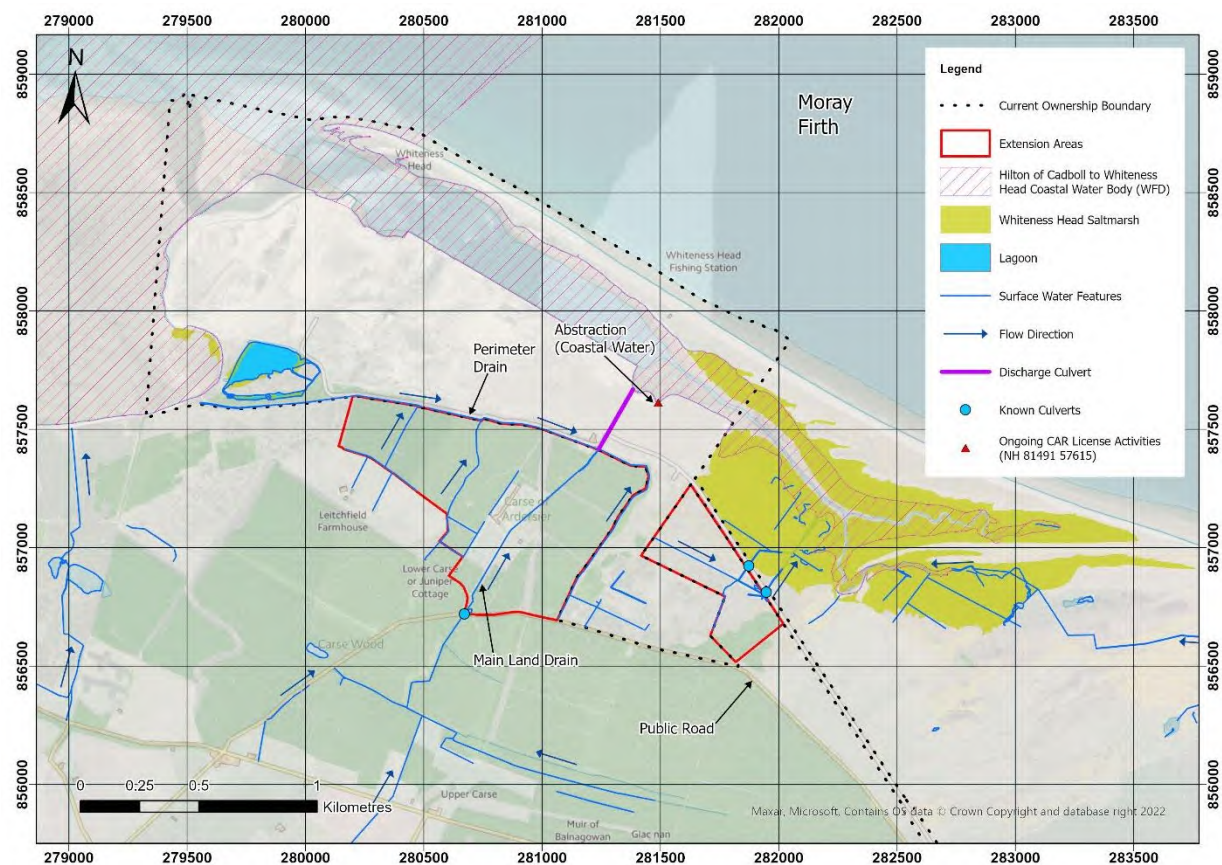
³ BGS, 2020. Geoindex Onshore. Available at: <https://mapapps2.bgs.ac.uk/geoindex/home.html?ga=2.51660010.2129794909.1749198372-1149183065.1749198372>

⁴ The James Hutton Institute, 2013. National Soil Map of Scotland. Available at: https://map.environment.gov.scot/Soil_maps/?layer=10#

⁵ SEPA, 2023. Water Classification Hub. Available at: <https://informatics.sepa.org.uk/WaterClassificationHub/>

⁶ British Geological Survey, (2011). User Guide: Groundwater Vulnerability (Scotland) GIS dataset, Version 2. Available at: <https://nora.nerc.ac.uk/id/eprint/17084/1/OR11064.pdf>

Figure 9.1: Hydrological Overview



A lagoon is present along the western extent of the consented boundary, between existing port infrastructure and the Whiteness Head sands; while this lagoon is within a designated area (Inner Moray Firth SPA and RAMSAR, Whiteness Head SSSI), the Applicant has confirmed that it is considered to be in a degraded condition (i.e. no longer performing the function it was designated for) by NatureScot due to unapproved historical works by the previous site owner which have degraded its function as a saltmarsh / intertidal mudflats and sandflats. Several land drains as denoted on SEPA mapping⁷ are present within the application site area. The main land drain through the extension site drains an approximate catchment area of 4.8 km², originating south of the application site to the north of Smithstown Wood, culverting under the road, flowing north through the area of forestry within the western section of the application site, before connecting into the perimeter drain which is located along the northern boundary of the western section of the application site. Several smaller land drains are also present within the forested area of the application site draining north towards the main perimeter drain. OS mapping indicates that the perimeter drain drains westward towards Whiteness Head sands to the south of the lagoon; however, following a site walkover and review of topography, the perimeter land drains does not drain westwards and instead has an eastwards fall. It discharges via large (1 m diameter, approximately 300 m length) twin steel culverts located northeast of the western portion of the application site, which flow northwards under the existing port site into the inner harbour.

⁷ SEPA (2025) SEPA Flood Maps. Available at: https://scottishsepa.maps.arcgis.com/apps/webappviewer/index.html?id=3098bbef089c4dd79e5344a0e1e7c91c&showLayers=FloodMapsBasic_2743;FloodMapsBasic_2743_0;FloodMapsBasic_2743_1;FloodMapsBasic_2743_2;FloodMapsBasic_2743_3;FloodMapsBasic_2743_4;FloodMapsBasic_2743_5;FloodMapsBasic_2743_6;FloodMapsBasic_2743_7;FloodMapsBasic_2743_8;FloodMapsBasic_2743_9;FloodMapsBasic_2743_10;FloodMapsBasic_2743_11

Within the eastern section of the application site, a land drain flows south-eastwards, splitting into two channels flowing northwards and north-eastwards, with flows in these drains discharging via (900 mm diameter) concrete culverts under the existing site access road. The outlet channels of these culverts converge a short distance northeast of the application site to discharge as an open channel which crosses the saltmarsh to the northeast of the application site, an area which is designated as RAMSAR, SSSI, and Special Protection Area (SPA).

The drainage features within the application site and wider study area are not classified under the WFD, however the land drain discharges into the Hilton of Cadboll to Whiteness Head coastal waterbody (ID: 200501) which has a 'good' overall status, with some physico-chemical and biological elements classified as 'high'. On the northern side of the spit is the Whiteness Head to Burghead coastal water body (ID: 200502), which also have an overall classification of 'good'.

Water quality monitoring has been undertaken at Ardersier Port since 2022. EnviroCentre have undertaken sediment transport monitoring at Whiteness Sands since 2022, analysing total suspended solids (TSS) at five locations as shown in Figure 9.2. For each of the twelve monitoring events between 2022 and 2025, samples were collected at 1-2 m below the water's surface on the flood and ebb tides, with measured total suspended solids (TSS) in samples summarised in Table 9.3. It should be noted that TSS concentrations at the time of sampling will be impacted by prevailing weather, wave and tidal conditions and port activities, including dredge activities during the baseline period (pre capital dredge) which will vary temporally and spatially. The March 2025 event was the final pre-dredge monitoring event undertaken prior to the Phase 1 capital dredge in the outer harbour which commenced in April 2025, with the June 2025 event undertaken during the dredge event. The June 2025 event falls towards the end of the dredge period where turbidity readings were generally lower as shown in Table 9.3. During flood tides, the pre-dredge range of TSS concentrations across the five locations varies between 4 mg/l to 170 mg/l compared to between <5 mg/l to 8 mg/l during the dredge event. The pre-dredge TSS concentrations across all locations during ebb tides range between 2 mg/l to 140 mg/l, compared to a range of <5 mg/l to 16 mg/l during the dredge event. The TSS concentrations recorded during the dredge event lies within the lower end of the pre-dredge range, implying no significant increase in TSS due to dredging at the time of sampling.

Figure 9.2: Water Quality Monitoring Locations

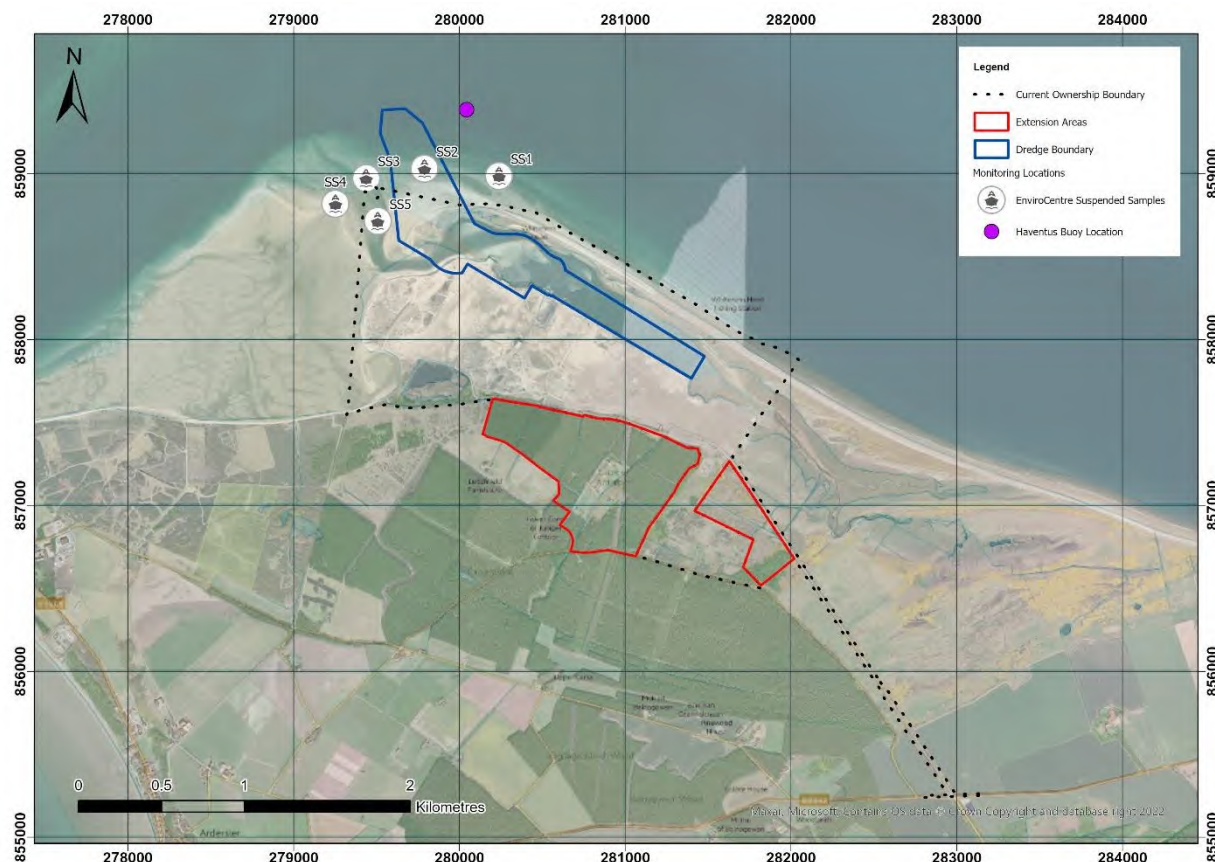
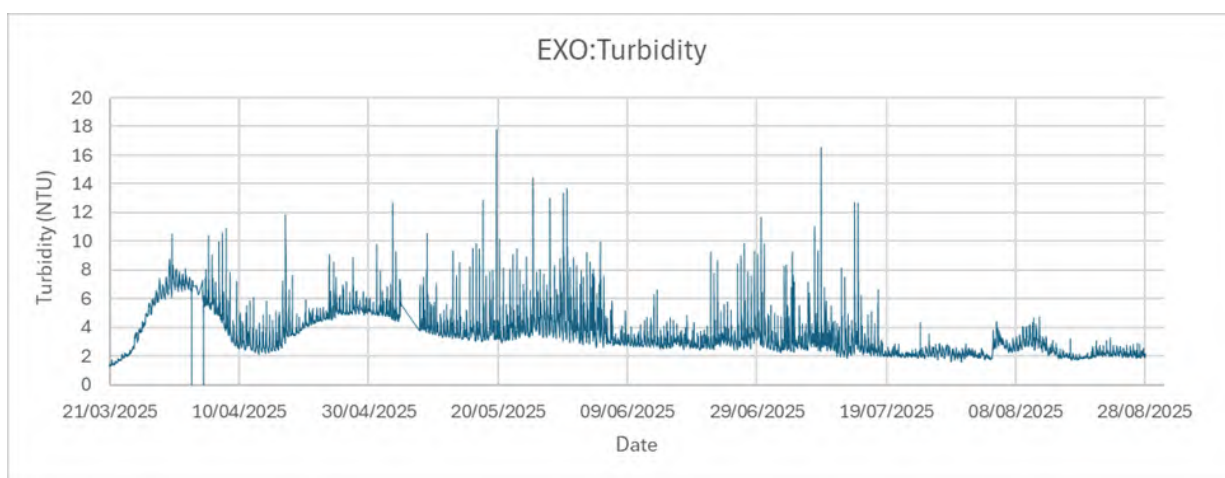


Table 9.3: Sediment Transport Monitoring Total Suspended Solids Results 2023-2025

Sample ID	Monitoring Events TSS (mg/l)											
	17 th May 2022	13 th June 2022	13 th July 2022	25 th Aug 2022	30 th Aug 2023	5 th Oct 2023	29 th Nov 2023	20 th Feb 2024	9 th April 2024	25 th June 2024	12 th March 2025	25 th June 2025
SS1 Ebb	21	13	53	21	55	13	120	69	44	12	36	<5
SS1 Flood	24	17	33	21	73	15	24	61	8	6	19	<5
SS2 Ebb	23	9	59	17	56	16	140	59	28	2	<14	13
SS2 Flood	18	17	32	20	74	11	40	30	170	4	<13	<5
SS3 Ebb	21	14	41	18	67	16	140	63	120	6	<14	<5
SS3 Flood	14	18	33	20	74	29	53	32	37	5	<13	<5
SS4 Ebb	26	12	36	18	70	14	140	51	30	7	<14	16
SS4 Flood	25	20	35	27	75	23	48	34	48	6	<17	<5
SS5 Ebb	24	22	39	19	76	13	40	60	17	8	11	<5
SS5 Flood	19	18	39	22	71	21	24	33	170	11	<13	8

A monitoring buoy was also installed in March 2025 by the Applicant prior to the capital dredge at NGR NH 80304 60380 as shown in Figure 9.2, which gathers data on waves (velocity and direction) as well as some water quality parameters including turbidity. A plot of measured turbidity is shown in Figure 9.3. This shows that the average turbidity prior to the capital dredge commencing in early April 2025 was 4.9 NTU. Concentrations during the Phase 1 dredge (April to July 2025) fluctuated with an average of 3.7 NTU recorded. Concentrations were typically higher at the start of the dredge period reducing towards the end. Fluctuations could be the result of dredge activities, weather, tidal or wave conditions but in general the majority of readings fell within the same range as pre-dredge readings. Concentrations remained generally low following the dredge event, recording an average concentration of 2.4 NTU.

Figure 9.3: Haventus Buoy Turbidity Results March to August 2025



9.4.5 Flood Risk

A flood risk assessment (FRA) has been undertaken in compliance with NPF4 requirements and SEPA and THC guidance, and is presented within EIAR Appendix 9.3. A summary of the baseline flood risk is noted below.

While SEPA fluvial flood maps⁸ indicate flooding within the western extent of the consented development, and the western area of the application site, this is based on an incorrect assumption of the direction of water flow within the site perimeter drain (which falls eastwards towards the twin outfall culverts into the inner harbour, rather than westwards towards the mouth of Rosemarkie Bay) and an incorrect classification of local water channels (which are excavated land drainage channels rather than watercourses).

Site-specific modelling undertaken for 1 in 200 year plus climate change flood conditions as part of the flood risk assessment predicts limited flooding from land drainage channels within the site under low tide conditions, with extensive site flooding predicted if extreme rainfall coincides with high tides. The culvert of the main site drain is predicted to surcharge and flood onto the public road regardless of tidal conditions.

SEPA maps indicate that surface water flood risk is minimal across the application site, limited to small, isolated pockets of lower-lying ground and within drainage channels. Surface water flood risk is indicated to be more extensive across the consented site, noting that mapping does not account for consented

platforming, levelling and site drainage provision, which will address surface water flood risk to the consented site.

The majority of the application site lies within an area at high risk of coastal flooding, with site ground levels generally below 4 mAOD compared to estimated 1 in 200 year coastal flood levels (with allowance for sea level rise due to climate change) of 4.24 mAOD based on the standard Coastal Flood Boundary dataset⁹ and current SEPA climate change guidance¹⁰. Platforming of the consented site will protect the application site from direct coastal inundation from the north, but the application site will remain at risk due to coastal inundation from the west as well as from backflow from the inner harbour and site access road outfall culverts along the northern and eastern boundary of the site. More information on extreme sea levels and coastal flooding is provided in EIAR Appendix 9.3.

9.4.6 Abstractions

Consultation was undertaken with SEPA in May 2025, which identified an abstraction licence is present at Ardersier Port, granted in April 2024 (CAR/R/5007603) with a variation in September 2024, which is noted to be a micro activity by SEPA.

Further information provided by the Applicant detailed that the original CAR licence (April 2024) included authorisation for an abstraction via a borehole at NH 80256 58321 to a maximum depth of 200 m, and an abstraction for industrial or commercial purposes (Process water – coastal) at NH 81491 57615 with a maximum daily abstraction limit of 100 m³. A variation to this was granted in September 2024 which supersedes the original license. It removed authorisation for abstraction via the borehole, allows for continued abstraction at NH 81491 57615, and includes an additional dewatering activity between NH 79929 58474 and NH 80480 58289. The Applicant has advised that dewatering is no longer undertaken as it was only required for the construction of a section of the quay wall, which is now complete. The active abstraction location is shown in **Error! Reference source not found.**

The works within the extension areas of the application site will comprise of land raising through infilling of dredged sand, with no proposed sub-surface activities, excavation, or dewatering to be undertaken. Additionally a quay wall will be constructed as part of the marine works. The current abstraction location lies out with the recommended SEPA buffer zones¹¹, lying over 10m from any proposed activities within the application site (approximately 273m to extension area). The edge of the marine component of the works (dredge activities) lies 130m northeast of the active abstraction and it is considered marine works are not likely to impact on the abstraction. Given the distance from the proposed activities and the nature of the works within the application site it is considered that the abstraction would not be impacted by the proposed development and as such has been scoped out of this EIAR.

9.4.7 GWDTE

National Vegetation Classification (NVC) surveys were undertaken by Botanaeco in August 2025 for the eastern extension area¹². An NVC Survey was undertaken by Highland Ecology and Development Limited for the western extension area where no GWDTE's were identified. More information is provided in EIAR Chapter 12 (Terrestrial Ecology). GWDTE's are protected under the Water Framework Directive (WFD) and therefore NVC communities have been assessed for groundwater dependency as part of the EIAR.

Potential GWDTE'S have been identified within the eastern extension site based on the communities identified within the NVC survey and associated potential for groundwater dependency as classified within

⁹ Environment Agency. (2018). *Coastal Design Sea Levels – Coastal Flood Boundary Extreme Sea Levels*.

¹⁰ SEPA (2025) Climate change Allowances for Flood Risk Assessments in Land Use Planning (Vol. Version 6). Available at: https://www.sepa.org.uk/media/jiwpuxso/climate-change-allowances-guidance_v6.pdf

¹¹ SEPA. (2024). Guidance on Assessing the Impacts of Development on Groundwater Abstractions. Available at: <https://www.sepa.org.uk/media/mfzpnjwb/guidance-on-assessing-the-impacts-of-developments-on-groundwater-abstractions.docx>

¹² Botanaeco (2025). Haventus Expansion Area. Habitats, vegetation and GWDTE.

SEPA Land Use Planning System Guidance Note 31 (LUPS-GU31)¹³ and updated SEPA guidance¹⁴. Within the eastern extension site, vegetation communities of MG10a (neutral grassland) and M23b (rush-pasture) are present. MG10a was previously classified as moderately groundwater dependant in SEPA LUPS-GU31 guidance however in more recent updated SEPA guidance (August 2024) it is classified as no longer groundwater dependant. M23b has the potential for groundwater dependency as shown in Table 9.4

Table 9.4: Potential GWDTE Habitats within Eastern Application Site

NVC Community	JNCC Phase 1 Habitat Type	Description	Location	Potential for Groundwater Dependency*
M23b	Rush-pasture	<i>J. effusus/acutiflorus</i> - <i>Galium palustre</i> rush-pasture, <i>J. effusus</i> sub-community	Adjacent to existing land drain within centre of eastern application site (considered surface water fed).	High

* This is primarily based on SEPA LUPS-GU31 guidance however for MG10 and MG25 communities the updated guidance from SEPA¹³ has been used. This updated guidance has reclassified MG10 and MG25 communities from moderately groundwater dependant to having no groundwater dependency.

The eastern application site is relatively flat with notable topographic lows within the existing and historic land drains. This habitat lies adjacent to an existing land drains which is considered the primary source of water. In the eastern application site, the bedrock and existing aquifer are also noted to be at depth. As a result, it is therefore considered that this habitat is dependent upon precipitation and surface water flows. As such, the Site hydrology does not support GWDTE and it is also noted that the nature of works will involve site clearance including removal of these habits, therefore these habitats are scoped out of this EIAR.

9.4.8 Future Baseline

SEPA's (Version 6, 2025) climate change guidance¹⁰ advises the following allowances should be applied to account for the impact of climate change in the North Highlands region:

- Peak flows in large watercourses are projected to increase by 40% to 2100.
- Peak rainfall intensity is projected to increase by 42% to 2080.
- Climate change is projected to result in 0.89 m of sea level rise to 2100.

These uplifts are accounted for, as appropriate, in flood risk assessment and drainage impact assessment for the site provided in EIAR Appendix 9.3 and 9.4 respectively.

9.4.9 Receptor Sensitivity

On the basis of the baseline assessment, Table 9.5 identifies the receptor sensitivity using the criteria outlined in Table 1 in EIAR Appendix 9.2.

¹³ SEPA (2017). Land Use Planning System; SEPA Guidance Note 31.

¹⁴ SEPA (2024). Guidance on Assessing the Impacts of Developments on Groundwater Dependiant Terrestrial Ecosystems. Available at: [guidance-on-assessing-the-impacts-of-developments-on-groundwater-dependent-terrestrial-ecosystems.docx](#)

Table 9.5: Summary of the value/sensitivity/importance of receptors

Receptor/Feature	Value/ Sensitivity/ Importance	Reasoning
Land Drains	Low	The existing land drains within the site are not classified as a surface water body within the River Basin Management Plan; are not subject to environmental designations; are not of local importance; and are not used for abstraction.
Groundwater	Medium	The groundwater body at the site is identified as a moderately productive aquifer; classified under the WFD as 'Good'; and classified as class 4c (where groundwater is vulnerable to pollutants which are not readily absorbed or transformed) and class 5 (Vulnerable to most pollutants, with rapid impact in many scenarios).
Coastal waters of Hilton of Cadboll to Whiteness Head	High	Coastal waterbody has a WFD designation of 'Good' and designated RAMSAR, SSSI, SPA, and SAC.
Lagoon to west of site	High	Designated RAMSAR and SPA (Inner Moray Firth) and SSSI (Whiteness Head). Note that the lagoon is considered to be in a degraded condition (i.e. no longer performing the function it was designated for) by NatureScot
Saltmarsh to east of site	High	Designated RAMSAR and SPA (Inner Moray Firth) and SSSI (Whiteness Head)

9.5 POTENTIAL IMPACTS

9.5.1 Construction

Key construction stage impacts of the proposed development on hydrology and hydrogeology may include:

- Hydrology alterations including potentially increased run-off and alteration of surface water overland flow patterns and surface water flood risk to the site and surrounding area;
- Physical changes to the local surface water / land drainage network (infilling and diversions);
- Changes to coastal flood risk and extent;
- Changes in water quality, due to contamination of groundwater, coastal water, surface water, sensitive habitats and sediments through spillage or leakage of polluting substances and/or sediment transfer.

Impacts relating to coastal processes (tides, waves and sediment transport) and geomorphology are considered within EIAR Chapter 10 (Coastal Processes and Geomorphology).

Hydrology and Surface Water Flow (Land Drainage) Alterations

The proposed development would include clearance of the application site through tree removal and soil stripping, and raising the ground level by infilling with dredged sand to the height of the currently consented land platform height (approximately 4.51 mAOD). This consists of an average land raise of 1.3 m within the western extension area, and 1.0 m within the eastern extension area. Existing land drains will also be lost within the application site due to infilling, with incoming land drainage from areas external to the site diverted around the site to the east (discharging by existing culverts under the site access road into a newly created watercourse and wetland feature, which thereafter discharges into the saltmarsh)

and west (discharging via a newly created watercourse feature into the existing lagoon), with more details provided in EIAR Appendix 9.3. Proposals also include for landscaped modifications to the lagoon to restore historical coastal connectivity and thereby improve its function as a saltmarsh / intertidal habitat for wading birds, which form the basis for the lagoon's inclusion within the RAMSAR, SSSI and SPA designated areas (refer to EIAR Chapter 3 (Project Description) for more information).

All of these activities, as well as the construction phase of buildout upon the site platform (i.e. construction of buildings and associated hardstand), have the potential to alter or disrupt surface water flow pathways and alter patterns of surface water runoff generation, flow and drainage.

The proposed net increase in catchment area draining eastwards to discharge towards the saltmarsh have the potential to impact upon hydrological and morphological processes within the receiving channel discharging into the saltmarsh. However:

- Analysis undertaken using representation of the receiving channel within the hydrodynamic model developed to represent post-development conditions for the flood risk assessment predicts peak in-channel velocities of 0.5 m/s for the median annual maxima flood (QMED), below values associated with risk of scour in typical silt/mud saltmarsh soils (i.e. > 0.6 m/s), with even 1 in 200 year plus climate change peak velocities only slightly above this threshold (0.8 m/s). The potential for proposed land drainage diversion (via watercourse creation) to induce additional scour compared to pre-existing conditions is limited to peak flow conditions in response to extreme storms, with negligible impact outwith extreme events.
- Freshwater baseflow rates into the receiving channel are predicted to increase from 0.011 m³/s to 0.051 m³/s, while those in the main channel of the saltmarsh increase from 0.05 m³/s to 0.091 m³/s due to development proposals. These increases are insignificant in magnitude compared to rates of seawater refresh, such that the flow regime within the receiving channel and saltmarsh more generally will not be materially impacted by proposed land drainage diversion.
- Any freshwater dilution impact will be restricted to the channels themselves, excepting in response to extreme high flows (where some flooding of low ground is predicted), with no potential to impact the general out-of-bank habitat of the saltmarsh (which will continue to be dominated by seawater refresh at high tide).

The impact of development upon altering hydrological and morphological processes within the saltmarsh is therefore concluded to be negligible, and is therefore not considered further.

Flooding

The construction phase of development entails infilling all existing land drains within the site, which currently drain surface water runoff from the site as well as areas to the south of the site. Continuity of external land drainage will be achieved by provision of new watercourse features, to divert these flows either eastwards or westwards around the southern perimeter of the site, which must be constructed prior to infilling of existing land drains. Diversion of land drainage has the potential to increase flood risk to the public road along the site's southern boundary.

During construction, and prior to final platforming, the site will remain at risk of coastal flooding from extreme tides and storm surge. However, given the site's proximity to the open coast, construction-phase platforming, stripping and stockpiling, etc., is not considered to cause flood storage displacement, such that construction activities are not considered to pose a risk of detrimentally impacting coastal flood risk to other receptors.

The construction phase of buildout upon the site platform will not have any flood risk impact, as the completed platform will be outwith the flood risk area and flood risk associated with surface water runoff will be managed by construction-phase SuDS or equivalent systems.

Sediment Discharges

There would be the potential for an increased release of sediments to surface water and coastal water as a consequence of the following activities:

- Vegetation clearance;
- Topsoil removal;
- Formation of the new perimeter drain;
- Land raising using dredged sand;
- Runoff and erosion from sediment stockpiles;
- Installation of rock armour and rock mattress; and
- Capital dredging of harbour extension area.

During the phase of site clearance, topsoil will be removed from the site and trees and roots removed, which could loosen the soil structure resulting in a risk of soil erosion and mobilisation. In addition to this, the temporary stockpiling of dredged material is proposed which could result in sediment laden runoff draining from the site. Surface water runoff will be discharged to groundwater via direct infiltration. It should be noted that temporary drainage will be constructed to the south of the application site and will intercept runoff from outwith the site (to discharge either eastwards to the saltmarsh or westwards to the lagoon, as described above). Site drainage provision, including during the construction phase, will therefore only be required in relation to rainfall falling upon the application site.

The proposed material to raise the land is dredged sand, topped with a crushed rock permeable pavement. These works could potentially cause plumes of suspended solids and a reduction in water quality with a resultant impact on aquatic life. Sedimentation of the proposed watercourse features may also have a detrimental effect on flow conveyance within these channels and downstream culverts, affecting flood risk. The proposed drainage for the application site will discharge either eastwards to the saltmarsh habitat (which is designated as RAMSAR, SSSI, and SPA) or else westwards into the lagoon (not classified under WFD, but within the Whiteness Head SSSI and Inner Moray Firth SPA and RAMSAR designated area), and subsequently to the Hilton of Cadboll to Whiteness Head coastal water body, which is designated as a SSSI, SPA, RAMSAR, and SAC, and is classified under the WFD as 'good'. These waterbodies and habitats may be impacted by sediment discharges arising from site clearance and land raising activities. The greatest potential impact is expected to the proposed watercourse features with lower impact expected to subsequent receptors such as the coastal waterbody and saltmarsh, as they are a greater distance from the works and separated by waterbodies (i.e. the proposed wetland area for the eastern watercourse and lagoon for the western watercourse) within which flow velocities will be low and settlement will occur.

It is considered that coarser sediment would be used to construct the rock armour and rock mattress. Any finer dust present on the surface of the crushed rock could result in a localised plume of sediment in the vicinity of the works.

The proposed dredge works could potentially cause plumes of suspended solids and a reduction in water quality to the receiving Hilton of Cadboll to Whiteness Head waterbody and resultant impact on aquatic life. The sediment within the dredge pocket consists predominantly of sands, with gravel also present and a minimal presence of silts and clay. Given the relatively coarse nature of the dredged sediment, it is considered that any plumes generated as a result of the dredging works will be very localised and short term in duration, primarily dropping out in the vicinity of where it is generated. In addition, Fairhurst have produced a Whiteness Sands Stability assessment presented in EIAR Appendix 3.1. This assessment determined that the ground conditions are broadly comparable within the proposed dredging area (dense sandy gravel) to those encountered within the Phase 1 dredge area with little variation in material properties. The outcome of water quality monitoring undertaken during the Phase 1 dredge are provided in Section 9.4.4, with measured TSS concentrations in water samples taken during the Phase 1 dredge within the range of pre-dredge measurements. Similarly, turbidity measurements recorded by offshore

buoy before, during and following the Phase 1 dredge are generally similar. As the sediment type is similar across the harbour, it is considered that impacts from the proposed Phase 2 dredge will also be negligible, noting that the Phase 2 dredge is smaller in scale than the Phase 1 dredge and will take place within the inner harbour, at a greater distance from Whiteness Sands.

Pollution Incidents / Contaminant Discharge

During construction there is a risk of accidental pollution incidences affecting the water environment (i.e. coastal waters, the existing lagoon and saltmarsh areas, created watercourse features and wetland features) from the following sources:

- Spillage or leakage of oils and fuels stored on site;
- Spillage or leakage of oils and fuels from construction machinery, site vehicles and vessels;
- Spillage of oil or fuel from refuelling machinery on site; and
- Spillage or leakage from on-site welfare facilities.

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. The effect of the potential pollution incidences during construction on surface water quality would be dependent on the scale and nature of the incident.

9.5.2 Operation

Key operational stage impacts of the proposed development upon hydrology and hydrogeology would include:

- Hydrology alterations including increased run-off and alteration of flow patterns;
- Physical changes to the local surface water / land drainage network (infilling and diversions);
- Changes to coastal flood risk and extent;
- Changes in water quality, due to contamination of groundwater, coastal water and sediments through spillage or leakage of polluting substances and/or sediment transfer.

Hydrology and Surface Water Flow (Land Drainage) Alterations

As for the construction phase, proposed land drainage diversion (via watercourse creation) will increase flow rates and velocities discharging eastwards from the site towards the saltmarsh, but these increases are determined to have a negligible impact upon hydrological and morphological processes within this designated site. As detailed in Section 9.5.1, the lagoon will receive increased land drainage flows compared to baseline conditions, but with accompanying landscaping measures restoring coastal connectivity.

Flooding

As during construction, during operation, continuity of external land drainage will be achieved by provision of new watercourse features, directing external land drainage flows either eastwards or westwards around the southern perimeter of the site. Diversion of land drainage has the potential to increase flood risk to the public road along the site's southern boundary.

The operational site will be raised above the projected 1 in 200 year plus climate change coastal flood level. Given the site's proximity to the open coast, platforming is not considered to cause flood storage displacement, such that the operational site is not considered to pose a risk of detrimentally impacting coastal flood risk to other receptors.

Pollution Incidents

Given the proposed use of the extension site includes the handling and assemble/construction of wind turbine components and manufacturing, there is likely to be a potential for pollution incidences from spillage or leakage during the operational stage as during construction. Additionally, there would be the potential for fuel spills and leakage from vessels berthing within the inner harbour.

The risk of pollution as a result of sedimentation is much lower than during construction given no groundworks are expected to be undertaken within the application site during operation. Maintenance dredging may be undertaken if required, however it is expected the risk of generation of plumes of sediment solids would be low based on the coarser sediment within the dredge pocket, with similar impacts expected to the construction phase.

9.6 MITIGATION AND ENHANCEMENT

9.6.1 Embedded Mitigation

The development of the design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the design. This is referred to as embedded mitigation (or design interventions). The principles of the design and mitigation hierarchy outlined in EIAR Chapter 2 (Methodology) have been followed. The first principle being to avoid potential adverse effects, if at all practicable, before seeking to minimise or mitigate for any unavoidable impacts. Embedded mitigation for the proposed development is reported in EIAR Chapter 3 (Project Description) which also includes a description of the design alternatives that have been considered, including the environmental factors which have influenced the decision-making. Mitigation measures will seek to reduce impacts during both construction and operation phases. Any effects which cannot be mitigated or reduced are referred to as residual effects.

9.6.2 Mitigation

Mitigation is included in the Outline Construction Environmental Management Document (CEMD). The Outline CEMD will be developed into the Construction Environmental Management Plan (CEMP) for approval by the Highland Council, with subordinate Construction Environmental Management Plans (CEMPs) for implementation during construction. Further information on the Outline CEMD is provided within EIAR Chapter 3 (Project Description). EIAR Chapter 15 (Schedule of Mitigation and Enhancements) provides a summary of the mitigations identified within this EIAR.

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

9.6.3 Construction Mitigation Measures

This section summarises the mitigation required during the construction of the proposed development. Unless stated all mitigation is considered to be embedded as it follows best practice measures and/or is required to achieve compliance with legislation. Mitigation measures of relevance during construction are included within the Outline CEMD.

Construction will be carried out using industry best practice and in accordance with implementation of the requirements identified in the Outline CEMD. Construction information is presented in Chapter 3 (Project Description).

General Management

An Outline CEMD will be produced to ensure that the mitigation measures outlined in the EIAR are followed during the proposed construction works. The Outline CEMD will be developed into a Construction Environment Management Plan (CEMP) and will include surface water management and pollution

prevention measures (e.g. Pollution Prevention Plan) and will be in place during construction and operation. The CEMD will remain a live document and will be continually updated as the work progresses. The Outline 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, and is detailed further within EIAR Appendix 3.2 of EIAR Chapter 3 (Project Description).

Best practice will be adopted throughout all phases of development, following current guidance. The programme of works, including timing, direction and method of capital dredge, will be planned, monitored and managed to minimise the potential negative environmental impacts through a specific CEMP.

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.

Any 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) (to be replaced by Environmental Authorisation (Scotland) Regulations 2018, EASR, as of 1 November 2025). The level of authorisation required is dependent on the anticipated environmental risk posed by the activity to be carried out.

Surface Water Management

Silt fences and temporary bunds will be installed around open or exposed ground and stockpiles to minimise the risk of significant overland flow and sediment mobilisation due to extreme or persistent rainfall, and to maximise direct infiltration to groundwater.

During the construction phase, until slopes are stabilised and planting established, there is an elevated erosion risk that may increase sediment loading in runoff in the proposed created watercourses along the southern site perimeter. This risk will be minimised by early-phase planting adjacent to and within the outer channel of the proposed two-stage watercourse channel and employing temporary settlement measures, such as settlement lagoons, to minimise the risk to the receiving environment during the construction phase. Construction methodologies will be in line with the recommendations given in *CIRIA C532, Control of Water Pollution from Construction Sites*¹⁵, and best practice.

Topsoil and vegetation stripping will only be undertaken where necessary, and programmed to minimise the time between stripping and construction of a finalised platform in any given area. These measures will minimise the timescale of elevated risk of erosion and sediment pollution in runoff. Silt fences will be installed around open or exposed ground and stockpiles to further limit sediment mobilisation in construction phase runoff, and aid infiltration of runoff.

Site Compounds

Run-off from compounds will be captured and passed through construction drainage features prior to discharge via infiltration. Foul drainage is discussed in EIAR Chapter 3 (Project Description).

Surface Water run-off from the site (including internal site roads) is to be discharged into the water environment through permeable pavement designed to accommodate storm events of 1 in 30 years plus 42% climate change allowance, and assessed by sensitivity testing to be capable of attenuating flows for events up to and including 1 in 200 years plus 42% climate change allowance while providing water quality treatment appropriate for the anticipated runoff pollution hazard.

¹⁵CIRIA (2001). Control of water pollution from construction sites: Guidance for consultants and contractors (C532)
https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C532

Concrete

In the case that concrete batching is to be undertaken on-site the following mitigation measures would be implemented to minimise the potential impact of concrete batching on the water environment in line with GPP 6: *Working on construction and demolition sites*¹⁶:

- Concrete batching will take place on an impermeable designated area and at least 10m from any waterbody.
- Equipment and vehicles will be washed out in a designated area that has been specifically designed to contain wet concrete/ wash water.
- A closed loop system will be used for wash waters. Wash waters will be stored in a contained lined pond for settlement before being reused (e.g. for mixing and washing).
- No discharge of wash waters will occur on-site. All excess wash water that cannot be reused will be disposed of off-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 where practical.
- A designed washout bay will be maintained throughout construction which will be lined and bunded, potentially using a system such as Siltbuster concrete washout.

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.

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 CEMP.

Oil, Fuel, Site Vehicle Use and Storage

The risk of oil contamination will be minimised by good site working practice further described below. 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 PPG and GPP documents and include the following:

- Storage for oil and fuels on site will be designed to be compliant with GPP2¹⁷ and GPP8¹⁸.
- Refuelling and maintenance of vehicles and machinery, and cleaning of tools, will be carried out in a designated area where possible in line with PPG7¹⁹.

Emergency procedure: The Pollution Incident Response Plan will include measures to deal with accidental spillages.

Sediment Management

¹⁶ NetRegs (2023). Guidance for pollution prevention. Working at construction and demolition sites (GPP6) <https://www.netregs.org.uk/media/tsybv2y3/gpp6-working-on-construction-and-demolition-sites.pdf>

¹⁷ NetRegs (2021). Guidance for Pollution Prevention: Above Ground Oil and Storage Tanks: GPP2

¹⁸ NetRegs (2021). Guidance for Pollution Prevention: Safe Storage and Disposal of Used Oils: GPP8

¹⁹ Environment Agency (2011). Pollution Prevention Guidelines PPG7 Safe operation of refuelling facilities

It is considered that dredging would be undertaken in line with the conditions of the marine licence and associated BPEO. To minimise dust being washed off the crushed rock used to construct the mattress and rock armour, rocks could be washed prior to construction.

9.6.4 Operation Mitigation Measures

General Management

The Port Operational Environmental Management Plan (POEMP) is already in place for the consented site, this will be updated for the operational phase should the extension gain consent. Best practice will be followed throughout the operational phase, with reference to the SEPA Guidance for Pollution Prevention (GPPs), and best practice guidance.

Surface Water (and Land Drainage) Management

Surface water runoff from roads and other hardstanding areas within the application site will be treated via SuDS-compliant site drainage measures, as detailed in the Drainage Impact Assessment presented within EIAR Appendix 9.4. Internal site access roads and yard areas will employ permeable pavement, suitable for treatment of low to medium pollution hazard runoff in compliance with the Simple Index Approach. Buildout of individual plots upon the site platform will include SuDS-compliant site drainage suitable for treatment and attenuation of runoff appropriate for the specific usage and impervious surface area of each plot.

Surface water and land drainage runoff from areas south of the site will continue to drain towards the site, and will be picked up by two newly created watercourses to be installed along the southern perimeter of the site:

- An eastern watercourse will collect flows from the main drain, along with any overland flows generated to the east of the main drain, and discharge it via the existing site access road culverts towards the saltmarsh area to the east of the site. The watercourse feature will meander through the proposed wetland area and will have riparian planting along the southeast and eastern boundaries.
- A western watercourse will collect flows from minor land drains to the west of the main drain, along with any overland flows generated to the west of the main drain, and discharge it into the existing lagoon to the west of the site.

To comply with scoping response requirements, both watercourse features employ a two-stage design, with inner channel sized to accommodate typical flows and outer channel capable of accommodating design (1 in 200 year plus climate change) flows. Hydraulic analysis undertaken as part of the flood risk assessment (EIAR Appendix 9.3) determines that the proposed watercourse feature design is sufficient to ensure that development does not cause flood risk detriment to external receptors relative to baseline conditions.

It is recommended that inlet screening is installed at the existing site access road culverts, to mitigate against the risk of culvert blockage due to floating debris (noting that the proposed wetland upstream of the inlets will reduce flow velocities on approach to the culverts and therefore provide protection against blockage by entrained debris). Consideration will also be given to installing flap valves at the culvert outlets, as well as at the outlet to the western watercourse, to reduce the risk of coastal flood inundation via backflow (noting that this risk exists for both pre- and post-development conditions) and maintain freshwater conditions within the watercourses and proposed wetland.

Oil, Fuel, Site Vehicle Use and Storage

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 port 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.

9.6.5 Enhancements

Proposals include creation of an approximate 2 ha wetland area in the southeastern corner of the site, which will be surface water fed. More details on this are provided within EIAR Chapter 3 (Project Description), EIAR Chapter 12 (Terrestrial Ecology) and EIAR Chapter 15 (Schedule of Mitigations and Enhancements).

9.6.6 Monitoring

The Applicant shall undertake a planned programme of compliance monitoring to verify the effectiveness of the project's environmental management during construction. Monitoring plans will be established and implemented with the agreement of THC, SEPA, NatureScot and Marine Scotland.

Specific auditing and monitoring plans will be developed by the Principal Contractor and will cover the following:

- The contractor's own Environmental Management System and project monitoring plans;
- The CEMD, schedule of mitigation register, relevant legislation and industry good practice;
- All construction activity;
- Roles and responsibilities for those undertaking audits and monitoring;
- Frequency of inspection activities (i.e. daily, weekly, monthly);
- Process to deal with corrective actions/non-compliance; and
- Reporting procedures (including non-compliance).

9.7 ASSESSMENT OF SIGNIFICANT EFFECTS

This section assesses the level and significance of the residual effects of the proposed development upon hydrology and hydrogeology receptors during both construction and operation with the mitigation described in Section 9.6 in place. The residual effects are presented in Table 9.6 and Table 9.7.

Table 9.6 summarises the assessment of significance of effect of the proposed development upon hydrology and hydrogeology receptors during construction.

Table 9.6: Summary of assessment of significance of effect during construction

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
Land Drains	Low	• Infilling of drains, change in surface water flow paths and drainage	• Creation of perimeter watercourse features to ensure continuous land drainage and ensure no detrimental impact upon flood risk during construction phase	Negligible

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
		Increased sediment loading and impact on flow conveyance.	Appropriate SuDS principles, pollution control and adequate surface water management measures	Negligible
		Impacts from fuel/ oil spill and pollution from cement which can affect the water, and associated habitat quality, and affect flora/fauna.	- Concrete batching to take place in line with GPP6 - Storage of fuels and oils in line with GPP2 and GPP8 and POEMP including spill response plans	Negligible
Groundwater	Medium	Impact of groundwater levels and flow pathways	Drainage in line with SuDS principles	Negligible
		Impacts from fuel/ oil spill and pollution from cement which can affect the water, and associated habitat quality, and affect flora/fauna.	- Concrete batching to take place in line with GPP6 - Storage of fuels and oils in line with GPP2 and GPP8 and POEMP including spill response plans	Negligible
Coastal waters of Hilton of Cadboll to Whiteness Head	High	Changes to flow and surface water flow pathways	Appropriate SuDS principles	Negligible
		Increased sediment loading from terrestrial works and subsequent effects on flora and fauna and flow conveyance.	Appropriate SuDS principles, pollution control and adequate surface water management measures	Negligible
		Impacts from fuel/ oil spill and pollution from cement which can affect the water, and associated habitat quality, and affect flora/fauna.	- Concrete batching to take place in line with GPP6 - Storage of fuels and oils in line with GPP2 and GPP8 and POEMP including spill response plans	Negligible

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
		Impacts to coastal water quality resulting from rock armour and rock mattress	Wash crushed rock prior to construction	Negligible
		Impacts to coastal water quality resulting from capital dredge works.	Undertake in accordance with marine licence, BPEO and associated conditions	Negligible
Lagoon to west of site	High	Change in hydrological regime (due to increased land drainage flows to lagoon combined with restored coastal connectivity))	None	Negligible
		Increased sediment loading and subsequent effects on flora and fauna and flow conveyance.	Appropriate SuDS principles, pollution control and adequate surface water management measures	Negligible
		Impacts from fuel/ oil spill and pollution from cement which can affect the water, and associated habitat quality, and affect flora/fauna.	- Concrete batching to take place in line with GPP6 - Storage of fuels and oils in line with GPP2 and GPP8 and POEMP including spill response plans	Negligible
Saltmarsh to east of site	High	Increase in (freshwater) flow rate and volume entering saltmarsh via site.	None (impact within designated site is marginal relative to saltwater refresh in each tidal cycle)	Negligible
		Increase in flow velocity entering saltmarsh via site	None (velocities within designated site insufficient to induce scour)	Negligible
		Impacts from fuel/ oil spill and pollution from cement which can affect the water, and associated habitat	- Concrete batching to take place in line with GPP6 - Storage of fuels and oils in line with	Negligible

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
		quality, and affect flora/fauna.	GPP2 and GPP8 and POEMP including spill response plans	

Table 9.7 summarises the assessment of significance of effect of the proposed development upon hydrology and hydrogeology receptors during operation.

Table 9.7: Summary of assessment of significance of effect during operation

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
Land Drains	Low	Potential flood risk and risk of scour	Creation of new two-stage perimeter watercourse features in compliance with scoping requirements	Negligible
		Impacts from fuel/ oil spill and pollution from cement which can affect the water, and associated habitat quality, and affect flora/fauna.	Storage of fuels and oils in line with GPP2 and GPP8 and POEMP including spill response plans. Vehicles and vessels to carry spill kits	Negligible
Groundwater	Medium	Impacts from fuel/ oil spill and pollution from cement which can affect the water, and associated habitat quality, and affect flora/fauna.	Storage of fuels and oils in line with GPP2 and GPP8 and POEMP including spill response plans. Vehicles and vessels to carry spill kits	Negligible
Coastal waters of Hilton of Cadboll to Whiteness Head	High	Increased runoff flow volumes and rates	Maintain site drainage	Negligible
		Impacts from fuel/ oil spill and pollution from cement which can affect the water, and associated habitat quality, and affect flora/fauna.	Storage of fuels and oils in line with GPP2 and GPP8 and POEMP including spill response plans. Vehicles and vessels to carry spill kits	Negligible
		Impacts to coastal water quality from maintenance dredging.	Undertake in accordance with	Negligible

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
			conditions of marine licence	
Lagoon to west of site	High	Change in hydrological regime (due to increased land drainage flows to lagoon combined with restored coastal connectivity)	None	Negligible
Saltmarsh to east of site	High	Increase in (freshwater) flow rate and volume entering saltmarsh via site.	None (impact within designated site is marginal relative to saltwater refresh in each tidal cycle)	Negligible
		Increase in flow velocity entering saltmarsh via site	None (velocities within designated site insufficient to induce scour)	Negligible
		Impacts from fuel/ oil spill and pollution from cement which can affect the water, and associated habitat quality, and affect flora/fauna.	Storage of fuels and oils in line with GPP2 and GPP8 and POEMP including spill response plans. Vehicles and vessels to carry spill kits	Negligible

9.8 STATEMENT OF SIGNIFICANCE

Overall, the proposed effects of the proposed construction and operation at Ardersier are considered to be **negligible** relative to baseline conditions, following the implementation of mitigation measures.

9.9 CUMULATIVE EFFECTS

A review of proposed and existing developments was undertaken within 15 km of the application site. For hydrology and hydrogeology the assessment focused on a smaller Zone of Influence (ZOI) surrounding the application site incorporating the wider surface water catchment of the site, lagoon, saltmarsh and receiving coastal waterbody (Hilton of Cadboll to Whiteness Head coastal water body).

No existing or proposed development are present within the surface water catchment of the site with the exception of the existing port. A development is proposed to the east of the application site 'Land To North Of A96 Extending From Whiteness Access Road To The Common Good Land Nairn'. A review of this proposed development indicates that construction is currently occurring on the land closer to Nairn over 4km from the eastern boundary of the application site, it lies out with the surface water catchment of the site and would discharge into a different coastal waterbody (Whiteness Head to Burghead). As such it is not expected that there would be any significant effect from this development.

From a water quality perspective there is a risk of pollution incidents and spills from vessels into the Hilton of Cadboll to Whiteness Head coastal water body. It is considered that when mitigation measures are applied (POEMP and PIRP) the residual impact of a spill from the proposed development is

negligible. Additionally, the two active ports present within 10km of the application site (The Port of Nigg and Cromarty Firth) discharge into the Cromarty Firth and a different coastal waterbody (Outer Cromarty Firth) therefore it is not expected there would be a significant cumulative effect on water quality from these developments.

The cumulative effects on hydrology and hydrogeology would therefore be **Negligible**.

ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION



November 2025



Chapter 10 Coastal Processes and
Geomorphology

Ardersier Port Extension

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10 COASTAL PROCESSES AND GEOMORPHOLOGY

10.1 INTRODUCTION

This chapter presents information required by the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 to be provided in the Environmental Impact Assessment Report (EIAR) to enable the identification and assessment of likely significant effects on coastal processes, which is considered to encompass tides, waves, sediment transport, and associated geomorphology.

The approach to this assessment follows the methodology set out in the EIA Scoping Report (SCOP-0062) and is in accordance with the Scoping Opinion (25/00226/SCOP) produced by The Highland Council (THC) and the Scoping Opinion produced by the Marine Directorate (MD). EIAR Chapter 4 (Consultation) contains further information on how each of the matters raised in the Scoping Opinion have been addressed.

The overarching legislation, policy and guidance relating to coastal processes and geomorphology in Scotland and relevant to this assessment of the proposed development are presented in EIAR Appendix 10.1.

The assessment has been undertaken in accordance with guidance and methodology relating to coastal processes and geomorphology. The methodology used in the assessment is presented in EIAR Appendix 10.2 which includes the study area, data sources reviewed and the assumptions and limitations of the assessment. EIAR Chapter 3 (Project Description) contains a detailed description of the proposed development. The assessment relating to hydrology and hydrogeology (flooding, drainage, soils and water quality) is outlined in EIAR Chapter 9 (Hydrology and Hydrogeology).

This chapter is supported by the following EIAR Appendices:

- EIAR Appendix 10.1: Legislation, Policy and Guidance
- EIAR Appendix 10.2: Assessment Methodology
- EIAR Appendix 10.3: Coastal Processes Assessment

10.2 CONSULTATION

Responses in relation to the statutory consultation undertaken are presented in EIAR Chapter 4 (Consultation). Following production of the EIA Scoping Report the following consultation has been undertaken.

Table 10.1: Consultation

Organisation	Request	Response and where addressed
NatureScot	NatureScot were contacted to discuss and agree the proposed coastal assessment scope and coastal modelling methodology. NatureScot requested:	EIAR Appendix 10.3 includes detail of the coastal modelling exercise undertaken and assessment of impacts to coastal processes, including tides, waves and sediment transport, and

Organisation	Request	Response and where addressed
	Assessment of impact to Saltmarsh habitat and associated RAMSAR designation.	associated receptors. The coastal model extent includes the Saltmarsh extent adjacent to the inner harbour. Predicted impacts to coastal processes and geomorphology are described in Section 10.5 of this chapter. EIAR Appendix 5.8: Marine and Coastal Ecology includes description of the Saltmarsh habitat and assessment of impact to that habitat and associated designations.
	Coastal model to consider full development proposal and sediment transport modelling to include for period of regular astronomical tides in addition to storm event.	EIAR Appendix 10.3 includes detail of the coastal modelling exercise undertaken and assessment of impact to coastal processes, including tides, waves and sediment transport. The coastal model considers all relevant elements of the proposed port extension in the marine environment. Options for island extension are also considered, these have been modelled in combination with other development proposals. Sediment transport model simulations undertaken all include for a period of regular astronomical tides, wind and wave conditions, followed by a storm event from the key north-eastern sector (Storm Ciaran, 2023).

10.3 METHODOLOGY

This section provides a summary of the assessment methodology. Further detail is provided in EIAR Appendix 10.2. This chapter is considered to encompass tidal action, wave climate, and sediment transport.

The methodology follows standard Environmental Impact Assessment (EIA) procedures, in accordance with the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, and involves the following:

- Consultation with key stakeholders;
- Coastal Processes Assessment (EIAR Appendix 10.3) including coastal modelling study;
- Desk based study establishing the existing baseline conditions, including a review of coastal model outputs;
- Identification of sensitive receptors and environmental constraints;
- Identification of potential environmental impacts including cumulative impacts;
- Assessment of impact magnitude;
- Identification and assessment of mitigation, enhancement, and monitoring measures; and
- Statement of significance of residual effects.

The criteria for assessing receptor sensitivity and the magnitude of impact is presented in EIAR Appendix 10.2. These criteria have then been used to develop a matrix to assess the significance of effects from the proposed development on the coastal processes and geomorphology as shown in Table 10.2.

Table 10.2: Criteria for Assessing Effects

Receptor Sensitivity		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

10.4 BASELINE CONDITIONS

This section describes the coastal processes and geomorphology baseline for the proposed development within the study areas identified within EIAR Appendix 10.2.

10.4.1 Site Description

Ardersier Port is situated within the Inner Moray Firth at Whiteness Head as shown in Figure 1.1 and described in EIAR Chapter 1 (Introduction). The site history and constraints are also described in EIAR Chapter 1. Ardersier Port has been subject to recent redevelopment with capital dredge works of the navigation channel and outer harbour recently completed to depth of -12.4 metres Chart Datum (mCD), along with construction of a quay wall.

The proposed development comprises an extension of the existing port within the inner harbour, including dredging, construction of a quay wall and launch pocket, placement of rock armour and mattress and installation of mooring dolphins within the existing harbour. Works within the extension area include site clearance, land raising, platform creation and creation of new perimeter drainage. Further detail on the proposed development is presented within EIAR Chapter 3 (Project Description) of this EIAR.

In general terms, the proposed port extension represents an increase in depth to the inner harbour versus that previously assessed in 2013, 2018 and 2024, while the relative positioning of proposed dredge extents remains similar. The port and dredge design considered within the 2024 assessment has been partially delivered during the summer of 2025 with the dredging of the navigation channel and outer harbour, and formation of associated quay.

10.4.2 Designated Sites

Numerous designated sites relating to the coastal water environment are present within 2 km of the proposed development including:

- The Whiteness Head Site of Special Scientific Interest (SSSI);
- The Inner Moray Firth Special Protection Area (SPA);
- The Moray Firth Special Area of Conservation (SAC);

- The Inner Moray Firth RAMSAR site; and
- To the northwest of the site, designated haul-out sites for Grey and Common/Harbour Seals (Protection of Seals Orders) are present.

Further detail on the designated sites is presented in Figure 1.3, EIAR Chapter 1 (Introduction). The potential impacts related to coastal processes on the Whiteness Head SSSI, the Inner Moray Firth SPA, Inner Moray Firth RAMSAR and the Moray Firth SAC are further detailed within Section 10.5 of this chapter. The Inner Moray Firth RAMSAR site and designated haul-out sites are further assessed within EIAR Chapter 11 (Marine Mammals), EIAR Chapter 12 (Terrestrial Ecology), EIAR Chapter 13 (Ornithology) and EIAR Appendix 5.8.

10.4.3 Topography and Bathymetry

The wider bathymetry of the Inner Moray Firth includes several key features that influence local hydrodynamics, such as the north and south channels around the Riff Bank sandbank near Ardersier Port, and the narrows between Fort George and Chanonry Point to the west.

The present-day bathymetry of the harbour and navigation channel is reflective of the recently completed capital dredge works, with depths of -12.4 m Chart Datum (CD) through the channel and outer harbour. The inner harbour is the subject of the proposed development and currently has varying bed levels, with shallower areas of recent deposition and localised areas which have been subject to smaller scale dredge activities over recent years.

Terrestrial elements of the spit to the north and east of the harbour sit above highest astronomical tide (HAT) level of +4.8 mCD, with localised topographic highs of 6.4 mCD. The former spit head to the immediate west of the navigation channel now forms an island feature elevated above HAT level, with peak level of 5.7 mCD. Across the terrestrial extent of Ardersier Port ground levels are generally around 6.8 mCD.

Further detail on topography, bathymetry and associated surveys, is provided in EIAR Appendix 10.3.

10.4.4 Sediment

Previous investigations¹ show that Whiteness Sands, the spit, and the nearby channel primarily consist of mobile sand deposits. Four sand types have been identified based on lognormal grain size:

- Medium-coarse sand (0.355 mm): Often forms a secondary grain population, indicating bedload transport.
- Medium sand (0.250 mm): Forms bimodal populations with medium-fine sand, also linked to bedload transport.
- Medium-fine sand (0.180 mm): Widespread except just offshore from the spit; easily mobilised by water, moving in near-bed suspension.
- Fine sand (0.125–0.150 mm): Dominates offshore seabed; typically transported in suspension.

Lithogenic gravel is found on the spit surface, predominantly along and above the high-water mark. Lower quantities of gravel appear nearby, with gravel consisting of shell debris present to the north of Whiteness Sands. Sediments around the site are typically shaped by modern processes, though chart annotations of seabed conditions indicate the presence and erosion of two Holocene or Pleistocene deposits to the east of the spit and at Fort George narrows, where recent sediment is likely thin or absent. These eroding areas are key sources of gravel reworked by current processes.

¹ EnviroCentre, 2024. Ardersier Deeper Dredge Coastal Modelling Report

Further detail on sediment character and transport processes is provided in EIAR Appendix 10.3.

10.4.5 Tidal Water Levels

Tidal levels at Ardersier Port (formerly McDermott Base) as presented within the Admiralty Tide Tables² are shown in Table 10.3. The mean tidal range at Ardersier Port is 3.3 m during spring tides and 1.6 m during neap tides, and the maximum astronomical tidal range is 4.6 m.

Further detail on tidal action is provided in EIAR Appendix 10.3.

Table 10.3: Tidal Water Levels - Ardersier Port

Tide Condition	Chart Datum (mCD)*	Ordnance Datum (mAOD)
Highest Astronomical Tide (HAT)	4.8	+2.7
Mean High Water Springs (MHWS)	4.2	+2.1
Mean High Water Neap (MHWN)	3.3	+1.2
Mean Sea Level (MSL)	2.5	+0.4
Mean Low Water Neap (MLWN)	1.7	-0.4
Mean Low Water Springs (MLWS)	0.9	-1.2
Lowest Astronomical Tide (LAT)	0.2	-1.9

* Chart Datum correction for Ordnance Datum is -2.1 m (relative to OD at Newlyn)

Extreme sea levels are outlined within EIAR Chapter 9 (Hydrology and Hydrogeology), section 9.4.5 (Flood Risk).

10.4.6 Tidal Currents

The key tidal flows near the site have been identified through site observation, monitoring and coastal modelling studies. During flood tides, tidal flow is east to west around the spit and into the harbour. During ebb tides, the flow reversed. Peak current speeds reach approximately 1 m/s in the main channel (South Channel) located to the north of Whiteness Sands, with lower velocities across the sands and within the harbour. Current speeds generally decrease at high and low tide, influenced by local seabed features. Residual current analysis has shown a dominant flood flow around the spit and into the harbour, while ebb flows dominate in deeper offshore waters. Within the inner harbour and further east into intertidal extents there is a marginal ebb current dominance, although peak current speeds are generally low.

Further detail on tidal action is provided in EIAR Appendix 10.3.

10.4.7 Wind and Wave Climate

A review of historic wind data from the Met Office³, for an area situated over 20 km offshore from the proposed development in the Outer Moray Firth, indicates an annual average wind speed at Kinloss (1991 – 2020) of 4.6 m/s, with highest monthly average wind speed shown in February (5.3 m/s) and lowest monthly average wind in July (4.0 m/s).

Hindcast wind data has been obtained from the DHI MetOcean data portal⁴ for a location immediately offshore of Ardersier Port between July 2024 and July 2025. The prevailing wind direction is from the

² Admiralty Tide Tables, 2025. UKHO

³ Met Office, 2020. UK Climate Averages. Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/location-specific-long-term-averages/qcuezdq3>

⁴ DHI. Metocean Data Portal. Available at : <https://www.metocean-on-demand.com/>

southwest, with the wind speed typically between 4 and 6 m/s, and in excess of 19 m/s during winter months. This is consistent with site measured data recorded by site weather stations. Hindcast wind data has also been obtained for an offshore location in the Outer Moray Firth covering the period 1979 to 2023, with a similar prevalence of wind from the south-western sectors.

The prevailing offshore wave direction is from the northeast. The proposed development is largely sheltered from offshore waves approaching from the northeast by the Whiteness Head Spit, and the wider topography of the Moray Firth. For a point just offshore from Whiteness Head, hindcast wave data from the period of July 2024 to July 2025 obtained from the DHI MetOcean Data Portal⁴, indicates that wave height was most commonly below 0.3 m, and occasionally in excess of 1m during winter months. This is consistent with data collected within 2025 by a wave buoy positioned immediately offshore from Ardersier Port to the northeast of the navigation channel.

At the offshore hindcast location in the Outer Moray Firth waves from the north and northeast are also prominent. This sector represents the longest fetch from Ardersier Port and therefore considered the key wave sectors for the site and surrounds.

Further detail on wave action and wind climate is provided in EIAR Appendix 10.3.

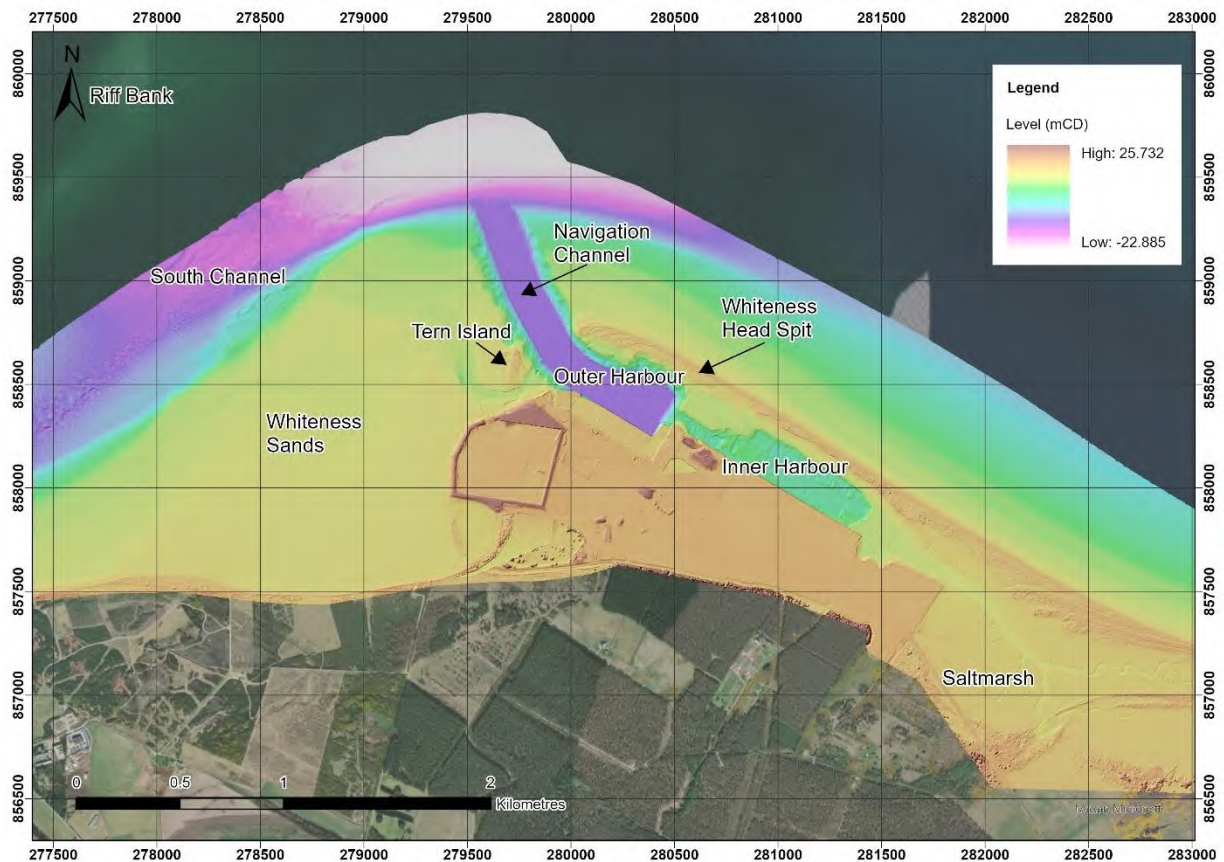
10.4.8 Morphology and Sediment Transport

A number of key morphological features are present within the site and surrounding area, as shown in Figure 10.1. An intertidal spit with a prominent intertidal recurve, truncated by the recently dredged navigation channel, extends immediately north of the present-day terrestrial spit head. Historically this has been orientated in a northwestern direction in line with the longshore sediment feed. Below MLWS, areas of subtidal deposition are present to the northwest of the spit and navigation channel, extending along the northern fringe of Whiteness Sands. The historic spit head remains as an island feature to the immediate west of the navigation channel, with the historic meandering harbour inlet channel still present further west, separating the island from Whiteness Sands.

Within the harbour recent spit restoration works have restored the inner face of Whiteness Head spit where erosion had occurred. To the southeast of the inner harbour the modified waters of the harbour transition to a network of creek features associated with saltmarsh habitat.

The main Moray Firth channel, known as the South Channel is located to the north of Whiteness sands, with various large scale bedforms including dunes, megaripples, ribbons, and possible landslips, present on the bed and surrounding slopes. These features indicate both westward and eastward sediment transport, shaped by flood and ebb currents. The Riff Bank sandbank forms the northern edge of the South Channel, with the intertidal Whiteness Sands to the south. The intertidal Whiteness Sands is relatively flat, with small scale ripples dominant, a few channel features are associated with tidal flow and a general absence of larger scale bedforms. A small sand spit feature is present on the southern shoreline of Whiteness Sands, indicative of westerly longshore transport of sand in this area. To the south of this a former lagoon is present, historically disconnected from the marine environment by former site operations.

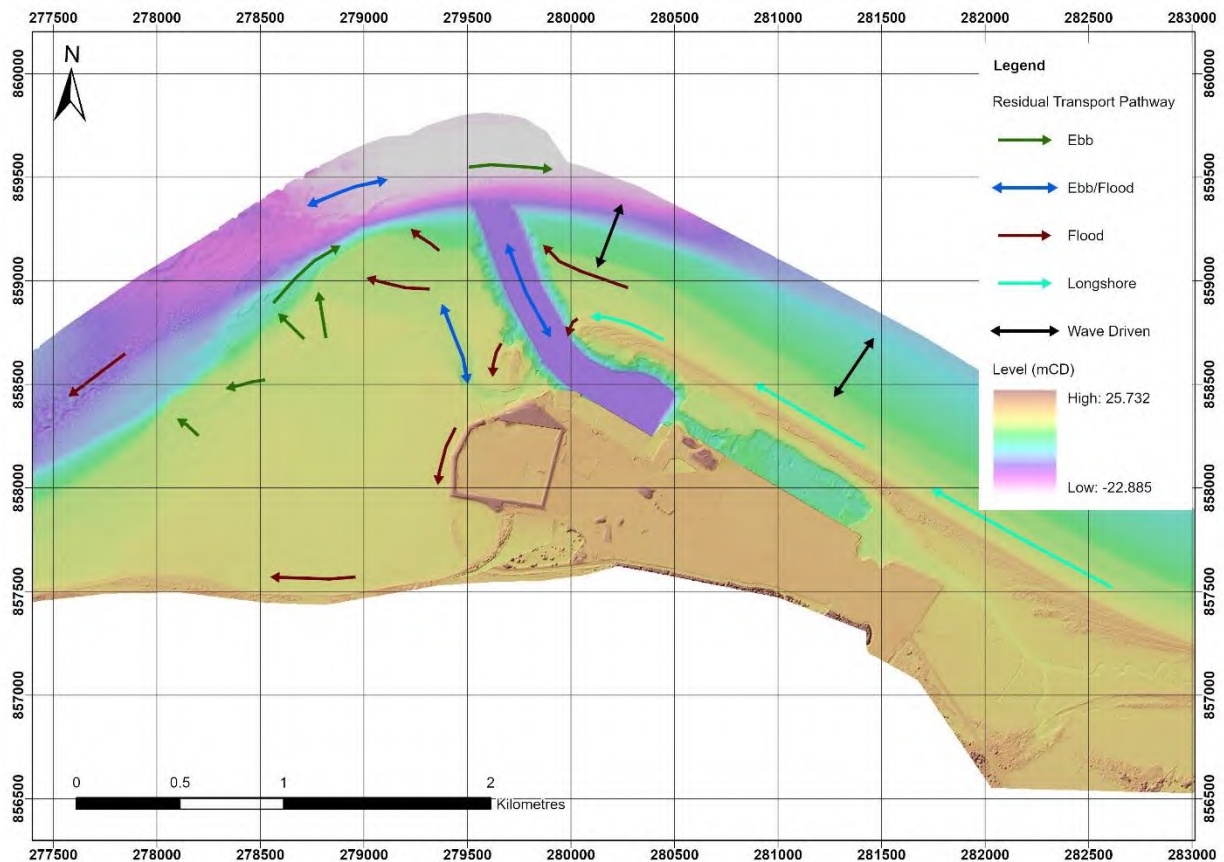
Figure 10.1: Key Morphological Features of Interest



Longshore transport of sand and gravel along the eastern shore of Whiteness Head spit drives the continued spit growth to the northwest, with the development of recurves extending to the southwest. This northwestern sediment pathway continues into the navigation channel and offshore into the deeper waters of the main South Channel, with some continuity of westward transport toward the north-eastern intertidal and subtidal edges of Whiteness Sands. Wave action from the northeast produces both on and offshore transport of sediment along the north-eastern shores of the Whiteness Head spit and Whiteness Sands. In addition, sand is transported offshore from the northern margin of Whiteness Sands, with a return transport pathway further offshore heading east. This eastward movement has historically contributed sediment to both the harbour and the southern shoreline of Whiteness Sands. Meanwhile, the central areas of Whiteness Sands remain generally stable relative to the surrounding dynamics at Whiteness Head.

A conceptual model of coastal processes under present day conditions is shown in Figure 10.2, whilst further detail on morphology and sediment transport is presented in EIAR Appendix 10.3.

Figure 10.2: Conceptual Model of Coastal Processes



10.4.9 Future Baseline

Future projections relating to the increase in rainfall intensity due to climate change are outlined within EIAR Chapter 9 (Hydrology and Hydrogeology) of this EIAR.

The UK government has published a range of climate projection reports and data for use in the assessment of climate change risks to help plan how to adapt to a changing climate. The latest set of comprehensive reports produced by UK Climate Projections (UKCP18) was published in 2018 and provides future climate projections for land and marine regions for the UK⁵.

The UKCP18 projections are presented for a range of different scenarios or Representative Concentration Pathways (RCPs). RCPs are a method for capturing assumptions required on future economic, social and physical changes to our environment that will influence climate change. The increase in global mean surface temperature (°C) by 2081 – 2100 for the different RCP's is outlined below:

- RCP2.6 = 1.6°C (0.9 – 2.3°C)
- RCP4.5 = 2.4°C (1.7 – 3.2°C)
- RCP6.0 = 2.8°C (2.0 – 3.7°C)
- RCP8.5 = 4.3°C (3.2 – 5.4°C)

⁵ MetOffice. (2018). UK Climate Projections 2018.

Predictions are provided for carbon dioxide concentrations, along with resulting changes in mean temperature and mean sea level change around the UK coastline to the year 2100. Review of these predictions highlights that the proposed development is within a zone of moderate sea level change in a UK context.

It should be noted that there is a wide range of uncertainty associated with these projections, and that these values represent an average relative sea-level rise across a range of return period scenarios. Under the United Nations Climate Change Paris Agreement, the UK is committed to attempt to hold the increase in global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit warming to 1.5°C. These targets are in line with those allowed for within UKCP18 RCP 2.6, or the lower end of RCP 4.5, in terms of median global temperature increase by 2100.

The UKCP18 values for sea-level rise at the proposed development have been obtained based on the best available guidance. Cumulative rise from 2017 to 2100 for the region within which the proposed development is located (North Highland) is 0.89 m, derived from the 95th percentile estimate for RCP8.5⁶.

The UKCP18 wind speed analysis concludes that there are no compelling trends in storminess, as determined by maximum gust speeds, from the UK wind network over the last four decades. The global projections over the UK show an increase wind speeds over the UK for the second half of the 21st century for the winter, associated with an increase in frequency of winter storms over the UK, while overall there is no trend in the wind speed over the UK.

The Marine Climate Change Impacts Partnership (MCCIP)⁷ highlights the poleward shift in the storm track since the 1990s and an increase in number of storms, but notes that the mechanisms are poorly understood, and that natural variability will likely continue to dominate storm conditions for the next few decades.

The likely impact of climate change on wave height remains an area of significant uncertainty. The SEPA climate change guidance⁶ does not provide recommended allowances. It is noted that the size of waves at the coast is often limited by depth of water, and therefore sea level is likely to have a greater impact on wave overtopping. The guidance recommends that wave model sensitivity to offshore wave height is tested through an increase of 10 – 20% in offshore wave height to account for changes as a result of climate change.

MCCIP⁷ notes that mean significant wave height has reduced in the north of the UK over the last 30 years, and that whilst the most severe waves could increase in height as a result of climate change, particularly under a high-emissions scenario, there could be an overall reduction in mean significant wave height in the North Atlantic.

10.4.10 Receptor Sensitivity

On the basis of the baseline assessment, Table 10.4 identifies the potential receptors and their sensitivity using the criteria outlined in Table 1 in EIAR Appendix 10.2. The Hilton of Cadboll to Whiteness Head coastal waterbody extent is shown in Figure 1.1 in EIAR Appendix 10.2 and further described in EIAR Chapter 9 (Hydrology and Hydrogeology). The designated site extents are shown in Figure 1.3, EIAR Chapter 1 (Introduction).

⁶ SEPA (2025) Climate change Allowances for Flood Risk Assessments in Land Use Planning (Vol. Version 6). Available at: https://www.sepa.org.uk/media/11wpxuso/climate-change-allowances-guidance_v6.pdf

⁷ Marine Climate Change Impacts Partnership Website (<https://www.mccip.org.uk/storms-and-waves>)

Table 10.4: Summary of the value/sensitivity/importance of receptors.

Receptor/Feature	Value/ Sensitivity/ Importance	Reasoning
Operational waters and sediment of Ardersier Port	Medium	Coastal waterbody within active harbour facility used by commercial vessels and not internationally designated.
Wider coastal waters and sediment of Hilton of Cadboll to Whiteness Head	High	Coastal waterbody has a WFD overall classification of 'Good' and designated RAMSAR, SSSI, SPA, and SAC.
Whiteness Head SSSI	High	Whiteness Head SSSI is designated for coastal geomorphology, coastal features (saltmarsh, sand dunes and shingle) and marine features (sandflats).
Inner Moray Firth RAMSAR	High	The Inner Moray Firth RAMSAR Site is designated for its internationally important wetland habitats (including intertidal mudflats, sandflats, saltmarsh, sand dunes, shingle bar, and eelgrass beds).

10.5 POTENTIAL IMPACTS

The proposed works involve the following key activities which have the potential to impact coastal processes and geomorphology within the site and surrounds:

- Capital dredging of the inner harbour extension;
- Construction activities (port infrastructure including quay wall, launch pocket, rock armour and mattress);
- Island extension activities; and
- Port operations.

The potential impacts on coastal processes and geomorphology include:

- Changes to tidal levels and currents;
- Changes to the wave climate;
- Changes to the sediment transport processes; and
- Associated impacts to key geomorphological features.

Impacts on water quality during construction and operational stages of the proposed development are outlined within Section 9.5 of EIAR Chapter 9 (Hydrology and Hydrogeology).

The potential interactions between coastal processes and geomorphology impacts and ecology, including associated designations, are assessed within EIAR Chapter 11 (Marine Mammals), EIAR Chapter 13 (Ornithology) and EIAR Appendix 5.8.

The following sections consider and assess the potential impacts.

10.5.1 Construction

In terms of construction phase impacts to coastal processes and geomorphology it is considered that the final stages of construction, with the capital dredge and associated infrastructure essentially complete, would produce the most significant impacts. Therefore, this is the construction condition that has been considered within this assessment and the associated coastal modelling study. Key construction stage impacts of the proposed works on coastal processes and geomorphology are assessed under the following headings:

- Tidal levels and currents;
- Wave climate;
- Sediment transport; and
- Geomorphology.

Tidal Levels and Currents

The proposed works could result in alterations to local tidal levels and currents. Hydrodynamic modelling has been undertaken for existing (baseline) and proposed development scenarios and is described within EiAR Appendix 10.3 of this EiAR. The model scenarios have simulated a period of astronomical tidal cycle including both neap and spring tides. Comparison of model results highlights that there will be no significant impact on tidal levels or phasing, except to increase low water tidal range within the dredge zone where deposition has occurred in the harbour under existing (baseline) conditions. The difference in modelled water level between existing and proposed conditions is insignificant, generally less than 1 cm throughout model simulation duration.

Comparison of statistical maximum current speed has been undertaken between the existing and proposed model scenarios. Only minor reductions in maximum current speed are predicted at the transition from the existing baseline dredge pocket into the expanded deeper dredge pocket (-12.4 mCD). Whilst the modelling results indicate that the proposed dredging will produce minor localised changes in current velocities within the dredge extent, it is considered that these variations are insignificant in terms of both the local and wider hydrodynamic regime of the Moray Firth, with post development velocities of a similar nature to those observed elsewhere.

Comparison of statistical maximum current speed has also been undertaken between two island extension options and the proposed development scenario. The results highlight that neither of the potential island extension options is predicted to have a significant impact on tidal currents versus the proposed development scenario.

Wave Climate

The proposed works could result in alterations to the local wave climate. Spectral wave modelling has been undertaken for existing (baseline) and proposed development scenarios and is described within EiAR Appendix 10.3 of this EiAR. The model scenarios have simulated a period of hindcast wave and wind conditions across an astronomical tidal cycle including both neap and spring tides. Comparison of existing and proposed scenario statistical maximum significant wave height through the simulation duration highlights only a minor increase in wave height predicted along the quay within the proposed port extension dredge pocket. Analysis of the model results and input parameters highlights that peak wave heights in this area occur during winds from the west and northwest, aligned with the harbour entrance and quay. Waves would be able to penetrate further into the harbour through the navigation channel and dredge pocket with wind from this direction. Elsewhere, outside the immediate vicinity of the proposed dredge zone the modelling indicates that the proposed development will have no significant impact on wave climate.

Sediment Transport

The proposed works could result in alterations to local sediment transport processes. Coupled hydrodynamic, spectral wave and sand transport modelling has been undertaken for the existing (baseline) and proposed development scenarios and is described within EiAR Appendix 10.3 of this EiAR. The model scenarios have simulated sand transport under a period of average conditions followed by a significant storm event from the key north-eastern sector (Storm Ciaran, 2023). Comparison of existing and proposed scenario bed level change (cumulative deposition and erosion) and the end of the scenario simulations highlights that no significant difference is predicted between the baseline and post extension scenarios. The deepening of the inner harbour is not predicted to impact the key sediment transport

processes or pathways, particularly those associated with the active spit extension and intertidal Whiteness Sands.

Due to the large volume of sediment currently available within the local coastal system, it is considered that the removal of the proposed extension dredge budget will not be significant in terms of the wider system. Observed trends, model results and the conceptual understanding of local sediment transport processes all indicate that potential impacts to sediment transport and coastal morphology will be insignificant and localised in extent. The key longshore feed of sediment along the spit will continue, with change limited to the footprint and immediate vicinity of the extension works.

Patterns of bed level change in the two island extension scenarios have been compared to the proposed port extension results, highlighting that the island extension options are predicted to only result in localised impacts to sand transport. Given the lack of impact to tidal currents, predictions of additional localised deposition under island extension option scenarios are considered to be primarily a result of provision of additional shelter from wave action.

Geomorphology

EIAR Appendix 10.3 of this EIAR presents the coastal processes assessment for the proposed port extension development. As described in the previous sections, the associated coastal modelling study finds that the proposed port extension is unlikely to result in any significant change to the key coastal processes of tides, waves and sediment transport. Where changes have been predicted from existing (baseline) conditions, these are minor and predominantly within the immediate vicinity of the extension dredge zone. The proposed port extension with dredging of the inner harbour is therefore not predicted to result in any significant impact to surrounding key geomorphological features or designations.

10.5.2 Operation

Key operational stage impacts of the proposed works on coastal processes and geomorphology are assessed under the following headings:

- Tidal levels and currents;
- Wave climate;
- Sediment transport; and
- Geomorphology.

Tidal Levels and Currents

The impact of the proposed development during the operational phase on tidal levels and currents is considered to be the same as during the final construction phase, where the full footprint of the proposed development would be in place.

Wave Climate

The impact of the proposed development during the operational phase on wave climate is considered to be the same as during the final construction phase, where the full footprint of the proposed development would be in place.

Sediment Transport

The impact of the proposed development during the operational phase on sediment transport processes is considered to be the same as during the final construction phase, where the full footprint of the proposed development would be in place.

Geomorphology

The impact of the proposed development during the operational phase on geomorphology is considered to be the same as during the final construction phase, where the full footprint of the proposed development would be in place.

10.6 MITIGATION AND ENHANCEMENT

10.6.1 Embedded mitigation

The development of the design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the design. This is referred to as embedded mitigation (or design interventions). The principles of the design and mitigation hierarchy outlined in EIAR Chapter 2 (Methodology) have been followed. The first principle being to avoid potential adverse effects, if at all practicable, before seeking to minimise or mitigate for any unavoidable impacts. Embedded mitigation for the proposed development is reported in EIAR Chapter 3 (Project Description) which also includes a description of the design alternatives that have been considered, including the environmental factors which have influenced the decision-making. Mitigation measures will seek to reduce impacts during both construction and operation phases. Any effects which cannot be mitigated or reduced are referred to as residual effects.

10.6.2 Mitigation

Mitigation is included in the Outline Construction Environmental Management Document (CEMD). The Outline CEMD will be developed into the Construction Environmental Management Plan (CEMP) for approval by the Highland Council, with subordinate Construction Environmental Management Plans (CEMPs) for implementation during construction. Further information on the Outline CEMD is provided within EIAR Chapter 3 (Project Description). EIAR Chapter 15 (Schedule of Mitigation and Enhancements) provides a summary of the mitigations identified within this EIAR.

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

10.6.3 Construction Mitigation Measures

This section summarises the mitigation required during the construction of the proposed development. Unless stated all mitigation is considered to be embedded as it follows best practice measures and/or is required to achieve compliance with legislation. Mitigation measures of relevance during construction are included within the Outline CEMD.

Construction will be carried out using industry best practice and in accordance with implementation of the requirements identified in the Outline CEMD. Construction information is presented in Chapter 3 (Project Description).

General Management

An Outline CEMD will be produced to ensure that the mitigation measures outlined in the EIAR are followed during the proposed construction works. The Outline CEMD will be developed into a Construction Environment Management Plan (CEMP) and will include surface water management and pollution prevention measures (e.g. Pollution Prevention Plan) and will be in place during construction and operation. The CEMD will remain a live document and will be continually updated as the work progresses. The Outline 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, and is detailed further within EIAR Appendix 3.2 of EIAR Chapter 3 (Project Description).

Best practice will be adopted throughout all phases of development, following current guidance. The programme of works, including timing, direction and method of capital dredge, will be planned, monitored and managed to minimise the potential negative environmental impacts through a specific CEMP.

The Port of Ardersier's Marine Environmental Policy sets out the principles applied to reduce the risks and impacts of port related activities on the environment. These principles flow down through the port environmental management documents.

Sediment Management

It is considered that dredging would be undertaken in line with the conditions of the marine licence and associated Best Practicable Environmental Option (BPEO) report.

10.6.4 Operation Mitigation Measures

General Management

The Port Operational Environmental Management Plan (POEMP) is already in place for the consented site, this will be updated for the operational phase should the extension gain consent. Best practice will be followed throughout the operational phase, with reference to the SEPA Guidance for Pollution Prevention (GPPs), and best practice guidance.

10.6.5 Enhancements

Proposals include extension of the Tern Island to the immediate west of the navigation channel for the benefit of the local bird population. More details on this are provided within EIAR Chapter 3 (Project Description), EIAR Chapter 13 (Ornithology) and EIAR Chapter 15 (Schedule of Mitigation and Enhancement).

10.6.6 Monitoring

The Applicant shall undertake a planned programme of compliance monitoring to verify the effectiveness of the project's environmental management during construction. Monitoring plans will be established and implemented with the agreement of THC, SEPA, NatureScot and Marine Scotland.

Specific auditing and monitoring plans will be developed by the Principal Contractor and will cover the following:

- The contractor's own Environmental Management System and project monitoring plans;
- The CEMD, schedule of mitigation register, relevant legislation and industry good practice;
- All construction activity;
- Roles and responsibilities for those undertaking audits and monitoring;
- Frequency of inspection activities (i.e. daily, weekly, monthly);
- Process to deal with corrective actions/non-compliance; and
- Reporting procedures (including non-compliance).

10.7 ASSESSMENT OF SIGNIFICANT EFFECTS

This section assesses the level and significance of the residual effects of the proposed development on coastal processes and geomorphology receptors during both construction and operation with the

mitigation described in Section 10.6 in place. The residual effects are presented in Table 10.5 and Table 10.6

Table 10.5 summarises the assessment of significance of effect of the proposed development upon coastal processes and geomorphology receptors during construction.

Table 10.5: Summary of assessment of significance of effect during construction

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
Operational waters and sediment of Ardersier Port	Medium	Changes to local tidal levels and currents	CEMP Marine Environmental Policy	Negligible
		Changes to the local wave climate	CEMP Marine Environmental Policy	Negligible
		Changes to the sediment transport processes	CEMP Marine Environmental Policy	Negligible
		Associated impacts to key geomorphological features	CEMP Marine Environmental Policy	Negligible
Wider coastal waters and sediment of Hilton of Cadboll to Whiteness Head	High	Changes to local tidal levels and currents	CEMP Marine Environmental Policy	Negligible
		Changes to the local wave climate	CEMP Marine Environmental Policy	Negligible
		Changes to the sediment transport processes	CEMP Marine Environmental Policy	Negligible
		Associated impacts to key geomorphological features	CEMP Marine Environmental Policy	Negligible
Whiteness Head SSSI	High	Changes to local tidal levels and currents	~~one~~ CEMP Marine Environmental Policy	Negligible
		Changes to the local wave climate	~~one~~ CEMP Marine Environmental Policy	Negligible
		Changes to the sediment transport processes	CEMP Marine Environmental Policy	Negligible

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
		Associated impacts to key geomorphological features	CEMP Marine Environmental Policy	Negligible
Inner Moray Firth RAMSAR	High	Changes to local tidal levels and currents	CEMP Marine Environmental Policy	Negligible
		Changes to the local wave climate	CEMP Marine Environmental Policy	Negligible
		Changes to the sediment transport processes	CEMP Marine Environmental Policy	Negligible
		Associated impacts to key geomorphological features	CEMP Marine Environmental Policy	Negligible
		Changes to local tidal levels and currents	CEMP Marine Environmental Policy	Negligible

Table 10.6 summarises the assessment of significance of effect of the proposed development upon coastal processes and geomorphology receptors during operation.

Table 10.6: Summary of assessment of significance of effect during operation

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
Operational waters and sediment of Ardersier Port	Medium	Changes to local tidal levels and currents	OEMP Marine Environmental Policy	Negligible
		Changes to the local wave climate	OEMP Marine Environmental Policy	Negligible
		Changes to the sediment transport processes	OEMP Marine Environmental Policy	Negligible
		Associated impacts to key geomorphological features	OEMP Marine Environmental Policy	Negligible

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
Wider coastal waters and sediment of Hilton of Cadboll to Whiteness Head	High	Changes to local tidal levels and currents	OEMP Marine Environmental Policy	Negligible
		Changes to the local wave climate	OEMP Marine Environmental Policy	Negligible
		Changes to the sediment transport processes	OEMP Marine Environmental Policy	Negligible
		Associated impacts to key geomorphological features	OEMP Marine Environmental Policy	Negligible
Whiteness Head SSSI	High	Changes to local tidal levels and currents	OEMP Marine Environmental Policy	Negligible
		Changes to the local wave climate	OEMP Marine Environmental Policy	Negligible
		Changes to the sediment transport processes	OEMP Marine Environmental Policy	Negligible
		Associated impacts to key geomorphological features	OEMP Marine Environmental Policy	Negligible
Inner Moray Firth RAMSAR	High	Changes to local tidal levels and currents	OEMP Marine Environmental Policy	Negligible
		Changes to the local wave climate	OEMP Marine Environmental Policy	Negligible
		Changes to the sediment transport processes	OEMP Marine Environmental Policy	Negligible

Receptor	Value/ Sensitivity/ Importance	Potential impact (in the absence of mitigation)	Mitigation	Residual effect
		Associated impacts to key geomorphological features	OEMP Marine Environmental Policy	Negligible
		Changes to local tidal levels and currents	OEMP Marine Environmental Policy	Negligible

10.8 STATEMENT OF SIGNIFICANCE

Overall, the effects of the proposed development on coastal processes and geomorphology are **not considered to be significant**.

10.9 CUMULATIVE EFFECTS

A review of proposed and existing developments was undertaken within 15 km of the application site. For coastal processes and geomorphology the assessment focused on a Zone of Influence (ZOI) surrounding the application site incorporating the harbour, intertidal extents including saltmarsh, and receiving coastal waterbody (Hilton of Cadboll to Whiteness Head coastal water body).

Two active ports are present within 10km of the application site (The Port of Nigg and Cromarty Firth). Both ports discharge into the Cromarty Firth, which is classified as a different coastal waterbody (Outer Cromarty Firth) than that of the proposed development. Given the distance from the site and the nature of the surrounding geography and bathymetry, it is not expected there would be a significant cumulative effect on coastal processes and geomorphology from these developments.

The cumulative effects on coastal processes and geomorphology would therefore be **Negligible**.

ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION



November 2025



Chapter 11 Marine Mammals

Ardersier Port Extension

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11 MARINE MAMMALS

11.1 INTRODUCTION

This chapter presents information required by the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 to be provided in the Environmental Impact Assessment Report (EIAR) to enable the identification and assessment of likely significant effects on marine mammals.

The approach to this assessment follows the methodology set out in the EIA Scoping Report (SCOP-0062) and is in accordance with the Scoping Opinion (25/00226/SCOP) produced by The Highland Council and Scoping Opinion received from the Marine Directorate in June 2025. EIAR Chapter 4 (Consultation) contains further information on how each of the matters raised in the Scoping Opinion have been addressed.

The overarching legislation, policy and guidance relating to Marine Mammals in Scotland and relevant to this assessment of the proposed development are presented in EIAR Appendix 11.1.

The assessment has been undertaken in accordance with the methodology as presented in EIAR Appendix 11.2 which includes the assumptions and limitations of the assessment, and EIAR Appendix 11.3 includes the marine mammal study area and key data sources used in the marine mammal assessment. EIAR Chapter 3 (Project Description) contains a detailed description of the proposed development. This chapter is supported by the following EIAR Appendices:

- EIAR Appendix 11.1: Legislation, Policy and Guidance
- EIAR Appendix 11.2: Marine Mammal Assessment Methodology
- EIAR Appendix 11.3: Ardersier ETF Extension Marine Mammal Baseline Characterisation
- EIAR Appendix 11.4: Ardersier ETF Extension Marine Mammal Impact Assessment
- EIAR Appendix 11.5: Underwater Noise Modelling Report
- EIAR Appendix 11.6: Report to Inform the Appropriate Assessment (RIAA) - Marine Mammal Designated Sites
- EIAR Appendix 11.7: Marine Mammal Mitigation Plan (MMMP).
- EIAR Appendix 11.8: Cetacean baseline distribution, occurrence and behaviour in the Moray Firth SAC

11.2 CONSULTATION

Responses in relation to the statutory consultation undertaken are presented in the EIAR Chapter 4 (Consultation). Following production of the EIA Scoping Report the following consultation has been undertaken.

Ongoing statutory and non-statutory consultation and incorporation of feedback is an integral part of developing a robust EIAR. The EIA Scoping Report (SCOP-0062) was submitted to the Marine Directorate – Licensing Operations Team (MD-LOT) who issued a detailed response to the Scoping Report's content in the June 2025 Scoping Opinion covering its own opinion on the Scoping Report as well as the statutory and non-statutory consultees' advice on each topic. Scoping responses on for the topic of Marine Mammals can be found in EIAR Chapter 4 (Consultation).

11.3 METHODOLOGY

This section provides a summary of the assessment methodology for marine mammals. Further detail is provided in EIAR Appendix 11.2.

11.3.1 General Approaches

This assessment has been conducted based on the existing baseline environment (presented in EIAR Appendix 11.3 and EIAR Chapter 3 (Project Description)).

Impacts have been assessed for two key, distinct phases of the proposed development; construction, and operations & maintenance (O&M). The EIA methodology for marine mammals is consistent with that provided in the EIA Scoping Report (SCOP-0062).

A summary of the proposed approach to the Marine Mammals assessment that has been considered in the EIAR is outlined below.

11.3.2 Assessment of Auditory Injury (PTS) and Disturbance from Piling, and Dredging Activities

Modelling of underwater noise across the proposed development has been undertaken for all potential noise sources (impulsive and continuous) and is used to determine the potential risk of auditory injury and disturbance/displacement effects caused by underwater noise. The methods used to assess the impacts from impulsive noise sources (e.g., piling activities which take place for the construction of mooring dolphins) are fully described in EIAR Appendix 11.5. For the assessment of non-impulsive, continuous noise sources such as vibro-piling, vessel noise and dredging, the underwater noise model incorporated measured source level data to predict auditory injury impact ranges.

For disturbance from piling, Outputs from the underwater noise modelling have been combined with marine mammal density information to quantify the number of marine mammals that are predicted to be impacted by the proposed development using dose-response functions^{1,2}. The numbers of animals impacted are presented as proportions of the relevant management units³ (MUs) (entire MU and UK portion). An assessment of vessel disturbance from dredging activities on marine mammals has made drawing on the results of studies of harbour porpoise responses (5 km effective deterrence range (EDR)) to construction vessel traffic by Benhemma-Le Gall *et al.* (2021)⁴ and Benhemma-Le Gall *et al.* (2023)⁵, and from bottlenose dolphin responses (1 km EDR) to vessels by New *et al.* (2013)⁶, Pirota *et al.* (2015a), Pirota *et al.* (2015b)^{7,8}.

Full details on the methodologies applied to the assessment of auditory injury (PTS) and disturbance from piling and dredging activities can be found in EIAR Appendix 11.2.

11.3.3 Assessment of Disturbance from Vessels

Assessments made on the impacts of vessel disturbance are based on the most up-to-date scientific evidence on the effect of construction, and/or O&M vessels on marine mammals, and is a quantitative assessment. For example, for vessels primarily associated with material deliveries, a 2 km effective deterrence range⁹ (EDR) has been applied to harbour porpoise, a 1 km EDR to seals, a 0.4 km EDR for

¹ Graham *et al.* (2017) Beatrice Offshore Wind Farm: An interim estimate of the probability of porpoise displacement at different unweighted single-pulse sound exposure levels. Prepared by the University of Aberdeen for Beatrice Offshore Windfarm Ltd.

² Whyte *et al.* (2020) Estimating the effects of pile driving sounds on seals: Pitfalls and possibilities. *J Acoust Soc Am* **147**:3948

³ Management Unit (MU) typically refers to a geographical area in which the animals of a particular species are found to which management of human activities is applied.

⁴ Benhemma-Le Gall *et al.* (2021) Broad-scale responses of harbor porpoises to pile-driving and vessel activities during offshore windfarm construction. *Frontiers in Marine Science* **8**:664724.

⁵ Benhemma-Le Gall *et al.* (2023) Vessel noise prior to pile driving at offshore windfarm sites deters harbour porpoises from potential injury zones. *Environmental Impact Assessment Review* **103**:107271

⁶ New *et al.* (2013) Modelling the biological significance of behavioural change in coastal bottlenose dolphins in response to disturbance. *Functional Ecology* **27**:314-322.

⁷ Pirota *et al.* (2015a) Predicting the effects of human developments on individual dolphins to understand potential long-term population consequences. *Proc. R. Soc. B* **282**:20152109

⁸ Pirota *et al.* (2015b) Quantifying the effect of boat disturbance on bottlenose dolphin foraging activity. *Biological Conservation* **181**:82-89.

⁹ An Effective Deterrent Range (EDR) is a radius where marine animals are significantly disturbed by underwater noise, not necessarily completely deterred.

bottlenose dolphins and a 0.25 km EDR for minke whale. Full details on the assessment methodology of disturbance from vessels is outlined in EIAR Appendix 11.2 and EIAR Appendix 11.4.

11.3.4 Assessment of Collision Risks from Vessels

The assessment of potential impacts other than underwater noise such as vessel collision risks is qualitative and based on the best available evidence of these impact pathways considered alongside the proposed development design envelope, location and species scoped-in to the assessment. Full details on the assessment methodology of collision risk from vessels is outlined in EIAR Appendix 11.2.

11.3.5 Assessment of Indirect Impacts on Prey Availability

The assessment of indirect impacts on prey availability is qualitative, using studies which focus on marine mammal prey species in the Moray Firth, and the potential risks of pollutant release and/or contamination impacts on marine mammal prey items.

11.3.6 Cumulative Effects Assessment (CEA)

For marine mammals, the approach to CEA is holistic and combines all potential sources of underwater noise including UXO clearance and pile driving at other construction projects (e.g., offshore wind projects) together with disturbance from vessels, and any other marine construction developments (e.g., ports and harbours) that are planned within the Moray Firth. For each project screened into the CEA, an assessment was made of the number of animals which may be impacted on any one day, based on reported levels of impacts in published EIARs where available and, where not, on various assumptions relating to impact footprints. Full details on the CEA methodology for marine mammals is outlined in EIAR Appendix 11.2.

11.3.7 Assessment of Significance

The criteria for determining the significance of effects is a two-stage process which involves defining the sensitivity of the receptors and the magnitude of the impacts. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors to the magnitude of potential impacts.

Sensitivity

The criteria for defining sensitivity for Marine Mammals receptors are provided below in Table 11.1. The value of the receptor is not included in the definition of sensitivity as all marine mammals are considered to have a high value. It is considered that since marine mammals are either listed under Annex IV of the Habitats Directive as EPS of Community Interest and are in need of strict protection and/or are listed in the under Annex II of the Habitats Directive as species of Community Interest, the value of the receptor is inherently considered through various legislation. In addition to the EIA process, there is legislation and regulatory mechanisms (HRA/EPS) to ensure additional and comprehensive assessment to specific species because of their value/importance. Further, the sensitivity of marine mammal receptors should be defined by their potential vulnerability to an impact from the proposed development, their recoverability and their tolerance. This ensures that the potential risks to individuals and populations are based around evidence on the behavioural adaptability of marine mammals, and the likelihood of changes to vital, reproduction and survival rates of these species from specific impacts. The definitions of sensitivity are based upon SMRU Consulting's professional judgement and experience.

Table 11.1: Definition of Terms Relating to Receptor Sensitivity.

Sensitivity	Definition Used in this Chapter
High	Adaptability: No ability to avoid or adapt to an impact so that individual survival and reproduction rates are affected.

Sensitivity	Definition Used in this Chapter
	Tolerance: No tolerance – Effect will cause a change in both individual reproduction and survival rates. Recoverability: No ability for the animal to recover from any impact on vital rates (reproduction and survival rates).
Medium	Adaptability: Limited ability to avoid or adapt to an impact so that individual survival and reproduction rates may be affected. Tolerance: Limited tolerance – Effect may cause a change in both individual reproduction and survival of individuals. Recoverability: Limited ability for the animal to recover from any impact on vital rates (reproduction and survival rates).
Low	Adaptability: Reasonable ability to avoid or adapt to an impact so that individual reproduction rates may be affected but survival rates not likely to be affected. Tolerance: Some tolerance – Effect unlikely to cause a change in both individual reproduction and survival rates. Recoverability: Ability for the animal to recover from any impact on vital rates (reproduction and survival rates).
Negligible	Adaptability: Receptor is able to avoid or adapt to an impact so that individual survival and reproduction rates are not affected. Tolerance: Receptor is able to tolerate the effect without any impact on individual reproduction and survival rates. Recoverability: Receptor is able to return to previous behavioural states/activities once the impact has ceased.

Magnitude

The magnitude of an impact is based on its duration and spatial extent. Data sources, feedback received from consultation, and expert judgement are used to inform the assessment of magnitude for impacts to Marine Mammals receptors. The criteria for defining magnitude are defined in Table 11.2

Table 11.2: Definition of Terms Relating to Magnitude of an Impact.

Magnitude	Definition Used in this Chapter
High	Extent/Duration: The impact occurs over a large spatial extent and over long-term duration, with the potential to affect a large proportion of a receptor population. Probability/frequency: The effect is highly likely to occur and/or will occur at a high frequency. Consequence: The effect could affect a large enough proportion of the population to alter the long-term trajectory of the population in the long term.
Medium	Extent/Duration: The impact occurs over a medium spatial extent and over medium-term duration, with potential affect a moderate proportion of a receptor population. Probability/frequency: The effect is likely to occur and/or will occur at a moderate frequency. Consequence: The effect could affect a moderate proportion of the population although not large enough to alter the population trajectory in the long term.
Low	Extent/Duration: The impact is localised and temporary or short-term, with potential to result in a noticeable effect on a small proportion of a receptor population. Probability/frequency: The effect may occur but at low frequency.

Magnitude	Definition Used in this Chapter
	Consequence: The effect could affect a small proportion of the population, and the population trajectory would not be altered.
Negligible	Extent/Duration: The impact is highly localised and short-term, with potential to result in very slight or imperceptible changes to a receptor population. Probability/frequency: The effect is very unlikely to occur; if it does, it will occur at a very low frequency. Consequence: The effect will not alter the population trajectory.

Significance

The significance of the effect upon Marine Mammals receptors is determined by correlating the sensitivity of the receptor and the magnitude of the impact. On this basis potential impacts as assessed as either negligible, minor, moderate or major significance. For the purposes of this assessment, any effects with a significance level of major and/or moderate are considered significant in EIA terms, while those of minor and/or negligible are deemed non-significant.

Where the potential for significant effects is identified, additional mitigation measures are proposed and an assessment of residual effects carried out. It should be noted that significant residual effects need not be unacceptable or irreversible.

Table 11.3: Matrix Used for Assessment of the Significance of the Effect.

Significance of Effect		Sensitivity of Receptor			
		<i>Negligible</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>
Magnitude of Effect	<i>Negligible</i>	Negligible	Negligible	Negligible	Negligible
	<i>Low</i>	Negligible	Negligible	Minor	Moderate
	<i>Medium</i>	Negligible	Minor	Moderate	Major
	<i>High</i>	Negligible	Moderate	Major	Major

11.4 BASELINE CONDITIONS

The study area for marine mammals varies depending on the species, as each species requires individual consideration based on differing ecology and behaviour. The marine mammal study area has therefore been defined at two spatial scales; a regional scale study area and the local scale study area. The regional scale study area encompasses a wider geographic context in terms of species presence, estimated densities and abundance (i.e.: the relevant Management Units), whilst the local study area consists of the waters surrounding the Port of Ardersier development site, namely the Inner Moray Firth.

EIAR Appendix 11.3 confirmed the presence of five marine mammal species regularly present within the area of the proposed development. These include bottlenose dolphin, harbour and grey seal, harbour porpoise, and minke whale. There are a range of density estimates available from various surveys and

data sources, as outlined in EIAR Appendix 11.3 for each species. Only the most robust and relevant density estimates have included in this EIAR for quantitative impact assessment. These are provided in Table 11.4.

Table 11.4: Species, management unit (MU) size and density estimates for use in impact assessment for the proposed development.

Species	MU	MU size	UK MU Size	MU Ref	Density (#/km ²)	Density Ref
Bottlenose dolphin	Coastal East Scotland	234		Arso Civil <i>et al.</i> (2025) ¹⁰	Density surface scaled from Thompson <i>et al.</i> (2015) ¹¹	
Harbour seal	Moray Firth	1,365		SCOS (2024) ¹²	Grid cell specific	Carter <i>et al.</i> (2025) ¹³
Grey seal	Moray Firth	5,384		SCOS (2024) ¹²	Grid cell specific	Carter <i>et al.</i> (2025) ¹³
Harbour porpoise	North Sea	346,601	159,632	IAMMWG (2023) ¹⁴	0.2813	SCANS IV (Gilles <i>et al.</i> , 2023) ¹⁵
					0.186	Grid cell closest to the port (Gilles <i>et al.</i> , 2025) ¹⁶
Minke whale	Celtic and Greater North Sea	20,118	10,288	IAMMWG (2023) ¹⁴	0.0116	SCANS IV (Gilles <i>et al.</i> , 2023) ¹⁵
					0.008	Grid cell closest to the port (Gilles <i>et al.</i> , 2025) ¹⁶

11.5 POTENTIAL IMPACTS

The assessment of potential impacts has been conducted in accordance with EIAR Appendix 11.2, and based upon the existing baseline environment (presented in EIAR Appendix 11.3. Full details on the assessments undertaken for each impact pathway, as listed in Sections 11.3.2 – 11.3.5 are provided in EIAR Appendix 11.4.

Table 11.5 details the key proposed development Design Parameters of relevance to the assessment for marine mammal receptors.

¹⁰ Arso Civil *et al.* (2025) Monitoring the Scottish east coast bottlenose dolphin population during a southward range expansion: Final report to Forth and Tay windfarm developers.

¹¹ Thompson *et al.* (2015) Integrating passive acoustic and visual data to model spatial patterns of occurrence in coastal dolphins. ICES Journal of Marine Science **72**(2):651-660.

¹² SCOS (2024) Scientific Advice on Matters Related to the Management of Seal Populations: 2024

¹³ Carter *et al.* (2025) Updated Habitat-Based At-Sea Distribution Maps for Harbour and Grey Seals in Scotland. Sea Mammal Research Unit, University of St Andrews.

¹⁴ IAMMWG (2023) Review of Management Unit boundaries for cetaceans in UK waters (2023). JNCC Report 734, JNCC, Peterborough, ISSN 0963-8091

¹⁵ Gilles *et al.* (2023) Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys.

¹⁶ Gilles *et al.* (2025) Spatial models of cetacean density in European Atlantic waters based on SCANS-IV summer 2022 survey data

Table 11.5: Proposed development Design Parameters used to inform the impact assessment for marine mammal receptors

Impact	Project details	Timeline
Construction		
Auditory injury and disturbance from pile driving of mooring dolphins	- Impact pile driving for 3 mooring dolphins Pile diameter: 1.2 meters Maximum hammer energy: 294 kJ Total number of piles: 12 Total number of piling days: 12 Number of piles installed per day: 1 Duration of each pile installation: 10 hours Duration of soft start: 20 minutes Initial soft start strike rate: 6 strikes per minute (spm) (20% of max) Maximum strike rate: 30 spm	12 piling days between 2026 and 2028
Auditory injury and disturbance from dredging and soil disposal	- Cutter Suction Dredge (CSD) modelled and assessed under worst-case scenario for auditory injury - Disturbance assessment has considered CSD, Trailer-Suction Hopper Dredgers (TSHD) and Split Hopper Barges (SHB) - Expected soil disposal sites: Inverness, Sutors or Burghead	Dredging and soil disposal is expected to be taking place over a 10 week period between March and September (sometime between 2027 – 2029)
Vessel disturbance and collision	Peak vessel activity: - during spoil disposal operations (between Ardersier and Inverness, Sutors or Burghead) - up to 13–23 barge movements per day may be required to transport dredged material offshore - maximum of ~450 additional vessel movements within the Inner Moray Firth over a 10 week period when considering material delivery by barge, and spoil disposal operations	Construction activities are planned to take place between 2026 and 2028, with dredging activities (licensed separately) set to take place between 2027 – 2029
Operation		
Vessel disturbance and collision	Vessel movements: Vessel traffic during the operational phase is anticipated to be 400 vessel calls per year as a maximum worst-case scenario (Haventus, 2025). Vessel speed: While some of the vessels expected to operate are capable of reaching speeds up to 13 knots, most are expected to transit at typical speeds around 10 knots. Vessel types, primarily large vessels servicing offshore industries, including: Heavy Load Carriers (>150 m): 7 different vessel types arriving on-site, in total, per year, Heavy Lift Vessels (>100 m): 4 different vessel types arriving on-site, in total, per year, Jack-up Barges	Vessel activity levels will be sustained over a long-term duration (50 years)

Impact	Project details	Timeline
	(>80 m): 7 different vessel types in total, General Cargo Vessels (>140 m): 2 different vessel types arriving on-site, in total, per year, Bulk Carrier (150 m): 1 vessel type arriving on-site, in total, per year, Semi-submersible (137 m): 1 vessel type arriving on-site, in total, per year	

11.5.1 Construction

Key construction stage impacts of the proposed development on Marine Mammals includes:

- Auditory injury (PTS) from piling of mooring dolphins
- Auditory injury (PTS) associated with dredging and spoil disposal activities
- Disturbance from piling of mooring dolphins
- Disturbance associated with dredging and spoil disposal activities
- Disturbance associated with increased vessel traffic
- Collision risks associated with increased vessel traffic
- Indirect impacts on prey availability

11.5.2 Operation

Key operational stage impacts of the proposed development on Marine Mammals includes:

- Collision risks associated with increased vessel traffic
- Disturbance associated with increased vessel traffic
- Indirect impacts on prey availability
- Long term habitat changes, displacement and/or barrier effects

11.6 MITIGATION AND ENHANCEMENT

11.6.1 Embedded mitigation

The development of the design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the design. This is referred to as embedded mitigation (or design interventions). The principles of the design and mitigation hierarchy outlined in EIAR Chapter 2 (Methodology) have been followed. The first principle being to avoid potential adverse effects, if at all practicable, before seeking to minimise or mitigate for any unavoidable impacts. Embedded mitigation for the proposed development is reported in EIAR Chapter 3 (Project Description) which also includes a description of the design alternatives that have been considered, including the environmental factors which have influenced the decision-making. Mitigation measures will seek to reduce impacts during both construction and operation phases. Any effects which cannot be mitigated or reduced are referred to as residual effects.

For marine mammal receptors, the embedded mitigation commitments adopted by the proposed development are presented in Table 11.6.

Table 11.6: Embedded mitigation commitments relevant to marine mammal receptors

Embedded Mitigation	Embedded mitigation commitment measures
Bunkering Procedures, and Port Oil Spill Contingency Plans	Development of a Bunkering Procedures, and Port Oil Spill Contingency Plans identify potential pollution sources and how the Port of Ardersier will respond to these spill events.
Marine Mammal Mitigation Plan (MMMP)	A Marine Mammal Mitigation Plan will be developed, which will be specific to piling and dredging activities. The mitigation measures within the MMMP will be informed by the following: - The design principles of the proposed development and secured under Marine Licence consent conditions; and - JNCC (2010) Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise. For piling activities, a 500 m mitigation zone (MZ) is considered sufficient to ensure that instantaneous PTS can be effectively mitigated. For dredging activities the JNCC protocol currently provides a disproportionate level of mitigation for the proposed dredging works, which is not justified by the perceived risk to marine mammals. It is proposed that there shall be no distance-specific MZ around the dredge vessel. Instead, it is proposed that prior to dredging operations commencing, the MMO will be required to conduct a pre-dredging search of the entire Phase 2 dredging area. This ensures that the inner harbour area is monitored for the presence of seals (the species most likely to be present within the inner harbour area) and other marine mammals. The MZ that should be monitored during spoil disposal operations on the approach to, and at the spoil disposal site, is a 200 m MZ established around the spoil disposal vessel. Full details can be found in EIAR Appendix 11.7.
Construction Environmental Management Plan (CEMP)	A CEMP will be developed and shall include port related oil spill contingency plans. This CEMP will also include information on chemical usage, waste management, and any port related environmental policies.
Navigational Risk Assessment (NRA)	An NSRA has been developed, which details the types and numbers of vessels involved in the proposed development work. A NRA shall also be implemented for the operational & maintenance phase of the project. The NRA shall employ mandatory pilotage which ensures vessels are guided safely through the harbour, reducing the risk of collision and accidents. An inhouse traffic management system, as well as coordination with nearby ports and maritime authorities shall manage vessel traffic and prevent congestion. As part of the NRA, implementation of vessel movement plans and marine management strategies shall be required to protect local wildlife.
Marine Environmental Policy	The Port of Ardersier's Marine Environmental Policy sets out the measures required to reduce the risks and impacts of port related activities on the environment to a level as low as reasonably practical. Measures include, but are not limited to:

Embedded Mitigation	Embedded mitigation commitment measures
	- Setting measurable environmental objectives and targets supported by a management programme that measures and monitors performance; - Involve and consult interested parties on environmental issues where appropriate; - Systematically identify and assess environmental risks associated with port related activities; - Strive to achieve continual improvement in environmental management systems and performance.
Port Waste Management Plan (PWMP)	The PWMP was developed by the Port of Ardersier to ensure that waste generated at Ardersier Port is managed responsibly, sustainably, and in accordance with relevant legislation and best practices. The goal is to reduce environmental impact, promote resource efficiency, and maintain compliance with the Waste Framework Directive and national waste regulations.

11.6.2 Additional Mitigation Measures

The requirement and feasibility of any additional commitments is dependent on the significance of the effects upon marine mammals. Additional commitments (which require further activity to achieve anticipated outcome- often secured through planning conditions and/or management plans) are incorporated to reduce potential significant effects to environmentally acceptable levels following initial assessment. The additional mitigation measures, if any, required as part of the development proposed development are outlined in section 11.7 and are described in detail in EIAR Appendix 11.4. Each additional mitigation measure relating to marine mammals shall be consulted upon with statutory consultees throughout the EIA process (e.g., through relevant representations).

11.6.3 Mitigation

Mitigation is included in the Outline Construction Environmental Management Document (CEMD). The Outline CEMD will be developed into the Construction Environmental Management Plan (CEMP) for implementation during construction. Further information on the Outline CEMD is provided within EIAR Chapter 3 (Project Description). EIAR Chapter 15 (Schedule of Mitigation and Enhancements) provides a summary of the mitigations identified within this EIAR.

Construction Mitigation Measures

Table 11.7 summarises all mitigation measures required during the construction of the proposed development. Mitigation measures of relevance during construction are included within the Outline CEMD and EIAR Chapter 15 (Schedule of Mitigation and Enhancements).

Construction will be carried out using industry best practice and in accordance with implementation of the requirements identified in the Outline CEMD. Construction information is presented in EIAR Chapter 3 (Project Description).

Table 11.7: Mitigation measures of relevance to marine mammals, that are included in the Outline CEMD

Mitigation	Mitigation Type
Bunkering Procedures, and Port Oil Spill Contingency Plans	Embedded
Marine Mammal Mitigation Plan (MMMP)	Embedded
Construction Environmental Management Plan (CEMP)	Embedded
Navigational Safety Risk Assessment (NRA)	Embedded
Marine Environmental Policy	Embedded
Port Waste Management Plan (PWMP)	Embedded
Port Environmental Management Plan (POEMP)	Embedded

Operational Mitigation Measures

An NRA will be developed, which will detail the types and numbers of vessels during the operations of the proposed development.

11.6.4 Enhancements

No enhancements have been identified for marine mammal receptors.

11.6.5 Monitoring

No monitoring measures have been identified for marine mammal receptors.

11.7 ASSESSMENT OF SIGNIFICANT EFFECTS

The assessment of potential impacts has been conducted in accordance with EIAR Appendix 11.2 and based upon the existing baseline environment (presented in EIAR Appendix 11.3).

Full details on the assessments undertaken for each impact pathway, as listed in Sections 11.3.2 – 11.3.5 are provided in EIAR Appendix 11.4. While EIAR Appendix 11.4 assesses the level and significance of the residual effects of the proposed development on marine mammal receptors during both construction and operation, in detail, this section of the EIAR Chapter provides only a summary of the potential construction and operational impacts of the proposed development for marine mammals. The assessment of significant effects takes into account the mitigation measures as listed in Section 11.6.

11.7.1 Construction Impacts

The environmental impacts arising from the construction of the proposed development, relating to marine mammals, are as follows:

- Auditory injury (PTS) associated with piling (vibro and impact) for installation of mooring dolphins;
- Auditory injury (PTS) associated with dredging and spoil disposal activities;
- Disturbance associated with piling (vibro and impact) for installation of mooring dolphins;
- Disturbance associated with dredging and spoil disposal activities;
- Disturbance associated with increased vessel traffic;
- Collision risks associated with increased vessel traffic; and
- Indirect impacts on prey availability.

Each construction phase impact has been assessed against the detailed project design envelope, as described in EIAR Chapter 3 (Project Description). A detailed description of the potential effect on Marine Mammal pathways and receptors caused by each identified impact is given in EIAR Appendix 11.4.

For the purpose of this EIAR Chapter, Table 11.8 summarises the assessment of significance of effect of the proposed development upon marine mammal receptors during construction.

Table 11.8 Summary of assessment of significance of effect during construction

Impact Pathway	Receptor	Sensitivity	Mitigation	Magnitude of Impact	Residual effect
Auditory injury (PTS) from piling	Harbour porpoise, bottlenose dolphins, grey seals, harbour seals	Low	MMMP CEMP	Negligible	Negligible Non-Significant
	Minke whales	Medium		Negligible	Negligible Non-significant
Auditory injury (PTS) from dredging and spoil disposal activities	Harbour porpoise, bottlenose dolphins, grey seals, harbour seals	Low	MMMP CEMP	Negligible	Negligible Non-Significant
	Minke whales	Medium		Negligible	Negligible Non-Significant
Disturbance from piling	Harbour porpoise, Harbour seal, Minke whale	Low	MMMP CEMP	Negligible	Negligible Non-Significant
	Bottlenose dolphin	Low		Low	Negligible Non-Significant
	Grey seal	Negligible		Negligible	Negligible Non-Significant
Disturbance from dredging and spoil disposal activities	Harbour porpoise, seals at-sea, Minke whale	Low	MMMP CEMP	Negligible	Negligible Non-Significant
	Bottlenose dolphin	Medium		Low	Minor Non-Significant
	Seals hauled-out	Medium (Harbour seals, breeding Grey seals)		Negligible	Negligible Non-Significant
		Low (non-breeding Grey seals)			

Impact Pathway	Receptor	Sensitivity	Mitigation	Magnitude of Impact	Residual effect
Disturbance from increased vessel traffic	Harbour porpoise, Seals at-sea	Low	MMMP CEMP	Negligible	Negligible Non-Significant
	Bottlenose dolphins	Low		Low (Non-dredging phase)	Negligible (non-dredging phase)
				Medium (Dredging phase)	Minor (dredging phase) Non-Significant
	Seals hauled-out	Low (outside breeding/moult)		Low	Negligible (outside breeding/moult) Non-Significant
		Medium (during breeding/moult)		Low	Minor (during breeding/moult) Non-Significant
	Minke whale	Medium		Low	Minor Non-Significant
Collision risks from increased vessel traffic	All marine mammals	High	MMMP CEMP	Negligible	Negligible Non-Significant
Indirect impacts on prey availability	All marine mammals	Low	MMMP CEMP	Negligible	Negligible Non-Significant

11.7.2 Operations & Maintenance Impacts

The environmental impacts arising from the operations and maintenance of the proposed development, relating to marine mammals, are as follows:

- Collision risk impacts associated with increased vessel traffic due to the proposed development during operations and maintenance;
- Disturbance impacts associated with increased vessel traffic due to the proposed development during operations and maintenance (including disturbance to seal haul-outs);
- Indirect impacts on prey availability; and
- Long term habitat changes, displacement and/or barrier effects.

Each operations and maintenance phase impact has been assessed against the detailed project design envelope, as described in EIAR Chapter 3 (Project Description). A detailed description of the potential effect on Marine Mammal pathways and receptors caused by each identified impact is given in EIAR Appendix 11.4.

For the purpose of this EIAR Chapter, Table 11.9 summarises the assessment of significance of effect of the proposed development upon marine mammal receptors during operations and maintenance.

Table 11.9 Summary of assessment of significance of effect during operation

Impact Pathway	Receptor	Sensitivity	Mitigation	Magnitude of Impact	Residual effect
Collision risks from increased vessel traffic	All marine mammals	High	NRA Marine Environmental Policy	Negligible	Negligible Non-Significant
Disturbance from increased vessel traffic	Harbour porpoise, Bottlenose dolphins, Seals at-sea	Low	NRA Marine Environmental Policy POEMP	Negligible	Negligible Non-Significant
	Seals hauled-out	Low (outside breeding/mo ult) Medium (during breeding/mo ult)			
	Minke whale	Medium			
Indirect impacts on prey availability	All marine mammals	Low	MMMP Bunkering Procedures, and Port Oil Spill Contingency Plans	Negligible	Negligible Non-Significant
Long term habitat changes, displacement and/or barrier effects	Harbour porpoise, Bottlenose dolphins, Minke whale	Low	MMMP POEMP	Negligible	Negligible Non-Significant
	Grey seals, Harbour seals	Low (outside breeding/mo ulting) Medium (during breeding/mo ulting)		Negligible	Negligible Non-Significant

11.8 CUMULATIVE EFFECTS ASSESSMENT

11.8.1 Construction

The environmental impacts arising from the construction of the proposed development, acting cumulatively with other projects, and relating to marine mammals, are as follows:

- Disturbance associated with piling (vibro and impact) for installation of mooring dolphins;
- Disturbance associated with dredging and spoil disposal activities;
- Disturbance associated with increased vessel traffic.

A detailed description of the potential effect on Marine Mammal pathways and receptors caused by each identified impact is given in EIAR Appendix 11.4.

For the purpose of this EIAR Chapter, Table 11.10 summarises the assessment of significance of effect of the proposed development upon marine mammal receptors during construction cumulatively with other projects.

Table 11.10 Summary of assessment of significance of effect during construction cumulatively with other projects

Impact Pathway	Receptor	Sensitivity	Mitigation	Magnitude of Impact	Residual effect
Disturbance from construction including piling and dredging	Harbour porpoise	Low	MMMP CEMP	Low	Negligible Non-Significant
	Bottlenose dolphin, Harbour seal	Low		Medium	Minor Non-Significant
	Minke whale	Negligible to Low		Low	Negligible Non-Significant
	Grey seal	Negligible to Low		Medium	Negligible to Minor Non-Significant
Disturbance from increased vessel traffic	Harbour porpoise, Bottlenose dolphin, Harbour seal, Grey seal	Low	NRA CEMP	Low	Negligible Non-Significant
	Minke whale	Medium		Low	Minor Non-Significant
	Seals hauled-out	Grey seal during breeding/moult: Medium		Low	Grey seal during breeding/moult: Minor Non-Significant
		Grey seal outside of breeding/moult: Low			Grey seal during breeding/moult: Negligible Non-Significant
		Harbour seal: Medium			Harbour seal: Minor Non-Significant

11.8.2 Operations & Maintenance

The environmental impacts arising from the operations and maintenance of the proposed development, acting cumulatively with other projects, and relating to marine mammals, are as follows:

- Disturbance associated with increased vessel traffic; and
- Disturbance to seal haul-out sites.

A detailed description of the potential effect on Marine Mammal pathways and receptors caused by each identified impact is given in EIAR Appendix 11.4.

For the purpose of this EIAR Chapter, Table 11.11 summarises the assessment of significance of effect of the proposed development upon marine mammal receptors during operations and maintenance cumulatively with other projects.

Table 11.11 Summary of assessment of significance of effect during operations & maintenance cumulatively with other projects

Impact Pathway	Receptor	Sensitivity	Mitigation	Magnitude of Impact	Residual effect
Disturbance from increased vessel traffic	Harbour porpoise, Grey seal	Low	NRA Marine Environmental Policy	Low	Negligible Non-Significant
	Bottlenose dolphin, Harbour seal	Low		Medium	Minor Non-Significant
	Minke whale	Medium		Low	Minor Non-Significant
Disturbance to seal haul-out sites	Seals during breeding/moulting season	Medium	MMMP Marine Environmental Policy POEMP	Low	Minor Non-significant
	Seals outside breeding/moulting season	Low			Negligible Non-Significant

11.9 STATEMENT OF SIGNIFICANCE

An assessment of the potential impacts of the proposed development on marine mammal receptors during both construction and operations & maintenance phases has been undertaken following the methodology presented in EIAR Appendix 11.2 and based on the existing environmental baseline established in EIAR Appendix 11.3.

During the construction phase, impact pathways such as auditory injury (PTS), behavioural disturbance, collision risk, and indirect effects on prey availability were assessed for a range of marine mammal species, including harbour porpoise, bottlenose dolphin, minke whale, and grey and harbour seals. Receptor sensitivities range from negligible to high. Across all impact pathways, the magnitude of effect was assessed as negligible or low with the exception for bottlenose dolphins during the dredging phase, which were assessed as medium. No significant residual effects are predicted for any species, and thus, all, impacts are assessed as **non-significant** in EIA terms. Embedded mitigation, such as a MMMP and NRA has been incorporated into the project design to reduce the potential for adverse effects.

During the operations and maintenance phase, potential impacts relating to increased vessel traffic, collision risk, prey availability, and long-term habitat changes were similarly assessed. Despite some receptors (e.g. seals during breeding/moulting, and minke whales) having medium sensitivity to specific pressures, the predicted magnitude of impact remains low or negligible. **No significant** effects were identified.

In summary, following detailed quantitative assessment and with the application of embedded mitigation measures, **no significant** adverse effects on marine mammals are expected from the proposed development during either construction or operation.

ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION



November 2025



Chapter 12 Terrestrial Ecology

Ardersier Port Extension

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12 TERRESTRIAL ECOLOGY

12.1 INTRODUCTION

This chapter presents information required by the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 to be provided in the Environmental Impact Assessment Report (EIAR) to enable the identification and assessment of likely significant on terrestrial ecology.

The approach to this assessment follows the methodology set out in the EIA Scoping Report (SCOP-0062) and is in accordance with the Scoping Opinion (25/00226/SCOP) produced by The Highland Council. EIAR Chapter 4 (Consultation) contains further information on how each of the matters raised in the Scoping Opinion have been addressed.

The overarching legislation, policy and guidance relating to terrestrial ecology in Scotland and relevant to this assessment of the proposed development are presented in EIAR Appendix 12.1.

The assessment has been undertaken in accordance with the methodology as set out in Section 12.3 below and in EIAR Appendix 12.2 which includes the study area, data sources used and the assumptions and limitations of the assessment. EIAR Chapter 3 (Project Description) contains a detailed description of the proposed development. This chapter is supported by the following EIAR appendices:

- EIAR Appendix 12.1: Legislation, policy and guidance
- EIAR Appendix 12.2: Methodology
- EIAR Appendix 12.3: Desk Study
- EIAR Appendix 12.4: Mitigation
- EIAR Appendix 12.5: Bat Report (GLTA / Statics)
- EIAR Confidential Appendix 12.6: Badger Report
- EIAR Appendix 12.7: Red Squirrel Report
- EIAR Appendix 12.8: Pine marten Report
- EIAR Appendix 12.9: Otter Report
- EIAR Appendix 12.10: Great Crested Newt Report
- EIAR Appendix 12.11: Reptiles Report
- EIAR Appendix 12.12: Water vole Report
- EIAR Appendix 12.13: Phase 1 and Habitat Condition Assessment Report
- EIAR Appendix 12.14: Habitats, Vegetation and GWDTE Report
- EIAR Appendix 12.15: National Vegetation Classification Report

Due to the potential risk of persecution, site-specific data relating to badgers is considered sensitive and is therefore not included within the main body of this report. Detailed information is provided separately in Confidential EIAR Appendix 12.6. The confidential appendix must not be published or made publicly accessible unless all references to badger sett locations have been fully redacted, in accordance with legal and ethical obligations under wildlife protection legislation.

12.2 CONSULTATION

Responses in relation to the statutory consultation undertaken are presented in the EIAR Chapter 4 (Consultation). Following production of the EIA Scoping Report the following consultation has been undertaken.

Consultation on terrestrial ecology was undertaken following receipt of the Scoping Opinion from The Highland Council (THC). A supplementary meeting was held to outline the proposed ecological survey programme and discuss key ecological considerations.

Key outcomes included:

- **Compensatory Planting:** THC confirmed that off-site compensatory commercial woodland planting would offset the significance of commercial woodland habitat loss. The proposed planting scheme was discussed with NatureScot in July and August 2025, and a suitable site is being identified.
- **Priority Invertebrates:** THC acknowledged that although the Highland Nature Biodiversity Action Plan (HNBAP) lists 25 priority invertebrate species, the site does not support suitable habitat for these species. The EnviroCentre (2024) Protected Species Survey Report concluded that the site lacks the structural and floristic diversity required by these species, including key microhabitats such as bare ground mosaics, nectar-rich swards, and undisturbed wetland margins.
- **Species Scoped Out:** Dingy Skipper *Erynnis tages* and Small Blue *Cupido minimus* were considered but scoped out due to absence of suitable habitat (e.g. sand dunes, coastal grasslands) within the site and consented port footprint.
- **Habitat Context:** The site is dominated by commercial Scots pine plantation, gorse scrub, and modified grassland, which are structurally unsuitable for notable invertebrate assemblages. Invertebrates were therefore robustly scoped out from further assessment.

The assessment follows the methodology outlined in the EIA Scoping Report (ETF Proposed Extension EIA Scoping – Jan 2025 v7_ISSUED) and responds to the Scoping Opinion issued by The Highland Council (THC 25_00226_SCOP-SCOPING_OPINION-3557435). A detailed response to the Scoping Opinion is provided in EIAR Chapter 4 (Consultation).

12.3 METHODOLOGY

The Ecological Impact Assessment (EclIA) has been undertaken in accordance with the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Version 1.3, 2024)¹. The assessment integrates desk-based research and field survey data to identify and evaluate likely significant ecological effects of the proposed development.

Scope and Zone of Influence (Zoi):

The Zoi was defined to capture direct and indirect effects beyond the project boundary. Desk studies included data from the National Biodiversity Network (NBN) Gateway, NatureScot SiteLink / Scotland's Environment Map, and aerial imagery, with search radii of:

- 10 km for internationally designated sites (SAC, SPA, Ramsar);
- 2 km for nationally designated sites (SSSI), protected species, and Local Wildlife Sites;
- 2 km for biological records; and
- 1 km for ancient woodland.

Valuation of Ecological Features:

Features were assessed for importance, value, and sensitivity using geographic criteria (International, National, Regional, County, Local, Site). Factors considered included:

- Conservation status and legal protection;
- Habitat rarity, connectivity, and irreplaceability;
- Species population size, distribution, and vulnerability; and
- Role in ecosystem function and potential for restoration.

¹ Chartered Institute of Ecology and Environmental Management (CIEEM). (2024). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Version 1.3. Winchester: CIEEM.

Impact Assessment:

Impacts were characterised by magnitude, duration, reversibility, and timing. The significance of residual effects was determined after applying the mitigation hierarchy (avoidance, mitigation, compensation, enhancement), with reference to conservation objectives and geographic scale.

Full details of the methodology, including evaluation criteria and supporting tables, are provided in EIAR Appendix 12.2.

Significance Matrix:

The significance of ecological effects has been assessed in accordance with CIEEM EcIA guidance (2018; updated 2023), which recommends considering both the importance of the ecological feature and the magnitude of the predicted impact. The matrix below provides a structured approach to assist professional judgment, supported by clear definitions for transparency.

Definitions

Importance (Value of Ecological Feature):

- International: Critical for global biodiversity (e.g., Ramsar site, SAC of global relevance).
- National: Key to maintaining UK biodiversity (e.g., SSSI, nationally rare species).
- Regional: Important within a region or county (e.g., Local Biodiversity Action Plan priority habitat).
- County: Important within a single county or administrative area.
- Local: Contributes to local ecological networks or green infrastructure.

Site: Features of value only within the development site or its immediate vicinity. Magnitude of Impact:

- Major: Permanent or long-term loss or severe degradation of feature integrity.
- Moderate: Partial loss or significant alteration, reversible only in the long term.
- Minor: Small-scale, short-term, or reversible change with limited effect on integrity.
- Negligible: No measurable effect on structure, function, or viability.

Significance of Effect:

- Significant: Likely to influence decision-making or require mitigation/compensation.
- Not Significant: No material influence on decision-making; minor or negligible effect.

Table 12.1: Significance Matrix

Importance	Major	Moderate	Minor	Negligible
International	Very High (Significant)	High (Significant)	Moderate (May be Significant)	Negligible
National	High (Significant)	Moderate (Significant)	Low (Not Significant)	Negligible
Regional	Moderate (Significant)	Low–Moderate	Low	Negligible
County	Low–Moderate	Low	Negligible	Negligible
Local	Low	Negligible	Negligible	Negligible
Site	Negligible	Negligible	Negligible	Negligible

12.4 BASELINE CONDITIONS

12.4.1 Desk Study

A desk study was undertaken to identify designated sites within the vicinity of both the terrestrial site and the dredge channel. Sites designated for ornithological interest are detailed separately in EIAR Chapter 13 (Ornithology), and are therefore not discussed further in this chapter. A summary of internationally designated sites within 10 km, as well as nationally and locally designated sites within 2 km Sites designated solely for terrestrial ecological features, which are unlikely to be affected by dredging activities, were excluded from the dredge channel assessment to maintain relevance. Full details of the desk study are presented in EIAR Appendix 12.3.

12.4.2 Field Surveys

Habitats

The HED UKHab survey encompassed the wider consented development area; however, this section focuses specifically on terrestrial habitats that will be directly affected within the proposed extension area. The habitats identified within the site are summarised in Table 12.1 and illustrated in Figure 12.1. Alongside the HED habitat survey, a Habitat Condition Assessment (HCA) was undertaken to evaluate the quality of individual habitat parcels. This assessment followed the Statutory Biodiversity Metric Condition Assessment methodology (DEFRA, 2024)², which applies defined criteria for each habitat type to determine its condition category. This metric provides a standardised approach for assessing habitat quality relative to its optimal state.

A second National Vegetation Classification (NVC) survey was undertaken specifically to assess Groundwater Dependent Terrestrial Ecosystems (GWDTE) within the site. The results of this survey are presented in EIAR Appendix 12.14, which supersedes any data for the same parcel of land previously covered in the original NVC survey (EIAR Appendix 12.15). Full survey results, including species lists, are provided in the Appendices referenced in Section 12.1.

² Department for Environment, Food and Rural Affairs (DEFRA). (2024). *Biodiversity Metric 4.0: Technical Supplement*. London: DEFRA.

Figure 12.1: UK Hab Habitat Plan

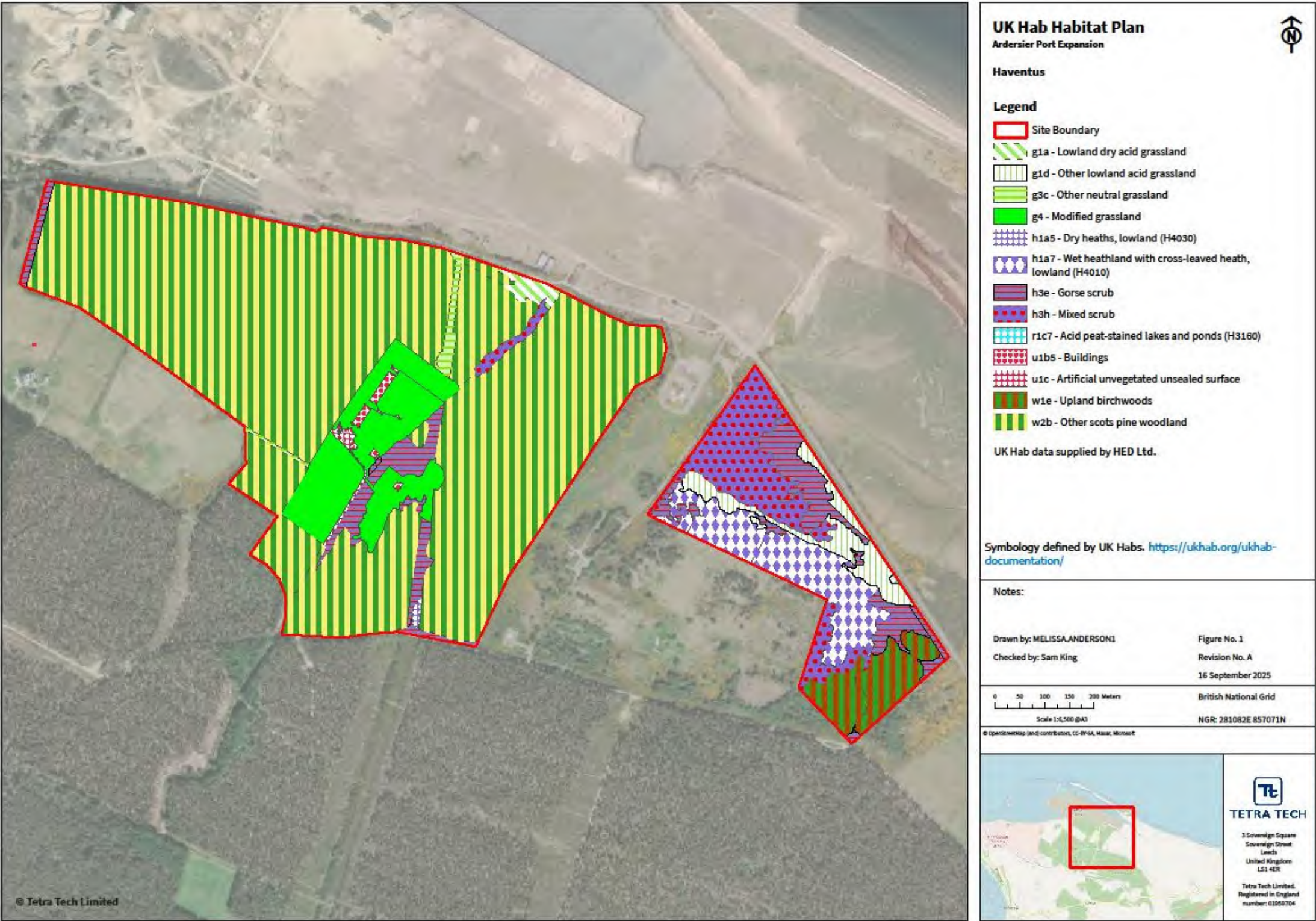


Table 12.2: Habitats.

Habitat (UKHab code)	Habitat Condition Assessment	Description	Conservation status / Designation context
Building (u1b5)	Not applicable	House, barns, and outbuildings used for pheasant rearing.	Site – Not a habitat of conservation importance (however, supports European Protected Species (EPS) bat maternity roost).
Gorse scrub (h3e)	Good to Moderate	Dense gorse with native undergrowth and structured glades.	Site – Common and widespread; not listed as a priority habitat in SBL or Highland Local Biodiversity Action Plan (LBAP).
Other Scot's Pine woodland (w2b)	Poor	Commercial plantation, single age class, no regeneration.	Plantation Scots pine (non-native origin); not SBL Native Pinewood priority habitat; poor condition.
Other neutral grassland (g3c)	Poor to Moderate	Semi-improved grassland on old track; limited species diversity.	Site – May include species-rich swards; not explicitly listed but can support biodiversity.
Lowland dry acid grassland (g1a)	Moderate	Flooded grassland with some indicator species; rabbit grazing.	National (Scotland) – Listed in the SBL as a Priority Habitat.
Mixed scrub (h3h)	Good to Moderate	Mosaic of gorse, broom, and heather with scattered trees.	Site – Not a priority habitat; typical of successional or disturbed areas.
Modified grassland (g4)	Poor	Managed grass and clover; short sward, species-poor.	Negligible – Intensively managed and species-poor.
Dry heaths; lowland (h1a5)	Good	Small heath patch with heather and bilberry; undisturbed.	National (UK) – Annex I habitat and Priority Habitat in the SBL.
Acid peat-stained lakes and ponds (r1c7)	Fairly Poor	Peat-stained pond with submerged vegetation; no floating plants.	National (UK) – Annex I habitat and Priority Habitat in the SBL.
Upland birchwood (w1e)	Moderate	Birch woodland with moss and lichens; limited age diversity, no veteran trees.	National (Scotland) – Listed as a Priority Habitat in the SBL and Highland LBAP.
Other lowland acid grassland (g1d)	Moderate	Flooded grassland on low soils; transitional habitat.	National (Scotland) – Included under broader acid grassland types in the SBL.

Habitat (UKHab code)	Habitat Condition Assessment	Description	Conservation status / Designation context
Wet heathland with cross-leaved heath; lowland (h1a7)	Good	Wet heath with cross-leaved heath, bilberry, heathers, and sphagnum moss.	National (UK) – Annex I habitat and Priority Habitat in the SBL.

Protected and notable species

Protected and notable species identified as a receptor for the site are also detailed in Table 12.3.

Table 12.3: Protected and notable species.

Species	Field Survey Result	Geographic importance
Badger	Detailed field survey information is provided separately in Confidential EIAR Appendix 12.6.	National (UK) – Protected under UK legislation.
Otter	Suitable habitat present, but no signs of activity recorded.	International- European Protected Species.
Water vole	Suitable habitat, but no signs; predators present; no historic records within 1 km.	National (UK) – Protected under UK legislation.
Pine marten	Presence confirmed via scat and camera traps; no dens found; suitable denning features present (e.g. dreys, cavities, disused setts).	National (UK) – Protected under UK legislation.
Red squirrel	36 dreys (34 assessed as active, 2 assessed as inactive); good habitat connectivity; healthy population confirmed.	National (UK) – Protected under UK legislation.
Bats	Potential Roost features (PRFs) in trees; no tree roosts; two confirmed roosts located in Juniper Cottage Buildings 2 and 3 (Common & Soprano Pipistrelle); multiple species recorded.	International - European Protected Species.
GCN and Common Amphibians	7 ponds surveyed; all negative for GCN eDNA; poor habitat suitability; historic records nearby. Two and 2 common toads recorded.	International – GCN are a European Protected Species.
Reptiles	10 common lizards; small, fragmented population.	Local - Confirmed presence of common lizard and toad; small and fragmented population supports local-level importance.
Invasive species	No Invasive Non-native Species (INNS) were observed within the site.	Negligible.

12.4.3 Ecological Receptors Scoped Out

Table 12.4 summarises the ecological features that have been scoped out from further assessment and the reasoning behind the decision.

Table 12.4 Ecological receptors scoped out from further assessment.

Ecological Receptor	Reason
Inner Moray Firth – Ramsar c.20m north of the site c.50m of the Dredged Channel	The Inner Moray Firth Ramsar Site is designated for its internationally important wetland habitats (including intertidal mudflats, sandflats, saltmarsh, sand dunes, shingle bar, and eelgrass beds) and for supporting significant populations of waterbirds. However, there are no direct or indirect terrestrial impact pathways between the proposed development and the Ramsar site's qualifying wetland features, as confirmed by desk study and field survey. All ornithological interests (osprey, common tern, waterbird assemblages) are fully assessed in EIAR Chapter 13 (Ornithology), ensuring no duplication of assessment. The terrestrial works do not affect the hydrology, physical integrity, or ecological connectivity of the Ramsar habitats. Embedded mitigation measures (such as bunds, silt fencing, and pollution controls) further ensure that any residual risk of indirect effects (e.g., sediment runoff, water quality changes) is negligible.
Moray Firth – SAC c.730m north of the site c.250 m of the Dredged Channel	The Moray Firth Special Area of Conservation (SAC) is designated under the EU Habitats Directive for features of international conservation importance, notably bottlenose dolphins and subtidal sandbanks. While SACs are of high international value and highly sensitive to underwater noise, water quality changes, and physical disturbance, the qualifying features of this site are marine ecological receptors. As such, the Moray Firth SAC has been scoped out of the terrestrial ecology chapter, with all relevant impacts fully assessed in EIAR Chapter 11 (Marine Mammals). This ensures that the internationally important Annex I and II features, and the site's role in the Natura 2000 and OSPAR MPA networks, are appropriately addressed within the correct specialist chapter.
Whiteness Head - SSSI c.20 m northeast and c.250 northwest of the site c.50m of the Dredged Channel	Whiteness Head is a Site of Special Scientific Interest (SSSI) designated for features of national conservation value and protected under UK legislation. While the site is highly sensitive to hydrological and geomorphological changes, sedimentation, and disturbance, its qualifying features are not relevant to terrestrial ecology receptors. Accordingly, Whiteness Head SSSI has been scoped out of the terrestrial ecology chapter, with all potential impacts on its nationally important features addressed in the relevant specialist chapters; EIAR Chapter 10 (Coastal Processes & Geomorphology); EIAR Chapter 11 (Marine Mammals); and EIAR Chapter 13 (Ornithology). This approach ensures that the statutory protection and conservation significance of the site are fully considered within the appropriate context.
Ardersier Glacial Deposits – SSSI c.1.6 km southwest of the site	This SSSI, designated for its nationally rare Quaternary geological and geomorphological features. However, due to its location over 1.6 km from the proposed development and the absence of hydrological connectivity, no direct or indirect impact pathways have been identified. As such, this receptor has been scoped out of further assessment.

Ecological Receptor	Reason
Kildrummie Kaines – SSSI c.3.6 km southeast of the site	This site is designated for both its Quaternary geomorphological features and nationally scarce biological habitats, each highly sensitive to hydrological changes. However, given its distance of over 3.6 km from the proposed development and the absence of hydrological connectivity, no impact pathways have been identified. Consequently, this receptor has been scoped out of further assessment.
Rosemarkie and Shandwich Coast – SSSI c.5.6 km west of the site	This site is valued for its diverse geological features, as well as important coastal habitats such as maritime cliffs, and sand dunes. However, with no identified impact pathways and a separation distance of over 5.6 km from the proposed development, this receptor has been scoped out of further assessment.
The Dens – SSSI c.6.6 km west of the site	This site is designated for its nationally important mass movement geomorphology. However, as the site lies over 6.6 km from the proposed works and no impact pathways have been identified, it has been scoped out of further assessment.
Cawdor Wood – SSSI c.7.2 km south of the site	This site is designated for its nationally important upland oak woodland and lichen assemblages. However, as the site is located over 7.2km from the proposed development and lacks hydrological or ecological connectivity, no impact pathways have been identified. Therefore, this receptor has been scoped out of further assessment.
Cawdor Wood – SAC c.7.2 km south of the site	This site is designated for its Annex I habitat “old sessile oak woods with Ilex and Blechnum,”. However, due to its location over 7.2 km from the proposed development and the absence of hydrological connectivity, no direct or indirect impact pathways have been identified. Therefore, this receptor has been scoped out of further assessment.
Culbin Bar – SAC c. 8.8 km east of the site	Culbin Bar SAC has been scoped out of the terrestrial ecology chapter, with all potential impacts on its nationally important features addressed in the relevant specialist chapters: EIAR Chapter 10 (Coastal Processes & Geomorphology). The Annex I habitats at Culbin Bar and Lower River Spey, Spey Bay—including 1220 Perennial vegetation of stony banks—are of high conservation value and represent unique shingle complexes in Scotland. However, this site is located over 8.8 km from the proposed works and is not hydrologically or physically connected to the dredging or piling zones. No plausible impact pathway has been identified between the project and the qualifying features of this site. As such, this receptor has been robustly scoped out of further assessment in the terrestrial ecology chapter.
Culbin Sands Forest and Findhorn Bay SSSI c.7.8 km east of the site	No impact pathway identified. Site is >7.8 km away and not connected to dredging or piling zones. As such, this receptor has been scoped out of further assessment.
Longman and Castle Stuart Bays SSSI	No impact pathway identified. Site is >7.3 km away and not hydrologically connected to the works, therefore, this receptor has been scoped out of further assessment.

Ecological Receptor	Reason
c.7.3 km southwest of the site	
Ancient woodland – I.D. 6357	Although close to the site boundary, this parcel is of plantation origin and does not support semi-natural ancient woodland features. No direct or indirect impacts are anticipated due to embedded buffer zones and lack of connectivity to construction areas.
Ancient woodland – I.D. 7052	Located outside the Zone of Influence (Zoi) for terrestrial works. No hydrological or ecological connectivity to the proposed development footprint. Plantation origin further reduces sensitivity.
Ancient woodland – I.D. 3634	Too distant to be affected by construction or operational activities. No pathways for disturbance, pollution, or fragmentation. Plantation origin and lack of qualifying ancient woodland indicators support exclusion.
Building u1b5	Buildings on site have been scoped out because, as physical structures, they are not considered an ecological receptor of intrinsic value under EclA methodology. Their ecological relevance arises solely from supporting bat roosts, which are European Protected Species (EPS) and therefore assessed separately as a high-sensitivity receptor in this chapter. This approach avoids duplication and ensures that the assessment focuses on the species and their legal protection rather than the built fabric, which does not independently contribute to biodiversity value.
Modified grassland g4	Intensively managed and species-poor; not considered of conservation importance.
Great crested newt	Seven ponds were surveyed, and habitat suitability for GCN was evaluated as ranging from Poor to Below Average based on standard assessment criteria. The eDNA analysis conducted on water samples from each pond returned negative results, indicating no detectable presence of GCN at the time of sampling.
Water vole	Although the survey area contains suitable habitats for resting, foraging, and commuting, no field signs indicative of water vole presence were recorded during the surveys. Evidence of key predators was observed, including plucks, both recent and historic nests, and incidental sightings of raptors such as Buzzards. Anecdotal reports also suggest the presence of domestic cats and pine martens within the area. Supporting these findings, no historical records of water vole have been identified within a 1 km radius of the proposed development, based on available online databases.
Invasive species	No Invasive Non-native Species (INNS) were recorded within the site.
Groundwater Dependent Terrestrial Ecosystems (GWDTE)	The habitat-focused survey confirms that, while some habitats (e.g. M6c–M23b mosaic and MG10a neutral grassland) are listed as potentially groundwater-dependent, site-specific assessment found these areas to be surface water dependent rather than true GWDTE. This is supported by the local hydrogeology, shallow depressions, proximity to drains, and absence of groundwater discharge or chemical indicators. Therefore, GWDTE are not present in a site-specific context and can be robustly scoped out of the EclA chapter, as their inclusion is not justified by the baseline evidence.

12.4.4 Important Ecological Features

This section qualifies the Important Ecological Features of the assessment and assigns their importance following judgement or evidence of their value or sensitivity in relation to the proposed development.

- Importance is taken from a schedule of geographic criteria and can relate to quality or extent of designated sites or habitats, to habitat/species rarity, to the extent to which they are threatened throughout their range, or to their rate of decline.
- Value is defined as a judgement of conservation value or contribution to conservation objectives.
- Sensitivity is defined as sensitivity to an environmental change.

Table 12.5 Summary of the value/sensitivity/importance of receptors.

Feature, Distance, Orientation	Importance	Reasoning
Gorse scrub (h3e) Onsite	Site	Gorse scrub is common and widespread in the region and is not listed as a priority habitat in the SBL or LBAP. It is structurally valuable for some generalist species but is highly resilient and regenerates quickly after disturbance. Its loss would not affect conservation objectives at any scale above the site. Therefore, value, sensitivity, and importance are all low.
Other Scot's Pine woodland (w2b) Onsite	Local	Although Scots Pine woodland is listed as a Priority Habitat on the Scottish Biodiversity List (SBL) and in the Highland LBAP, and would typically be considered of national value, the woodland in question is a commercial plantation of poor condition, lacking structural diversity and natural regeneration. Plantation pine is not nationally scarce, is regionally abundant and not irreplaceable.
Other neutral grassland (g3c) Onsite	Site	This semi-improved grassland has limited species diversity and is not listed in the SBL. It may support generalist fauna but lacks conservation priority. The habitat is degraded and resilient to disturbance, so sensitivity is low. Its limited ecological function and lack of priority status mean it is of low importance.
Lowland dry acid grassland (g1a) Onsite	Local	This habitat is listed as a Priority Habitat in the SBL and supports acid-tolerant flora and bryophytes. However, the patch within the site is small, fragmented, and of moderate condition, with limited species diversity. While it is sensitive to soil disturbance and hydrological changes, it does not represent a significant or irreplaceable example of the habitat.
Mixed scrub (h3h) Onsite	Site	Mixed scrub is a mosaic of gorse, broom, and heather, typical of successional or disturbed areas. It is not a priority habitat and has limited conservation value. It is low in sensitivity due to its ability to regenerate and adapt to environmental changes. Its structural diversity is noted, but lack of priority status means low importance.
Dry heaths; lowland (h1a5) Onsite	Local	This habitat is an Annex I habitat under the Habitats Directive and a Priority Habitat in the SBL, which would usually indicate national or even international value. However, the patch within the site is relatively small and isolated, though in good condition. Its sensitivity is high due to slow recovery and vulnerability to fragmentation, but its overall importance is at the local scale, as it does not represent a significant proportion of the national resource and is not directly connected to larger, more significant heathland habitats.

Feature, Distance, Orientation	Importance	Reasoning
Acid peat-stained lakes and ponds (r1c7) Onsite	Local	These ponds are ecologically distinct and qualify as Annex I and SBL Priority Habitats. Their rarity and aquatic biodiversity confer value, but their condition is poor, lacking aquatic vegetation. Local importance is assigned due to its semi-natural character.
Upland birchwood (w1e) Onsite	County	Upland birchwood is a Priority Habitat in the SBL and Highland LBAP, supporting protected species and contributing to biodiversity and connectivity. Birch species are not regionally scarce and so a county level of importance is applied.
Other lowland acid grassland (g1d) Onsite	Local	Included under broader acid grassland types in the SBL, this habitat supports transitional flora. It is a habitat which is fairly widespread in the region, but not present in all areas
Wet heathland with cross-leaved heath; lowland (h1a7) Onsite	Local	This Annex I and Scottish Biodiversity List (SBL) Priority Habitat is in good condition but is sensitive to hydrological changes and slow to recover, making it vulnerable to disturbance. While it is relatively widespread and semi-natural in the local area, a National Vegetation Classification (NVC) survey confirmed that no peatland, deep peat, or Groundwater Dependent Terrestrial Ecosystems (GWDTEs) are present. Full results are provided in EIA Appendix 12.13.
Badger Onsite	Site	Badger are a common and widespread species, widespread across the region. They are moderately sensitive to disturbance, especially during breeding and foraging, and are vulnerable to habitat fragmentation due to reliance on sett networks and territorial behaviour.
Otter Onsite	Local	Otter are EPS and legally protected, but no field signs or confirmed activity were found during the survey. As a species they are considered ubiquitous to British waterways and can be expected to be present in the wider landscape. They are sensitive to disturbance when using resting sites and holts.
Pine marten Onsite	County	Pine marten were confirmed present on site via scat and camera trap footage. The site offers habitat with suitable denning features, supporting a county value. Pine marten are highly sensitive to disturbance, especially during breeding, and rely on specific denning features. In a period of species recovery at a UK level, the highland region is considered to host a healthy population.
Red squirrel Onsite	County	The site supports a healthy population with 36 active dreys recorded. Red squirrel are legally protected and vulnerable to habitat loss, supporting county value. They are highly sensitive to disturbance and habitat fragmentation, especially during breeding and foraging. In a period of species recovery at a UK level, the highland region is considered to host a healthy population.
Bats Onsite	County	Multiple bat species were recorded, including confirmed maternity roosts of common and widespread species. Bats are EPS and listed in the Highland LBAP, supporting county value. If future evidence indicates the roosts are of exceptional size or conservation status, this should be reviewed. They are highly sensitive to disturbance, particularly from lighting, noise, and habitat fragmentation during breeding.

Feature, Distance, Orientation	Importance	Reasoning
Reptiles Onsite	Site	Confirmed presence of common lizard and toad supports local value. These species are widespread but legally protected. They are moderately sensitive to habitat disturbance and fragmentation, especially during breeding and hibernation.

12.5 POTENTIAL IMPACTS

This section describes predicted ecological impacts and resultant effects during the construction and operation phases of the proposed development on designated sites, habitats, and species.

12.5.1 Construction

During the construction phase of the proposed development, the main impacts on the site will include the permanent loss of habitat; the potential for habitat damage, injury or direct mortality of protected and notable species, and disturbance of protected and notable species (i.e. noise, lighting, visual).

Habitats

The construction phase will result in the direct loss and fragmentation of multiple habitat types, including Annex I and Priority Habitats such as lowland dry acid grassland, wet heathland, and dry heaths. The dominant habitat types that will be lost to facilitate the development are Other Scot's Pine woodland, Mixed scrub, and Wet heathland with cross-leaved heath; lowland. Soil stripping, vegetation clearance, and construction access will cause physical disturbance, loss of structural diversity, and disruption of hydrological regimes. These impacts are likely to be long-term and irreversible, especially for habitats with slow recovery potential such as wet heathland and dry heaths.

Protected, Priority and Notable Species

Construction activities associated with the proposed development present significant risks to a range of protected and notable species. The removal of buildings will directly affect bats through the loss of confirmed roosts (located in Juniper Cottage Buildings 2 and 3). The clearance of habitats used by bats, badger (10 total setts), red squirrel (36 dreys recorded), pine marten (numerous suitable denning features present), and reptiles will result in the permanent loss of important commuting, foraging, and resting site habitats within the terrestrial extension area. In addition, construction traffic poses a risk of injury or mortality to fauna moving through the site, and elevated levels of noise and artificial lighting during works may displace species or alter their behaviour within retained adjacent habitat.

12.5.2 Operation

During the operational phase, the site will function as an industrial landscape with minimal landscaping. The primary ecological considerations relate to potential indirect effects from operational activities, including noise, lighting, and vehicle movements associated with routine maintenance.

Designated Sites

- Artificial lighting associated with security and operational requirements may result in light spill towards adjacent habitats, potentially affecting nocturnal species. Lighting will be directional and designed to minimise spill beyond the site boundary in accordance with best practice outlined in EIAR Chapter 5 (Additional Information and Assessments).

Habitats

- The operational footprint will remain largely hardstanding and industrial in character, with limited landscaped areas. Habitat management will focus on maintaining and enhancing retained and created habitats.
- No additional land-take or habitat loss is expected during operation. Habitat continuity with surrounding areas will be maintained, which includes measures to control invasive species and promote native vegetation.

Protected, Priority and Notable Species

- Noise and lighting during operation may influence the behaviour of species such as bats, pine marten, and red squirrel in adjacent habitats. However, lighting will be controlled to minimise spill, and operational activity will primarily occur during daylight hours, reducing potential disturbance to nocturnal species.
- Routine maintenance activities are limited in frequency and scale and are not expected to result in disturbance, injury, or mortality of protected species.
- Habitat management measures, including the retention of woodland edges and scrub, will continue to provide foraging and commuting opportunities for bats, red squirrels, and other species.
- No operational impacts are anticipated on amphibians, reptiles, as no further habitat clearance will occur post-construction.

12.6 Mitigation And Enhancement

12.6.1 Embedded mitigation

The proposed development design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the proposed design. This is referred to as embedded mitigation (or design interventions). The principles of the design and mitigation hierarchy outlined in EIAR Chapter 2 (Methodology) have been followed.

The first principle being to avoid potential adverse impacts, if at all practicable, before seeking to minimise or mitigate for any unavoidable impacts. Embedded mitigation for the proposed development is reported in EIAR Chapter 3 (Project Description) which also includes a description of the design alternatives that have been considered, including the environmental factors which have influenced the decision-making. Mitigation measures will seek to reduce impacts during both construction and operation phases. Any effects which cannot be mitigated or reduced are referred to as residual effects.

12.6.2 Mitigation

Mitigation is included in the Outline Construction Environmental Management Document (CEMD). The Outline CEMD will be developed into the Construction Environmental Management Plan (CEMP) for implementation during construction. Further information on the Outline CEMD is provided within EIAR Chapter 3 (Project Description). EIAR Chapter 15 (Schedule of Mitigation and Enhancements) provides a summary of the mitigations identified within this EIAR.

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

Additional mitigation measures will address impacts during construction and operation. Any effects that cannot be fully mitigated are identified as residual effects in Section 12.7. A summary of embedded, construction-phase, and operational mitigation measures, including species protection, habitat management plan (HMP), habitat compensation, pollution control, and monitoring, is provided in EIAR Appendix 12.4.

Avoidance

Principle: Prevent impacts before they occur, through design and planning.

- Iterative proposed development design to avoid sensitive habitats and species (see “Embedded Mitigation”).
- Where practicable, schedule works outside sensitive periods for qualifying ecological features to avoid disturbance.

- Retaining habitat margins and boundary features (e.g., scrub, woodland) wherever practicable to maintain ecological connectivity.
- Settle closure works will only occur between 1st July and 30th November (inclusive), outside the period when dependent young are present, and under licence where required.
- Pre-works checks by an experienced ecologist to avoid direct injury or mortality to protected species.

Reduce

Principle: Reduce the scale or intensity of unavoidable impacts.

- Ecological monitoring and guidance during works in sensitive periods.
- Avoid intense disturbance and apply species-specific standoff/temporal controls where relevant.
- Establishing buffer zones and sediment controls to prevent runoff to adjacent designated sites.
- Directional lighting to reduce visual disturbance (see EIAR Appendix 5.2).
- Retaining boundary woodland blocks and maintaining connectivity for woodland species.
- Staggering forestry operations to encourage dispersal of protected species.

Mitigation (On-site Measures)

Principle: Implement measures to remedy or offset impacts during and after works.

- Implementation of the Outline Construction Environmental Management Document (CEMD), subsequent CEMP, and HMP.
- Toolbox Talks and translocation procedures for unexpected species encounters.
- ECoW (Ecological Clerk of Works) supervision for compliance with Species Protection Plans (SPPs).
- Pollution prevention measures: bunded fuel storage, spill kits, designated refuelling areas.
- Installation of artificial refugia and translocation for reptiles prior to vegetation clearance.
- Installation of bat boxes, pine marten den boxes, and red squirrel drey boxes in retained habitats.
- Habitat restoration along woodland edges (e.g., selective thinning, deadwood creation).

Compensation (Off-site or Additional Measures)

Principle: Compensate for residual impacts that cannot be avoided, reduced or mitigated.

- Off-site compensatory planting to replicate lost Scot's Pine commercial woodland, with up to 10% native broadleaf component and habitat features.
- Creation of compensatory wetland and heathland habitats within a 2ha on-site donor area (located within the site), which is currently at concept stage.
- Artificial sett creation for badger, bat barn for maternity roost replacement, and enhancement of retained woodland for pine marten and red squirrel (final locations will be confirmed in the Habitat Management Plan in accordance with licensing requirements for protected species).

12.6.3 Enhancements

No specific enhancement measures are proposed.

12.6.4 Monitoring

Monitoring

Principle: Ensure effectiveness of mitigation and compensation through ongoing monitoring and adaptive management.

- Annual monitoring of artificial features (bat boxes, dens, dreys) for occupancy and condition.
- Seasonal surveys for key species (bats, red squirrel, pine marten).

- Vegetation surveys to assess native planting and seedbank establishment.
- Adaptive management based on monitoring results.

12.7 ASSESSMENT OF SIGNIFICANT EFFECTS

This section assesses the level and significance of the residual effects of the proposed development on terrestrial ecology receptors during both construction and operation with the mitigation described in Section 12.6 in place. Residual effects are the predicted ecological impacts that remain after mitigation measures have been applied, and are considered significant if they affect the integrity, conservation status, or viability of ecological receptors, in line with CIEEM EclA Guidelines (2024)^{Error! Bookmark not defined.}.

12.7.1 Construction phase

Table 12.6 and **Table 12.7** summarise the important ecological features, potential impact pathways in the absence of mitigation, proposed mitigation to address the effect, and any residual impacts during the construction phase.

Habitats

Table 12.6 Habitat impact assessment for the construction phase.

Ecological Receptor	Geographic importance	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual effects
Gorse scrub (h3e)	Site	Direct loss due to clearance.	- Retain boundary scrub where practicable; - Incorporate scrub species in landscaping.	Minor adverse effects at Site level
Other Scot's Pine woodland (w2b)	Local	Direct loss of plantation woodland.	- Retain boundary woodland habitats and augment to enhance structural and plant diversity; - Compensatory off-site woodland planting.	No likely significant effects at Local level
Other neutral grassland (g3c)	Site	Direct loss of semi-improved grassland.	- Retain margins in buffer strips - Seed mixes in landscaping to replicate structure; - Habitat restoration in retained areas.	Minor adverse effects at site level
Lowland dry acid grassland (g1a)	Local	- Direct loss of habitat; - Soil disturbance; - Direct loss of acid-tolerant flora and bryophytes.	- Retain patches in buffer zones; - Seed mixes in landscaping to replicate structure; - Restoration post-construction.	Minor adverse effects at Local level
Mixed scrub (h3h)	Site	- Direct loss of mosaic scrub; - Direct loss of structural diversity.	- Where practicable, the objective will be to recreate suitable habitat using a 2 ha on-site donor area. The detailed design and implementation measures will be set out in the Habitat Management Plan (HMP); - Where practicable, include mosaic structure in landscaping; - Incorporate scrub species in landscaping.	Minor adverse effects at Site level
Dry heaths; lowland (h1a5)	Local	- Direct loss of Annex I habitat; - Fragmentation; - Slow recovery potential.	Where practicable, the objective will be to recreate suitable habitat using a 2 ha on-site donor area. The detailed design and implementation measures will be set out in the HMP.	Minor adverse effects at Local level
Acid peat-stained lakes and ponds (r1c7)	Local	- Direct loss of aquatic habitat; - Changes to hydrology and water chemistry.	- Retain pond in located in the eastern boundary; - The objective will be to seek to recreate acid peat-stained lakes and ponds within a 2-hectare on-site donor area, thereby contributing to the restoration of	Minor adverse effects at Local level

Ecological Receptor	Geographic importance	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual effects
			wetland habitat. The detailed design and implementation measures will be set out in the HMP.	
Upland birchwood (w1e)	County	Direct loss of mature woodland structure and associated biodiversity during construction.	- Where practicable (i.e. along the western boundary) retain boundary woodland; - Include birchwood planting within the compensatory off-site woodland planting; - Maintain connectivity.	Minor adverse effects at County level
Other lowland acid grassland (g1d)	Local	- Habitat removal; - Soil disturbance; - Direct loss of transitional flora.	- Where practicable, retain margins; - Re-use soils in habitat creation; - Habitat restoration in retained areas.	Minor adverse effects at Local level
Wet heathland with cross-leaved heath (h1a7)	Local	- Direct loss of Annex I habitat; - Hydrological disruption; - Slow recovery.	The objective will be to seek to recreate Wet heathland with cross-leaved heath within a 2-hectare on-site donor area. Detailed design will be detailed in the HMP.	Minor adverse effects at Local level

Protected, Priority and Notable Species

Table 12.7 Protected, priority and notable species impact assessment for the construction phase.

Ecological Feature	Geographic importance	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual impacts
Badger	Site	- Damage or destruction of setts (Detailed sett information is provided separately in Confidential EIAR Appendix 12.6) - Disturbance to badgers through increased noise, lighting, and site activity - Displacement of badgers from foraging areas - Increased potential for road mortality due	- Prepare and implement a Badger Species Protection Plan (SPP) before works. - Repeat pre-construction survey within 3 months of works to confirm presence/activity. Avoidance - Maintain ≥ 30 m buffers around active setts (100 m for high-noise/vibration works). - Where practicable, schedule disruptive works outside 1 Dec–30 Jun where practicable. - Retain commuting corridors and avoid sett destruction where practicable. Mitigation	No likely significant effects at Site level

Ecological Feature	Geographic importance	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual impacts
		to increased volumes of construction traffic.	- If seasonal constraints cannot be avoided and buffers aren't practicable, obtain a NatureScot licence and implement a Badger SPP. - Appoint an ECoW for Toolbox Talks and compliance monitoring. - Where required, install badger gates, and signage; enforce speed limits; direct lighting away from setts and corridors. Compensation - Provide artificial setts under licence, informed by bait-marking surveys if required. - Where practicable, reinstate habitat connectivity post-construction; monitor sett activity and foraging behaviour. - Improve on- and off-site foraging habitat (e.g., grasslands).	
Otter	Local	- Potential damage or destruction of holts / resting place - Disturbance to otter through increased noise, lighting, and Site activity - Displacement of otter from traditional foraging areas - Increased potential for road mortality due to increased volumes of construction traffic.	- Prepare and implement an Otter SPP during works. - Repeat pre-construction survey within 3 months of works to confirm otter presence/activity within 200 m of the site. - Deliver Toolbox Talks to site teams on otter protection measures.	Not significant at a Local level
Pine marten	County	- Potential damage or destruction of dens / resting place - Disturbance to pine marten through increased noise, lighting, and site activity - Displacement of otter from traditional foraging areas - Increased potential for road mortality due to increased volumes of construction traffic.	- Prepare and implement a Pine Marten Species Protection Plan (SPP) before works. - Repeat pre-construction survey within 3 months of works to confirm presence/activity. Avoidance - Survey suitable habitats using camera/thermal aids; maintain 30 m buffers for non-breeding dens and 100 m for breeding dens. - Where practicable, avoid disturbance during March–August; schedule felling outside this period. Mitigation	Minor adverse effect at County level

Ecological Feature	Geographic importance	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual impacts
			- If seasonal constraints cannot be avoided and buffers aren't practicable or dens must be removed, obtain a NatureScot licence and follow the SPP. - Deliver Toolbox Talks; implement emergency procedures; enforce speed limits and signage; soft-start machinery; consider licensed translocation under the Scottish Code. Compensation - Enhance retained woodlands; install artificial dens/nest boxes; collaborate on conservation translocations.	
Red squirrel	County	- Direct loss of nesting and foraging habitat through vegetation clearance and felling of Scots pine and Mixed woodland. - Destruction of active dreys, which are used for shelter and breeding. - Loss of habitat connectivity, reducing movement between woodland blocks and increasing isolation. - Increased disturbance from construction activities, noise, and human presence. Without mitigation, the development would result in: - Local population decline due to loss of shelter, food sources, and breeding sites. - Displacement of individuals into suboptimal or already occupied habitats, increasing competition and mortality.	Prepare and implement a Red Squirrel Species Protection Plan (SPP) before works. Avoidance - Where practicable, schedule felling outside Feb–Sept where practicable; appoint an ECoW to monitor dreys and advise on avoidance/licensing. Mitigation - If seasonal constraints cannot be avoided and destruction of dreys cannot be avoided, obtain a NatureScot licence and follow the SPP. - Where practicable, maintain trees around the perimeter of the proposed extension area (at least 10m) to provide a connecting pathway to any adjacent woodland. - Deliver Toolbox Talks; implement emergency procedures; enforce speed limits and signage; stagger felling and soft-start machinery; repeat pre-construction surveys within 3 months; consider licensed translocation under the Scottish Code. Compensation - Plant new woodland to compensate for woodland loss; enhance retained woodlands; install artificial dreys/nest boxes in retained habitats and new woodland	Minor adverse effect at County level

Ecological Feature	Geographic importance	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual impacts
		Potential breach of legal protections, as red squirrels are protected under the Wildlife and Countryside Act 1981, making it an offence to disturb or destroy active dreys.	creation; collaborate on conservation translocations if required.	
Bats	County	The following activities are associated with the proposed extension of the port re-development area: - Felling operations; - Demolition of structures; increased workforce and mechanised plant movement within 30m of a confirmed roost; and - Increased nuisances associated with construction activity (e.g., dust, light, noise pollution). Such activities are anticipated to pose significant direct and indirect impacts to roosting bats, including but not limited to damage/destruction of roosts; severe injury or fatality to roosting bats; and disturbance to roosting, commuting and foraging bats.	Prepare and implement a Bat Species Protection Plan (SPP) before works. Avoidance - Where practicable, schedule outside occupancy periods (May–Sept for summer roosts; Nov–Mar for hibernacula). Mitigation - If works within occupancy periods are unavoidable, obtain a NatureScot licence and follow the SPP. - For roost loss, secure a derogation licence, time works for bat absence, and supervise demolition by a licence holder. - Site-specific: Juniper Cottage Buildings 2 and 3 require derogation licences; exclusions in April or Sept–Oct; provide compensatory roosts in advance and monitor effectiveness. - Deliver Toolbox Talks; implement emergency stop-work procedures; schedule works in daylight; avoid plant movement near dusk/dawn; direct lighting away from roosts or screen as needed; retain ≥ 10 m tree belts; conduct pre-felling PRF checks within 3 months; inspect PRF trees April–Sept; repeat surveys if >18 months elapse. Compensation - Install a purpose-built bat roost (“bat barn”) designed to support a maternity colony. - Install bat boxes (e.g., Schwegler types) and integrate roost features into new structures; translocate PRF-bearing timber to retained trees; create new PRFs in retained trees; plant insect-friendly vegetation; maintain connectivity via	No likely significant effects at County level

Ecological Feature	Geographic importance	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual impacts
			corridors/underpasses; reuse suitable timber in new structures.	
Reptiles	Site	Habitat clearance will result in the loss of suitable habitat for common lizards and common toads, including basking areas, refugia, and hibernacula. Destruction of refugia and hibernation sites may cause direct mortality or injury to reptiles sheltering within. Disturbance during active or hibernation periods could lead to displacement, stress, or death. Fragmentation of habitat may reduce connectivity and isolate individuals from viable populations. Effect on Ecological Receptors: Without mitigation, the development would cause: • Direct harm or killing of reptiles, breaching protections under the Wildlife and Countryside Act 1981. • Local population decline due to loss of shelter and breeding habitat. • Reduced ecological function of the site for reptile species.	Mitigation • Implement a SPP and deliver Toolbox Talks. • Install reptile mats before clearance, allow settling time, then check and translocate reptiles to a suitable adjacent receptor site under ecologist supervision. • Soft-dismantle refugia by hand under ecologist supervision; relocate reptiles if found (April–Sept). Compensation • Create reptile refugia in woodland compensation scheme; enhance retained habitat (e.g., varied sward grasslands, south-facing banks).	Minor adverse effect at Site level

12.7.2 Operational phase

This section assesses the level and significance of residual effects on terrestrial ecological receptors during the operational phase of the proposed development, with all mitigation measures described in Section 12.6 in place. Residual effects are considered significant if they affect the integrity, conservation status, or viability of ecological receptors.

Table 12.8 Assessment of Significant Effects at Operational Phase.

Ecological Feature	Geographic importance	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual impacts
Retained Habitats (Woodland edges, scrub, grassland)	Local / County	Indirect disturbance (incursion, lighting, noise); risk of invasive species	Habitat Management and Enhancement - Where practicable, recreate suitable habitat using a 2 ha on-site donor area; detailed design and implementation will be set out in the Habitat Management Plan (HMP). - Implement habitat creation or restoration measures. Control of Invasive Species - Monitor and manage invasive non-native species. Promotion of Native Vegetation - Use locally appropriate native species in planting schemes. Species Protection Plans - Prepare and implement species-specific protection plans as detailed in the mitigation appendix (e.g., bats, badgers, otters, red squirrels). Species-Specific Measures - Maintain compensatory bat roost features. - Monitor and maintain artificial dreys (for red squirrels).	Not significant
Bats	County	Light spill, noise, disturbance		Not significant
Red Squirrel	County	Noise, lighting, disturbance		Not significant
Pine Marten	County	Noise, lighting, disturbance		Not significant
Badger	Site	Noise, lighting, disturbance		Not significant
Amphibians & Reptiles (Common lizard, common toad)	Local / Site	None (no further habitat clearance)		Not significant

Ecological Feature	Geographic importance	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual impacts
Other Protected/Notable Species	Local / Site	Occasional disturbance	• Monitor and maintain artificial dens (for otters). • Monitor and maintain artificial setts (for badgers). Lighting Control • Implement sensitive lighting design to maintain dark corridors and reduce disturbance. Retention of Key Features • Retain woodland edges and commuting corridors. Traffic and Access Management • Maintain designated speed-controlled routes to reduce wildlife collisions.	Not significant
Habitats (General)	Local / County	Indirect disturbance; risk of invasives	• Habitat management; • Control of invasives	Not significant

12.8 CUMULATIVE EFFECTS

Cumulative effects have been assessed by reviewing all consented and proposed developments within a 15 km Zone of Influence (Zoi), as detailed in EIAR Chapter 13 (Ornithology) and the EIAR Chapter 14 (Cumulative Effects). Each project was screened for potential to affect the same Important Ecological Features (IEFs) as the proposed development, considering both spatial and temporal overlap. No other developments were identified that would result in overlapping habitat loss, fragmentation, or disturbance to the same IEFs during the same period. Embedded mitigation and compensation measures further reduce the potential for cumulative effects. Therefore, no significant cumulative effects are predicted.

12.9 STATEMENT OF SIGNIFICANCE

The assessment of likely significant effects on terrestrial ecology from the proposed development has been undertaken in accordance with the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (2024)¹. The significance of effects has been determined with reference to the value and sensitivity of ecological features, the magnitude and duration of predicted impacts, and the effectiveness of proposed mitigation, compensation, and enhancement measures.

Construction Phase:

With the implementation of the mitigation hierarchy (avoidance, reduction, mitigation, compensation), the majority of residual effects on important terrestrial ecological features are assessed as **not significant** at their respective geographic scales. Direct losses of habitats, including areas of Scots pine plantation, lowland dry acid grassland, wet heathland, and dry heaths, are unavoidable, but these are either of limited extent, of lower conservation value due to condition, or are subject to robust compensatory planting and habitat creation schemes. The loss of plantation woodland and upland birchwood is offset by off-site compensatory planting, agreed with statutory consultees, and designed to deliver equivalent or greater ecological functionality in the medium to long term.

For protected and notable species (bats, badger, red squirrel, pine marten, reptiles), the application of species-specific protection plans, licensing, and compensatory measures (e.g., artificial roosts, setts, dreys, and den boxes) ensures that the risk of significant adverse effects is minimised. **No significant residual effects** are predicted for these species at the county or site level, provided that all mitigation and compensation measures are implemented as described.

Operational Phase:

During operation, the site will be managed as an industrial landscape with retained and enhanced habitat margins. The principal risks relate to indirect disturbance (lighting, noise, vehicle movements), but these are controlled through embedded design measures and ongoing habitat management. No further land-take or habitat loss is anticipated. Residual effects on retained habitats and species are assessed as **not significant** at all geographic scales, with ongoing monitoring and adaptive management in place to ensure the effectiveness of mitigation.

Cumulative Effects:

A review of other developments within the zone of influence has not identified any projects likely to result in significant cumulative effects on important ecological features, either in combination with the proposed development or as part of wider landscape-scale impacts.

Conclusion:

In summary, with the full implementation of the mitigation, compensation, and monitoring measures set out in this chapter and its appendices, the proposed development is **not predicted to result in any significant residual adverse effects** on terrestrial ecological receptors at the international, national, county, or local scale.

The proposed development accords with the requirements of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, the Marine Works (Environmental

Impact Assessment) (Scotland) Regulations 2017, and relevant biodiversity policy objectives, including National Planning Framework 4 (NPF4).

NPF4 places the climate and nature crises at the heart of planning policy and requires that all national, major, and EIA developments deliver significant biodiversity enhancement, leaving nature in a demonstrably better state than before development. The proposed development aligns with NPF4 Policy 3 (Biodiversity) by applying the mitigation hierarchy, incorporating habitat creation and enhancement measures, and committing to long-term management and monitoring.

No significant residual adverse effects are predicted, and the proposed development includes compensatory planting and habitat enhancement that provide opportunities for biodiversity gain, consistent with NPF4's objective to secure positive effects for biodiversity and strengthen ecological connectivity.

This conclusion is based on the best available evidence and professional judgement, in line with the CIEEM EclA Guidelines (2024). Any uncertainties or limitations in the assessment have been addressed through the application of the precautionary principle and the commitment to ongoing monitoring and adaptive management.

ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION



November 2025



Chapter 13 Ornithology

Ardersier Port Extension

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13 ORNITHOLOGY

13.1 INTRODUCTION

This chapter presents information required by the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 to be provided in the Environmental Impact Assessment Report (EIAR) to enable the identification and assessment of likely significant effects on ornithology.

The approach to this assessment follows the methodology set out in the EIA Scoping Report (SCOP-0062) and is in accordance with the Scoping Opinion (25/00226/SCOP) produced by The Highland Council. EIAR Chapter 4 (Consultation) contains further information on how each of the matters raised in the Scoping Opinion have been addressed.

The overarching legislation, policy and guidance relating to ornithology in Scotland and relevant to this assessment of the proposed development are presented in EIAR Appendix 13.1.

The assessment has been undertaken in accordance with the methodology as set out in Section 13.3 below and in Appendix 13.2 which includes the study area, data sources used and the assumptions and limitations of the assessment. EIAR Chapter 3 (Project Description) contains a detailed description of the proposed development. This chapter is supported by the following EIAR appendices:

- EIAR Appendix 13.1: Legislation, policy and guidance
- EIAR Appendix 13.2: Methodology
- EIAR Appendix 13.3: Desk Study
- EIAR Appendix 13.4: Mitigation
- EIAR Appendix 13.5: Pinewood Birds Report
- EIAR Appendix 13.6: Breeding Birds Report
- EIAR Confidential Appendix 13.7: Raptors Report
- EIAR Appendix 13.8: Wader Monitoring Report
- EIAR Appendix 13.9: Report to Inform Appropriate Assessment (RIAA) – Habitats Regulations Assessment Stage 1 Screening for Likely Significant Effect and Stage 2 Appropriate Assessment
- EIAR Appendix 13.10: Literature Review (displacement and collision risk, species sensitivity, behavioural adaptation)

Due to the potential risk of disturbance and illegal persecution, site-specific data relating to certain raptor species is considered environmentally sensitive and has therefore been excluded from the main body of this report. Detailed information is provided separately in Confidential EIAR Appendix 13.7. This appendix must not be published or made publicly accessible unless all references to nest locations, flight lines, and roost sites have been fully redacted, in accordance with legal and ethical obligations under the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act 2004. These Acts make it an offence to intentionally or recklessly disturb Schedule 1 species while nesting, or to harass species listed on Schedules 1A and A1.

This chapter assesses likely significant effects on ornithological receptors under the EIA Regulations, while screening for Likely Significant Effect (LSE) and Appropriate Assessment (AA) for Habitats sites is provided in EIAR Appendix 13.9. The RIAA, applying the People over Wind principle and securing enforceable measures through the Construction Environmental Management Plan (CEMP)/Habitat Management Plan (HMP), lighting and vessel protocols, and Ecological Clerk of Works (ECOW) oversight, concludes no adverse effect on site integrity (AEoI) for the Inner Moray Firth Special Protection Area

(SPA) & Ramsar and Moray Firth SPA. The proposed development also includes assembly and tow-out of floating offshore wind turbines, introducing near-shore vessel movements; the RIAA specifically addresses tow-out impacts on the Inner Moray Firth SPA and Moray Firth SPA and confirms no AEoI with vessel-management protocols in place. This EclA therefore signposts integrity conclusions to EIAR Appendix 13.9 and focuses on EIA significance in parallel.

HRA/EIA signposting and avoidance of duplication. HRA-specific evidence, analysis and the integrity test for Habitats sites are consolidated in EIAR Appendix 13.9. This chapter only:

- (i) summarises pathways and receptors where that helps the EIA narrative, and
- (ii) signposts to EIAR Appendix 13.9 for the full HRA reasoning and enforceable measures.

To avoid duplication, any HRA-critical measures are referenced here at high level and secured in the Outline CEMD → CEMP/HMP and method statements, with the detailed HRA justification remaining in EIAR Appendix 13.9.

The study area includes both the terrestrial extension land proposed for development (comprising woodland, scrub, and grassland habitats) and the adjacent marine environment affected by proposed dredging activities. The Zone of Influence (Zoi) has been defined to capture direct and indirect effects on ornithological features, including designated sites and important bird populations.

13.2 CONSULTATION

Responses in relation to the statutory consultation undertaken are presented in the EIAR Chapter 4 (Consultation). Following production of the EIA Scoping Report the following consultation has been undertaken.

Following receipt of the Scoping Response from THC, a supplementary meeting was held at which the proposed programme of ecological study was outlined (28th May 2025). It was further clarified that compensatory woodland planting would occur off-site, which would reduce the significance of the habitat removal effect at a county level.

The scope and approach to the Ornithology assessment have been informed by:

- (i) the Marine Directorate, Licensing Operations Scoping Opinion for the Ardersier Port Extension (June 2025), which sets out the expected EIA content, scope decisions and the need for clear mitigation and monitoring measures; and
- (ii) subsequent client and consultee feedback relayed through the project correspondence. Key points relevant to this chapter are the requirement to present a transparent EIA scope (what is assessed and why) and to provide a measurable Schedule of Mitigation with any associated monitoring.

Consistent with the Marine Directorate, Licensing Operations Team Scoping Opinion, ornithology is scoped into HRA (screening and AA) for the Inner Moray Firth SPA & Ramsar and Moray Firth SPA, with marine mammals and associated designated sites addressed separately under EIAR Chapter 11 (Marine Mammals) / Marine Licence HRA. This scope and the regulatory test of site integrity are documented in EIAR Appendix 13.9 and underpin the signposting used in this chapter.

A literature review on displacement and collision risk for SPA species (EIAR Appendix 13.9) has been used to support the assessment approach and assumptions.

The design and location of compensatory planting were consulted upon with NatureScot in July and August 2025, whereby a suitable location for the planting project was agreed in a manner that would not raise an objection from this natural heritage consultee.

13.3 METHODOLOGY

The Ornithological Impact Assessment has been undertaken in accordance with the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Version 1.3, 2024)¹. The assessment combines desk-based research with targeted bird surveys to identify and evaluate likely significant effects of the proposed development on ornithological receptors.

Scope and Zone of Influence (Zoi):

The Zoi was defined to encompass direct and indirect effects on bird populations, including potential disturbance, displacement, and habitat loss. Desk studies drew on data from the National Biodiversity Network (NBN) Gateway², MAGIC³, local bird records, and aerial imagery. Search radii were applied as follows:

- 10 km for internationally designated sites (Special Protection Areas (SPA), Special Areas of Conservation (SAC), Ramsar sites);
- 2 km for nationally designated sites (SSSI) and locally designated sites relevant to ornithology; and
- 2 km for ornithological records from local recording centres and national databases.

Valuation of Ornithological Receptors:

Bird species and assemblages were evaluated for importance, value, and sensitivity using geographic criteria (International, National, Regional, County, Local, Site). Key considerations included:

- Conservation status (e.g., Annex I Birds Directive, Schedule 1 Wildlife and Countryside Act, Birds of Conservation Concern);
- Population size, distribution, and vulnerability;
- Functional role of habitats for breeding, foraging, roosting, or migration; and
- Connectivity to designated sites and wider ecological networks.

Impact Assessment:

Potential impacts were characterised by magnitude, duration, reversibility, and timing, with specific attention to seasonal sensitivity (e.g., breeding and overwintering periods). The significance of residual effects was determined following application of the mitigation hierarchy (avoidance, mitigation, compensation, enhancement) and assessed against relevant conservation objectives at the appropriate geographic scale.

Full details of survey methods, evaluation criteria, and supporting data are provided in EIAR Appendix 13.2.

Significance Matrix:

The significance of ecological effects has been assessed in accordance with CIEEM EcIA guidance (2018; updated 2023), which recommends considering both the importance of the ecological feature and the magnitude of the predicted impact. The matrix below provides a structured approach to assist professional judgment, supported by clear definitions for transparency.

Definitions

Importance (Value of Ecological Feature):

- International: Critical for global biodiversity (e.g., Ramsar site, SAC of global relevance).
- National: Key to maintaining UK biodiversity (e.g., SSSI, nationally rare species).
- Regional: Important within a region or county (e.g., Local Biodiversity Action Plan priority habitat).
- County: Important within a single county or administrative area.

¹ Chartered Institute of Ecology and Environmental Management (CIEEM). (2024). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Version 1.3. Winchester: CIEEM.

² National Biodiversity Network (NBN). (2025). NBN Atlas. Available at: <https://records.nbnatlas.org/explore/your-area>

³ Department for Environment, Food & Rural Affairs (defra). (2025). MagicMaps. Available at: <https://magic.defra.gov.uk/MagicMap.html>

- Local: Contributes to local ecological networks or green infrastructure.

Site: Features of value only within the development site or its immediate vicinity. Magnitude of Impact:

- Major: Permanent or long-term loss or severe degradation of feature integrity.
- Moderate: Partial loss or significant alteration, reversible only in the long term.
- Minor: Small-scale, short-term, or reversible change with limited effect on integrity.
- Negligible: No measurable effect on structure, function, or viability.

Significance of Effect:

- Significant: Likely to influence decision-making or require mitigation/compensation.
- Not Significant: No material influence on decision-making; minor or negligible effect.

Table 13.1: Significance Matrix

Importance	Major	Moderate	Minor	Negligible
International	Very High (Significant)	High (Significant)	Moderate (May be Significant)	Negligible
National	High (Significant)	Moderate (Significant)	Low (Not Significant)	Negligible
Regional	Moderate (Significant)	Low–Moderate	Low	Negligible
County	Low–Moderate	Low	Negligible	Negligible
Local	Low	Negligible	Negligible	Negligible
Site	Negligible	Negligible	Negligible	Negligible

Assumptions for disturbance and displacement of intertidal waders and waterfowl are supported by a client-provided literature review on collision and displacement of SPA species; species-specific parameters (e.g., sensitivity to visual/noise disturbance, typical flight/flush distances, and likely avoidance) are drawn from that review and applied conservatively where site-specific data are limited.

Potential effects that are principally marine ecology or hydrology in nature (e.g., changes to water quality; underwater noise; coastal processes) are addressed in those chapters. This chapter only assesses ornithological effects via terrestrial/intertidal pathways and provides cross-references where relevant.

13.4 BASELINE CONDITIONS

13.4.1 Desk Study

A desk study was undertaken to identify designated sites of ornithological interest within the vicinity of both the site and the dredge channel. A summary of internationally designated sites within 10 km, as well as nationally and locally designated sites within 2 km. Sites designated solely for ornithological features, which are unlikely to be affected by dredging activities, were excluded from the dredge channel assessment to maintain relevance. Full details of the desk study are presented in EIAR Appendix 13.3.

13.4.2 Field Surveys

Bird species identified as receptors for the site are listed in **Table 13.2**. It should be noted that during the survey seasons, substantial construction activity was underway for the consented port development, which may have influenced bird distribution and behaviour. Full details of the survey results, along with associated figures, are provided in the Appendices referenced in Section 1.1.

Table 13.2 Bird species

Species	Field Survey Result	Conservation status / Designation context
Breeding birds	42 species recorded (333 individuals) in 2025, including 10 red/amber-listed (BoCC 2021) and 3 UKBAP priority species: skylark (<i>Alauda arvensis</i>), song thrush (<i>Turdus philomelos</i>), and yellowhammer (<i>Emberiza citrinella</i>). Scrubland to SE supports high passerine diversity; Scots pine plantation supports corvids and raptors.	County/Regional (diverse assemblage, red/amber-listed and UKBAP species present).
Raptors	Detailed field survey information is provided separately in Confidential EIAR Appendix 13.7.	County/National (presence of Schedule 1, suitable woodland habitat).
Pinewood birds	20 species (2025), including Schedule 1 crested tit (<i>Lophophanes cristatus</i>) and common crossbill (<i>Loxia curvirostra</i>), red-listed woodcock (<i>Scolopax rusticola</i>), and 3 amber-listed. Breeding evidence for several species.	National (Schedule 1, red/amber-listed, pinewood specialists).
Waders (SPA/SSSI assemblage)	Oystercatcher (<i>Haematopus ostralegus</i>) (max 535), curlew (<i>Numenius arquata</i>) (max 132), bar-tailed godwit (<i>Limosa lapponica</i>) (max 305), knot (<i>Calidris canutus</i>) (max 387), redshank (<i>Tringa totanus</i>) (max 76), etc. High tide roosts mapped. Disturbance events: peregrine, dog walkers, kayakers, wildfowlers.	International/National (SPA/SSSI qualifying features).

13.4.3 Ecological Receptors Scoped Out

Table 13.3 summarises the ecological features that have been scoped out from further assessment and the reasoning behind the decision.

Table 13.3 Ecological receptors scoped out from further assessment.

Ecological Receptor	Reason
Moray and Nairn Coast SPA	This site is located approximately 8.2 km east of the proposed development. It is designated for osprey, bar-tailed godwit, pink-footed goose, greylag goose, redshank, and large waterfowl assemblages. There are no direct or indirect hydrological, habitat, or disturbance pathways between the proposed development and this SPA, due to the substantial separation distance, prevailing land use, and absence of functional connectivity for qualifying species. The distance far exceeds typical disturbance ranges for these features, and no evidence exists of regular movement or ecological linkage with the project area. In line with CIEEM EcIA Guidelines (2024) and EIA Regulations, this SPA is robustly scoped out of further assessment as no likely significant effects are predicted.
Moray and Nairn Coast Ramsar c. 8.2km east from the site c. 8.2km east from the site	The Ramsar site, overlapping the SPA and also c. 8.2 km east, is designated for its wetland habitats, rare plants and invertebrates, and large waterbird assemblages. There is no hydrological or functional pathway for impact from the proposed works, given the distance and lack of connectivity. The qualifying features are not susceptible to disturbance or pollution at this range. Consistent with CIEEM (2024) and UK government guidance, the Ramsar site is scoped out as no plausible impact pathway exists and no likely significant effects are predicted.
Cromarty Firth SPA	Located c. 8.6 km north of the site, this SPA is designated for osprey, common tern, whooper swan, bar-tailed godwit, greylag goose, and large waterfowl assemblages. The

Ecological Receptor	Reason
c. 8.6km north from the site	separation distance, intervening land, and lack of hydrological or ecological connectivity mean there is no plausible pathway for disturbance or impact. The qualifying features do not use the project area, and the site is well beyond the range of any direct or indirect effects. In accordance with CIEEM EcIA Guidelines (2024) and EIA Regulations, this SPA is robustly scoped out of further assessment.
Loch Flemington SPA c. 4.7km south from the site	This SPA is approximately 4.7 km south of the site and is designated for breeding Slavonian grebe. The loch is a discrete, enclosed waterbody with no hydrological or ecological connection to the proposed development or dredge channel. Slavonian grebe is a site-faithful breeder and does not use habitats near the project area. There is no plausible pathway for disturbance, pollution, or habitat loss. Following CIEEM (2024) and EIA Regulations, Loch Flemington SPA is robustly scoped out as no likely significant effects are predicted.
Rosemarkie and Shandwick Coast SSSI c.5.6 km west of the site	Both sites are hydrologically connected, but are unlikely to be impacted by disturbance, habitat loss, or waterborne pollution due to the separation distance. This site supports important coastal habitats and breeding cormorant populations. While hydrological connectivity exists between this site and the proposed development, there are no direct or indirect pathways for disturbance, habitat loss, or waterborne pollution that could affect bird populations at this distance. The separation distance (>5.6 km) exceeds the typical disturbance range for the qualifying bird species, and there is no evidence of functional connectivity for birds between the two sites.
Longman and Castle Stuart Bays SSSI c.7.3 km southwest of the site	This site supports wetland and estuarine bird assemblages. Although it is hydrologically connected to the proposed works, the >7.3 km separation distance means there is no plausible pathway for disturbance, habitat loss, or water quality impacts affecting birds. The site lies outside the Zol for noise, visual, or construction disturbance.

The separation distances between the proposed development and the Moray and Nairn Coast SPA/Ramsar (8.2 km), Cromarty Firth SPA (8.6 km), and Loch Flemington SPA (4.7 km) exceed published disturbance distances for the qualifying bird species of these sites. Goodship & Furness (2022, NatureScot Research Report 1283)⁴ provide a comprehensive review of disturbance distances for waterbirds and waders, reporting typical flush or disturbance distances in the range of 50–500 m, with even the most sensitive species rarely exceeding 1 km. Desk study and field survey data (EIAR Appendix 13.3) confirm that while some qualifying species are present locally, there is no evidence of regular movement or functional linkage between the project area and the populations of these distant designated sites. This is further supported by the 2024–25 wader monitoring (EIAR Appendix 13.7), which found that disturbance responses in SPA/SSSI wader species at Ardersier were only observed in response to localised stimuli (e.g., machinery, people, or predators) and did not extend beyond a few hundred metres. Similarly, the breeding bird survey (EIAR Appendix 13.5) recorded no evidence of displacement or regular movement between the proposed development and the distant SPAs/Ramsar. Therefore, there is no plausible impact pathway, and the rationale for scoping out these sites is robust, transparent, and consistent with CIEEM EcIA Guidelines (2024) and EIA Regulations.

⁴ Goodship, N.M. & Furness, R.W. (2022). Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

13.4.4 Important Ecological Features

This section qualifies the Important Ecological Features of the assessment and assigns their importance following judgement or evidence of their value or sensitivity in relation to the proposed development.

Table 13.4 Summary of the value/sensitivity/importance of receptors.

Feature, Distance, Orientation	Importance	Reasoning
Moray Firth – SPA c.730 m north of the site c.730 m north of the site c.250 m of the Dredged Channel	International	The SPA supports internationally important non-breeding populations of divers, grebes (<i>Podicipedidae</i>), sea ducks, and shags (<i>Gulosus aristotelis</i>). While the SPA lies within the broader Zol of the proposed works, there is direct hydrological pathway that could result in waterborne pollution affecting these species, and disturbance effects, such as noise or vessel movement, could potentially affect foraging or roosting birds using the SPA, depending on proximity and activity levels.
Inner Moray Firth – SPA c.20 m north of the site c.50 m of the Dredged Channel	International	The SPA supports internationally important non-breeding populations of divers, grebes, sea ducks, and shags. These bird populations are sensitive to disturbance, sedimentation, and changes in habitat structure. While the SPA lies within the broader Zol of the proposed works, there is no direct hydrological pathway that would result in waterborne pollution affecting these species. However, the proximity of the site means that construction or operational impacts, such as noise, vessel movement, or changes in sediment dynamics, could directly affect the SPA's ornithological features, particularly foraging or roosting birds.
Inner Moray Firth – Ramsar c.20 m north of the site c.50 m of the Dredged Channel	International	Ramsar site overlaps with the SPA and supports the same waterbird assemblages. There is direct hydrological and habitat connectivity for birds, and the site is sensitive to disturbance, pollution, and habitat alteration.
Whiteness Head - SSSI c.20 m northeast and c.250 m northwest of the site c.50m of the Dredged Channel	National	SSSI notified for non-breeding bar-tailed godwit and knot, both of which use intertidal habitats adjacent to the site. These bird populations are sensitive to disturbance, sedimentation, and changes in habitat structure. The proximity of the site means that construction or operational impacts could directly affect the SSSI's ornithological features.
Breeding Birds Onsite	County / Regional	The site supports a diverse assemblage of breeding birds, including red- and amber-listed species and UKBAP priorities. These populations are sensitive to habitat loss, fragmentation, and disturbance, especially during the breeding season. The value is elevated due to the presence of species of conservation concern.
Raptors	County / National	Vantage point and walkover surveys confirmed the presence of several raptor species in the wider area surrounding the proposed development.

Feature, Distance, Orientation	Importance	Reasoning
Onsite		Detailed field survey information is provided separately in Confidential EIAR Appendix 13.7.
Pinewood birds Onsite	National	The pinewood supports Schedule 1 and red/amber-listed species (crested tit, crossbill, woodcock), which are sensitive to woodland management and disturbance. The site is important for maintaining local populations of these specialists.

13.5 POTENTIAL IMPACTS

This section provides an assessment of the potential impacts of the proposed development on ornithological receptors, considering both direct and indirect effects during the operational phases.

13.5.1 Construction

Construction disturbance (terrestrial/intertidal)

The primary pathway is visual/noise disturbance from construction plant, personnel and temporary lighting affecting foraging and roosting waders on adjacent intertidal habitats. Risk is highest during high-tide periods (when roost options are limited) and in cold weather. Without mitigation, short-term behavioural displacement and temporary reductions in feeding efficiency could occur.

Applicability across ornithological receptors. Unless stated otherwise, the disturbance pathways described (noise, visual presence, lighting and human activity) and the corresponding controls apply to all relevant bird groups assessed in this chapter, including onsite breeding birds, raptors/Schedule 1, and pinewood specialists, with receptor-specific sensitivities and legal protections addressed in their dedicated subsections and in EIAR Chapter 15 (Schedule of Mitigation and Enhancements).

Designated Sites and Qualifying Bird Features

Inner Moray Firth SPA/Ramsar & Whiteness Head SSSI

- **Direct impacts:** There is a risk of disturbance to SPA/SSSI qualifying wader and waterbird assemblages (oystercatcher, curlew, bar-tailed godwit, knot, redshank) using intertidal and adjacent habitats, particularly during high tide roosts. Construction activities (e.g. piling, dredging, vehicle movement) may cause displacement, reduced foraging efficiency, or abandonment of key roosts.
- **Indirect impacts:** Sediment plumes, turbidity, and accidental pollution could degrade intertidal feeding habitats, affecting prey availability and habitat quality for SPA/SSSI birds.
- **Functional connectivity:** The site is directly connected to the SPA/SSSI for birds, with regular movement of individuals between feeding and roosting areas. Disturbance or habitat alteration at Ardersier could have population-level effects if significant numbers are displaced or if key roosts are lost.

Disturbance (noise/visual/lighting/human presence) to SPA/Ramsar qualifying features on adjacent foreland/foreshore and any physical change to supratidal/intertidal areas are assessed in EIAR Appendix 13.9, Sections 5.1–5.6; subject to the enforceable measures specified there (bund screening, ECoW-verified roost buffers, temporal management at peak high-tide windows/cold snaps, directional/curfewed lighting, disciplined access, and CEMP/GPP pollution controls), these potential effects are mitigated such that residual effects are not significant in EIA terms.

Moray Firth SPA

- **Direct impacts:** Less direct risk to SPA bird features due to distance, but potential for disturbance to foraging seabirds and waterbirds from noise, vessel movement, or lighting.

- **Indirect impacts:** Any changes to water quality or sediment dynamics could have downstream effects, but these are considered low risk for seabird species.

Onsite Breeding Birds and Raptors

This section assesses the potential impacts on onsite breeding birds, including both general breeding species and raptors, which are considered separately due to their conservation status and specific sensitivities.

Assembly & Tow-out: near-shore Moray Firth SPA and Inner Moray Firth SPA

- **Impact pathway:** Assembly and tow-out of floating turbines, and associated tug/escort movements, present a temporary disturbance/displacement pathway for the SPAs qualifying features (non-breeding divers, grebes, sea ducks, shag).
- **Mitigation:** The vessel-management protocol - slow, predictable transits on agreed routes; timing to avoid peak periods where practicable; and on-water observation with adaptive response, specified in EIAR Appendix 13.9 Section 5.7 and secured through the CEMP/operational method statements.

Breeding Birds (including red/amber-listed and UKBAP species)

- **Direct impacts:** Clearance of woodland, scrub, and grassland will result in the loss of nesting, foraging, and sheltering habitat for a diverse assemblage of breeding birds. There is a risk of nest destruction, direct mortality of eggs/chicks, and reduced breeding success if clearance occurs during the breeding season.
- **Indirect impacts:** Increased noise, lighting and human activity may cause disturbance (e.g. reduced nest attendance, nest abandonment) and reduce productivity. Loss of habitat connectivity may fragment populations, especially for woodland and scrub specialists.
- The impact is likely to be significant at the county/regional level for red/amber-listed and UKBAP species if not mitigated.

Raptors (including Schedule 1 species)

- **Direct impacts:** Felling of woodland or disturbance near nest sites may destroy active nests or cause breeding failure for raptor species such as peregrine. Raptors are highly sensitive to disturbance, especially during the nesting period.
- **Indirect impacts:** Increased human disturbance, noise and lighting, together with edge effects and fragmentation, may reduce breeding success and the long-term viability of pinewood bird populations.
- The impact is likely to be significant at the county/national level for Schedule 1 raptors if not mitigated.

Pinewood Birds

Direct impacts: Loss or degradation of pinewood habitat will affect specialist species (crested tit, crossbill, woodcock) and have limited alternative habitat locally.

- **Indirect impacts:** Increased edge effects, disturbance, and fragmentation may reduce breeding success and long-term viability of pinewood bird populations.
- The impact is likely to be significant at the local level for pinewood specialists if not mitigated.

13.5.2 Operation

Operational disturbance & lighting

Operational lighting and episodic high-activity periods could cause repeated disturbance if not designed/managed; lighting design and operational controls are therefore included in EIAR Chapter 15 (Schedule of Mitigation and Enhancements).

Designated Sites and Qualifying Bird Features

- **Direct impacts:** Routine port operations (vehicle movement, lighting, noise) may cause intermittent disturbance to SPA/SSSI birds, particularly during sensitive periods (e.g. high tide roosts, wintering season).
- **Indirect impacts:** Artificial lighting may disrupt nocturnal behaviour or increase predation risk for ground-roosting birds. Ongoing human activity may reduce the suitability of adjacent habitats for sensitive species.
- With effective mitigation (e.g. directional lighting, restricted access), operational impacts are likely to be minor and not significant at the population level, but ongoing monitoring is required.

Onsite Breeding Birds, Raptors, and Pinewood Birds

- **Direct impacts:** No further habitat clearance is anticipated post-construction, but ongoing disturbance from maintenance, traffic, and human presence may reduce breeding success or deter recolonisation of restored habitats.
- **Indirect impacts:** Loss of mature woodland and scrub may have long-term effects on population viability for woodland and pinewood specialists, unless compensatory planting and habitat management are successful.
- Residual operational impacts are likely to be minor if mitigation and habitat compensation are fully implemented and maintained.

13.6 MITIGATION

13.6.1 Embedded mitigation

The proposed development design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the proposed design. This is referred to as embedded mitigation (or design interventions). The principles of the design and mitigation hierarchy outlined in EIAR Chapter 2 (Methodology) have been followed.

The first principle being to avoid potential adverse impacts, if at all practicable, before seeking to minimise or mitigate for any unavoidable impacts. Embedded mitigation for the proposed development is reported in EIAR Chapter 3 (Project Description) which also includes a description of the design alternatives that have been considered, including the environmental factors which have influenced the decision-making. Mitigation measures will seek to reduce impacts during both construction and operation phases. Any effects which cannot be mitigated or reduced are referred to as residual effects.

13.6.2 Mitigation

Mitigation is included in the Outline Construction Environmental Management Document (CEMD). The Outline CEMD will be finalised and will have subordinate task specific Construction Environmental Management Plans (CEMPs) as necessary for implementation during construction. Further information on the Outline CEMD is provided within EIAR Chapter 3 (Project Description). EIAR Chapter 15 (Schedule of Mitigation and Enhancements) provides a summary of the mitigations identified within this EIAR.

As part of the extant consented area, a 3 m bund has already been established to act as an avoidance strategy, specifically aimed at reducing negative effects on wader species. In addition, a further 2 m bund is proposed along the eastern boundary to provide additional visual screening and reduce potential disturbance to waders. Consideration is being given to the installation of an additional 2 m bund in strategic locations to further reduce line-of-sight impacts and maintain the effectiveness of this embedded mitigation feature. The proposed extension area does not introduce any new works beyond this bundled zone, thereby reinforcing the existing mitigation strategy.

The integrity conclusion in HRA EIAR Appendix 13.9 relies on the following being specific, effective and enforceable:

- maintenance of the ~3 m bund and installation of the additional ~2 m eastern bund;
- ECoW-verified roost buffers and adaptive scheduling to avoid peak high-tide windows/severe cold snaps where practicable;
- directional, shielded lighting with dimming/curfew regimes;
- disciplined access/traffic along shore-adjacent corridors;
CEMP/GPP-aligned drainage, turbidity and pollution controls during earthworks and dredging. These will be detailed in the Outline CEMD → CEMP and HMP; compliance and adaptive management are monitored by the ECoW; and
- Vessel-management protocol for assembly & tow-out (slow, predictable transits along agreed routes; timing to avoid peak periods where practicable; on-water observation with adaptive response), as relied upon by EIAR Appendix 13.9 Section 5.7 for the Inner Moray Firth SPA/Ramsar and Moray Firth SPA integrity conclusion.

While secured to meet HRA requirements for SPA/Ramsar features, these measures also reduce construction and operational risks for raptors/Schedule 1, onsite breeding birds and pinewood specialists, and are implemented project-wide through the Outline CEMD → CEMP/HMP and RAMS.

Mitigation is included in the Outline CEMD. The Outline CEMD will be developed into a CEMP for implementation during construction. Further information on the Outline CEMD is provided within EIAR Chapter 3 (Project Description).

Additional mitigation measures will be implemented during construction and operation to protect all key ornithological receptors, including breeding and wintering birds, pinewood specialists, raptors, and the qualifying assemblages of designated sites (SPA, Ramsar, SSSI). Any residual effects that cannot be fully mitigated are identified in Section 1.7. A summary of embedded, construction-phase, and operational ornithological mitigation, including species protection plans, habitat management plan (HMP), habitat enhancement, disturbance controls, and monitoring for all relevant receptors, is provided in Technical EIAR Appendix 13.4.

Wader-specific measures

To address NatureScot's emphasis on waders and the MD-LOT Scoping Opinion requirement for clear mitigation and monitoring, the following targeted measures will supplement embedded design interventions:

- ECoW vantage watches and buffer setting: Prior to works near intertidal margins, the ECoW will confirm roost/foraging locations and set no-go/setback buffers, refining adaptively based on monitoring.
- Temporal management of highest-noise activities: Avoid clustering the noisiest tasks during peak high-tide periods and severe cold snaps, applying adaptive scheduling rather than blanket seasonal shut-downs.
- Traffic discipline near intertidal margins: Define access routes and speed limits to minimise repeated disturbance along sensitive edges; consolidate movements along pre-defined corridors.
- Directional/obtrusive-light control: Install downward-facing, shielded lighting with low spill towards intertidal areas, select appropriate CCT, and apply dimming/curfew regimes where practicable.

In-works monitoring and reporting: During early construction near sensitive areas, the ECoW will maintain short notes to monitor if triggers arise; a close-out memo will capture any adaptive refinements at phase end.

These measures complement the existing bunding, seasonal timing, and habitat management controls already described, ensuring compliance with the mitigation hierarchy and statutory guidance.

These targeted wader measures are the same measures the AA relies upon to exclude AEol for Inner Moray Firth SPA & Ramsar; see EIAR Appendix 13.9 Sections 5.1–5.2.

Avoidance

Principle: Prevent impacts before they occur, through design and planning.

- Earth Bund Construction: A 3 m high earth bund has been constructed along the consented boundary to act as a physical barrier, reducing visual and acoustic disturbance to adjacent intertidal habitats and designated sites' wader assemblages.
- Retention of Key Habitats: Retention of woodland edges, scrub, and buffer zones adjacent to intertidal habitats to maintain habitat connectivity and reduce edge effects.
- Timing of Works: Where practicable, programme clearance and construction activities outside the main breeding season for birds (March–August) and outside peak high-tide roost periods for waders, wherever practicable.

Reduce

Principle: Reduce the scale or intensity of unavoidable impacts.

Noise and Visual Disturbance Management: Where physical screening is not practicable, implement an activity schedule to minimise disturbance. Sediment and Pollution Control: Implementation of robust silt fencing, bunding, and spill response protocols to prevent sediment plumes and pollution from reaching intertidal habitats.

- Pre-Works Checks: During the nesting bird season (typically March to August), a qualified ecologist will carry out pre-works nesting bird checks within 48 hours of any vegetation clearance. If active nests are found, works must cease within a minimum 10–50 m buffer (species-specific, following NatureScot guidance) until fledging is complete.
- Dissuasion (if required): Where early clearance is not possible, use non-lethal dissuasion (e.g. strimming, bird scarers) before the breeding season to discourage nesting in areas scheduled for disturbance.
- Raptor Nest Protection: Identify and map all active raptor and Schedule 1 nests prior to works. Implement species-specific exclusion zones.
- Timing of Felling: Schedule felling in areas of woodland with known or potential raptor nests outside the breeding season (April–August). If active raptor nests are identified, establish a suitable species-specific buffer within which no felling or disturbance will take place until the breeding season has concluded.
- Toolbox Talks: All site personnel to receive ornithology toolbox talks, including legal obligations and reporting protocols for nest discoveries.

Mitigation (On-site Measures)

Principle: Implement measures to remedy or offset impacts during and after works.

- Implementation of the Outline Construction Environmental Management Document (CEMD), subsequent CEMP, and Habitat Management Plan (HMP).
- Licensing: In the unlikely event that disturbance to Schedule 1 birds (including raptors) cannot be avoided through timing and exclusion zones, works will proceed only under a NatureScot Schedule 1 disturbance licence, with supervision by a specialist ornithologist.

Supervision: A suitably qualified ornithologist will advise and implement additional mitigation measures as required, ensuring compliance with legal protections and project commitments.

- Directional Lighting: Install downward-facing, shielded lighting to minimise light spill onto adjacent intertidal and woodland habitats, maintaining dark corridors for nocturnal and crepuscular (dawn and dusk active species) species.
- Habitat Management: Manage the retained buffer habitat to support key species by retaining mature conifers for crossbill, creating standing deadwood for crested tit, and considering specific habitat needs for woodcock.

Access Control: Avoid access to sensitive retained habitat areas (e.g., roosts, retained woodland) for all site personnel. These areas will be clearly demarcated with fencing and signage, and no entry will be permitted except by authorised ecological staff for monitoring purposes.

Compensation (Off-site or Additional Measures)

Principle: Compensate for residual impacts that cannot be avoided or mitigated.

- Compensatory Artificial Nest Sites: Where practicable and if required, compensatory provision of artificial nest sites for key bird species will be implemented.

13.6.3 Enhancements

No specific enhancement measures are proposed.

13.6.4 Monitoring

Monitoring

Principle: Ensure effectiveness of mitigation and compensation through ongoing monitoring and adaptive management.

- **Post-Construction Monitoring:** Monitoring of wader roosts, breeding bird territories, and raptor nest sites will be undertaken in accordance with the Habitat Management Plan (HMP) and reviewed annually as part of the HMP review process. Results will be assessed by a qualified ornithologist and reported to NatureScot and The Highland Council (THC).

Habitat Establishment Monitoring: Monitoring of habitat establishment and the use of artificial nest sites if required will be carried out as set out in the HMP and reviewed annually in line with the HMP review process.

Trigger points for action will be embedded within the HMP, which will be subject to annual review. For instance, if compensatory habitats do not establish as intended, additional measures, such as further habitat creation or enhanced exclusion zones, may be implemented in consultation with the relevant statutory agencies.

13.7 ASSESSMENT OF SIGNIFICANT EFFECTS

This section assesses the level and significance of the residual effects of the proposed development on terrestrial ecology receptors during both construction and operation with the mitigation described in section 1.6 and EIAR Appendix 13.4. Residual effects are the predicted ecological impacts that remain after mitigation measures have been applied, and are considered significant if they affect the integrity, conservation status, or viability of ecological receptors, in line with CIEEM EcIA Guidelines (2024)^{Error! Bookmark not defined.}.

Residual EcIA effects reported below sit alongside the EIAR Appendix 13.9, which concludes no AEoI for Inner Moray Firth SPA & Ramsar and Moray Firth SPA when the specified measures are implemented. Where a pathway depends on coastal-process outcomes (e.g., dredge/armour hydrodynamics), this chapter cross-refers to EIAR Chapter 9 (Hydrology and Hydrogeology) and EIAR Appendix 13.9 for the condition precedent and monitoring commitments.

Table 13.5 Assessment of Significant Effects for the construction phase.

Ecological Feature	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual effects (i.e with mitigation)
Construction phase			
Shared measures (apply across receptors during operation; see Section 1.6 and EIAR Appendix 13.4; HRA-secured measures per EIAR Appendix 13.9): • Maintain bund screening and visual/noise screening at sensitive interfaces; • Directional/shielded/curfewed lighting with ongoing obtrusive-light control; • Access controls and traffic discipline along shore-adjacent corridors; • Pollution prevention and incident response in accordance with the CEMP; • Vessel-management protocol for episodic assembly/tow-out activities (as per EIAR Appendix 13.9); and • Monitoring and adaptive management via the ECoW/HMP to address any observed displacement or roost pressure. These shared measures apply unless receptor-specific text states otherwise.			

Ecological Feature	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual effects (i.e with mitigation)
Moray Firth SPA	- Potential disturbance to non-breeding populations of divers, grebes, sea ducks, and shags from noise, vessel movement, or lighting. - Possible indirect effects via disturbance or water quality, including assembly & tow-out of floating turbines and associated vessel movements.	- Schedule high-disturbance works within proximity to the SPA (e.g., within 250 m) to avoid peak non-breeding periods for qualifying bird features where possible; - If seasonal constraints cannot be avoided, a suitably qualified ornithologist should be present on site to advise and implement additional mitigation as required; - Apply the vessel-management protocol in EIAR Appendix 13.9 (slow, predictable transits; agreed routes; timing to avoid peak periods; on-water observation with adaptive response); - Visual/noise screening; monitor bird activity during construction; - Maintain the existing 3 m bund as a physical screening/avoidance measure to reduce disturbance to waders; - Pollution controls.	Not significant at international level

Ecological Feature	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual effects (i.e with mitigation)
Inner Moray Firth SPA	- Disturbance and displacement of qualifying wader and waterbird assemblages (e.g. oystercatcher, curlew, bar-tailed godwit, knot, redshank) from high-tide roosts and feeding areas due to construction noise, vibration, human activity, and habitat loss. - Direct hydrological and habitat connectivity means any disturbance or pollution could affect internationally important populations. - Potential for reduced foraging efficiency, increased energy expenditure, and abandonment of key roosts. - Possible indirect effects via disturbance or water quality, including assembly & tow-out of floating turbines and associated vessel movements.	- Maintain buffers near aquatic features; - Establish and adhere to exclusion zones and timing of works to avoid sensitive periods; - If seasonal constraints and exclusion zones cannot be avoided, a suitably qualified ornithologist should be present on site to advise and implement additional mitigation as required; - Noise and visual screening; - Robust sediment and pollution controls; - Apply the vessel-management protocol in EIAR Appendix 13.9 (slow, predictable transits; agreed routes; timing to avoid peak periods; on-water observation with adaptive response); - Habitat enhancement measures (e.g., restoration of any disturbed margins, management of retained buffer zones, and compensatory planting) as detailed in the Outline CEMD/CEMP; - Post-construction monitoring and adaptive management.	Not significant at international level
Inner Moray Firth Ramsar	- As above; Ramsar site overlaps with SPA and supports the same waterbird assemblages. - Direct hydrological and habitat connectivity means any disturbance or pollution could affect internationally important populations.	- As above, wetland protection and pollution prevention measures. - As above, apply the vessel-management protocol.	Not significant at international level
Whiteness Head SSSI	Disturbance to non-breeding bar-tailed godwit and knot, and potential degradation of sandflat, saltmarsh, and dune habitats from sedimentation, vibration, or pollution.	- Maintain buffers near aquatic features; - Establish and adhere to exclusion zones and timing of works to avoid sensitive periods; - If exclusion zones cannot be avoided, a suitably qualified ornithologist should be present on site to advise and implement additional mitigation as required.	Not significant at national level

Ecological Feature	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual effects (i.e with mitigation)
Raptors (including Schedule 1 species)	• Destruction or disturbance of active nests due to felling or construction near nest sites. • Displacement from traditional nesting or foraging grounds due to noise, lighting, and human activity. • Loss of mature woodland reduces nesting opportunities.	• Mapping and protection of active nests with species-specific exclusion zones; • Timing of felling outside breeding season; • If seasonal constraints and exclusion zones cannot be avoided, a suitably qualified ornithologist should be present on site to advise and implement additional mitigation as required; • If required, installation of artificial nest sites; • Toolbox talks and supervision by specialist ornithologist.	Not significant at national/county level
Pinewood birds	• Loss or degradation of pinewood habitat, increased edge effects, disturbance, and fragmentation, leading to reduced breeding success and long-term viability.	• Retain selected mature conifers for species such as crossbill; • Create standing deadwood/snags; • Retain coarse woody debris; • Manage dense understorey mosaics; • Species specific nest boxes and where practicable standing deadwood proposed for crested tit and ; • Adaptive management based on monitoring results.	Not significant at National level

Ecological Feature	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual effects (i.e with mitigation)
Breeding birds (including red/amber-listed and UKBAP species)	- Clearance of woodland, scrub, and grassland will result in loss of nesting, foraging, and sheltering habitat for a diverse assemblage of breeding birds. - Risk of nest destruction, direct mortality of eggs/chicks, and reduced breeding success if clearance occurs during the breeding season. Increased noise, vibration, and human activity may cause disturbance, leading to nest abandonment or reduced productivity. - Loss of habitat connectivity may fragment populations, especially for woodland and scrub specialists.	- Vegetation clearance scheduled outside the core breeding season (March–August) where practicable; pre-works nesting bird check within 48 hours of clearance; - If active nest found, apply species-specific buffers (10–50 m) and delay works until fledging; - If early clearance is not possible, deploy non-lethal dissuasion prior to breeding in work areas. - If seasonal constraints and exclusion zones cannot be avoided, a suitably qualified ornithologist should be present on site to advise and implement additional mitigation as required - Retention of woodland edges and buffer zones where possible. - Toolbox talks for all site staff.	Not significant at regional/county level

With the embedded design measures (e.g., bunding, seasonal timing) and the additional targeted controls set out in Section 1.6 (including ECoW-led buffer setting, temporal management, lighting design, and traffic discipline), disturbance to waders using adjacent intertidal habitats is expected to reduce to short-term, intermittent behavioural responses. These responses are unlikely to result in a material reduction in feeding efficiency or population viability at the regional scale.

Residual significance is therefore assessed as Not Significant in EIA terms for the wader receptor group, provided that all measures in EIAR Chapter 15 (Schedule of Mitigation and Enhancements) are implemented and monitored as described. Should monitoring identify unexpected displacement or roost abandonment, adaptive measures will be considered.

Table 13.6 Assessment of Significant Effects for the operational phase.

Ecological Feature	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual effects (i.e. with mitigation)
Operational phase			
Shared measures (apply across receptors during operation; see Section 1.6 and EIAR Appendix 13.4; HRA-secured measures per EIAR Appendix 13.9): • Maintain bund screening and visual/noise screening at sensitive interfaces; • Directional/shielded/curfewed lighting with ongoing obtrusive-light control; • Access controls and traffic discipline along shore-adjacent corridors; • Pollution prevention and incident response in accordance with the CEMP; • Vessel-management protocol for episodic assembly/tow-out activities (as per EIAR Appendix 13.9); and • Monitoring and adaptive management via the ECoW/HMP to address any observed displacement or roost pressure. These shared measures apply unless receptor-specific text states otherwise.			
Moray Firth SPA	• Occasional disturbance to non-breeding seabirds and waterbirds from port lighting, vessel movement, or noise. • Episodic assembly/tow-out activities.	• Maintain best practice lighting and noise management. • Maintain tow-out vessel protocol per EIAR Appendix 13.9.	Not significant at international level
Inner Moray Firth SPA	• Intermittent disturbance to waders and waterbirds from operational noise, lighting, and vehicle movement. • Potential for reduced roosting/foraging efficiency if disturbance is frequent or coincides with sensitive periods. • Episodic assembly/tow-out activities.	• Directional shielded lighting; • Maintain exclusion zones and access controls near sensitive roosts; • All tow-out activities must adhere to the vessel management protocol, maintaining a speed of no more than 3–4 knots throughout the harbour area until clear of the site; • Ongoing monitoring.	Not significant at international level

Ecological Feature	Impact pathway/s and effect on ecological receptor without mitigation	Proposed avoidance / mitigation	Likely significant residual effects (i.e. with mitigation)
Inner Moray Firth Ramsar	- As above; Ramsar site overlaps with SPA and supports the same waterbird assemblages. - Ongoing risk of disturbance or pollution from operational activities. - Episodic assembly/tow-out activities.	- As above, with continued focus on wetland protection and pollution prevention. - All tow-out activities must adhere to the vessel management protocol, maintaining a speed of no more than 3–4 knots throughout the harbour area until clear of the site.	Not significant at international level
Whiteness Head SSSI	Potential for disturbance to non-breeding bar-tailed godwit and knot from operational activities, and risk of habitat degradation from accidental pollution or lighting.	- Maintain operational buffers; - Implement pollution prevention and rapid response protocols.	Not significant at national level
Breeding birds (including red/amber-listed and UKBAP species)	Ongoing disturbance from maintenance, traffic, and human presence may reduce breeding success or deter recolonisation of restored habitats.	- Maintain habitat buffers and access controls; - Monitor breeding success and adapt management as needed.	Not significant at regional/county level
Pinewood birds (e.g. crested tit, crossbill, woodcock)	Ongoing disturbance from operational noise, lighting, and human activity may reduce breeding success or deter recolonisation of retained/compensatory pinewood habitat. Loss of mature woodland and increased edge effects may have long-term effects on population viability unless habitat management is successful.	- Retain and manage buffer woodland; - Implement compensatory native pine planting; - Install nest boxes/artificial sites; - Monitor breeding activity and adapt management as needed. - Where practicable, restrict access to sensitive retained woodland areas.	Not significant at national level
Onsite raptors (including Schedule 1 species)	Potential disturbance from operational noise, lighting, and human activity near retained woodland or nest sites.	- Maintain exclusion zones and access controls; - Monitor nest activity; - Adapt operational practices if disturbance is detected.	Not significant at national/county level

13.8 STATEMENT OF SIGNIFICANCE

The assessment of likely significant effects on ornithological receptors from the proposed development has been undertaken in accordance with the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (2024)¹. The evaluation considers both the construction and operational phases, with all proposed mitigation and compensation measures in place.

For tow-out and associated vessel movements, the integrity judgement for Inner Moray Firth SPA/Ramsar and Moray Firth SPA is provided in EIAR Appendix 13.9 Section 5.7, which concludes no AEoI with the vessel-management protocol secured.

Summary of Residual Effects

- Internationally Important Sites (Inner Moray Firth SPA, Ramsar, Moray Firth SPA):**
 With the implementation of embedded and additional mitigation, including timing of works, exclusion zones, acoustic and visual screening, and robust pollution controls, **no significant residual effects** are predicted on the qualifying bird assemblages of these sites at the international scale. The conservation objectives for these designated sites are not undermined, and the structure, function, and population viability of qualifying features are maintained.
- Nationally Important Sites (Whiteness Head SSSI):**
 The risk of disturbance or habitat degradation to SSSI features (notably non-breeding bar-tailed godwit and knot) is effectively mitigated through buffers, timing restrictions, and pollution prevention. **No significant adverse effects** remain at the national scale.
- Onsite Breeding Birds (including red/amber-listed and UKBAP species):**
 The loss of breeding habitat and potential disturbance is mitigated through seasonal clearance, pre-works checks, retention of key habitats, and compensatory planting. With these measures, residual effects are **not significant** at the county/regional scale.
- Raptors (including Schedule 1 species):**
 Potential impacts on raptors are addressed through nest mapping, exclusion zones, timing of works, and, where necessary, licensing and specialist supervision. **No significant residual effects** are predicted at the county/national scale.
- Pinewood Birds (crested tit, crossbill, woodcock):**
 The retention and management of buffer woodland, compensatory planting, and targeted habitat management are expected to maintain the viability of pinewood specialists. Residual effects are **not significant** at the national level.

Cumulative Effects:

A review of other developments within the extended zone of influence (15 km) concluded that the proposed development is unlikely to give rise to significant cumulative effects on ornithological receptors, either alone or in combination with other projects, provided standard mitigation is implemented.

Conclusion

In accordance with the CIEEM EcIA Guidelines (2024), a significant effect is one that supports or undermines biodiversity conservation objectives for important ecological features or for biodiversity in general, at any geographic scale. For the proposed development, after the application of the mitigation hierarchy (avoidance, minimisation, mitigation, compensation), **no significant residual adverse effects** are predicted for any ornithological receptor at the relevant geographic scale. The integrity, conservation status, and viability of designated sites and important bird populations are maintained. Ongoing monitoring and adaptive management are recommended to ensure the continued effectiveness of mitigation and to address any unforeseen impacts.

13.9 CUMULATIVE EFFECTS

A review of other proposed and consented projects within the shared zone of influence (Zoi) found no substantial overlap in construction or operational impacts on key ornithological receptors. The screening process considered spatial and temporal overlap, as well as the nature of potential additive effects. Where minor overlaps were identified, standard mitigation measures (such as timing restrictions, buffers, and pollution controls) are expected to effectively limit any additive or synergistic impacts. As a result, **no significant cumulative effects** on important bird populations or designated sites are predicted.

ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION



November 2025



Chapter 14 Cumulative Effects

Ardersier Port Extension

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14 CUMULATIVE EFFECTS

14.1 INTRODUCTION

This chapter presents information required by the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 to be provided in the Environmental Impact Assessment Report (EIAR) to enable the identification and assessment of likely significant cumulative effects.

The approach to this assessment follows the methodology set out in the EIA Scoping Report (SCOP-0062) and is in accordance with the Scoping Opinion (25/00226/SCOP) produced by The Highland Council. EIAR Chapter 4 (Consultation) contains further information on how each of the matters raised in the Scoping Opinion have been addressed.

Cumulative effects are generally described as either:

- intra-cumulative – where multiple different impacts from a proposed development result in a significant effect on the same single receptor or group of receptors; or
- inter-cumulative – where effects from several different developments combine together resulting in a significant cumulative effect.

Intra-cumulative effects are presented and assessed in this chapter. A summary of the inter-cumulative effects are presented in this chapter. Further detail on the inter-cumulative assessments can be found in EIAR Chapters 6-13. The methodologies for both intra and inter-cumulative are presented in EIAR Appendix 14.1.

EIAR Appendix 14.1 includes the study area, data sources used and the assumptions and limitations of the assessment. EIAR Chapter 3 (Project Description) contains a detailed description of the proposed development. This chapter is supported by the following EIAR Appendices:

- EIAR Appendix 14.1: Assessment Methodology
- EIAR Appendix 14.2: Other Developments

14.2 CONSULTATION

Responses in relation to the statutory consultation undertaken are presented in the EIAR Chapter 4 (Consultation). Following production of the EIA Scoping Report the following consultation has been undertaken.

The Highland Council was contacted in July 2025 to agree the long list of developments.

14.3 METHODOLOGY

This section provides a summary of the assessment methodology. Further detail is provided in EIAR Appendix 14.1.

Legislation, Policy and guidance

In the absence of any industry-standard guidance for carrying out intra and inter - cumulative effects assessment in EIA, the assessment has been carried out in line with the UK Government Nationally

Significant Infrastructure Projects: Advice on Cumulative Effects Assessment¹ relevant to nationally significant infrastructure projects under the Planning Act 2008.

The following sources of guidance have also been used in this cumulative effects assessment:

- Scottish Government Planning Advice Note 1/2013 (Environmental Impact Assessment), updated May 2017;
- European Commission (2017): Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU);
- European Commission (1999): Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions;
- International Association for Impact Assessment (IAIA) Cumulative Effects Assessment Fast Tips (October 2017); and
- Institute of Environmental Management and Assessment (IEMA) (2020): Impact Assessment Outlook Journal -Demystifying Cumulative Effects (Volume 7, July 2020).
- Planning Inspectorate (2024) Nationally Significant Infrastructure Projects (NSIP): Advice on Cumulative Effects Assessment, updated March 2025.

The assessment includes a review of existing baseline conditions, consideration of any potential cumulative effects, and whether mitigation measures would be required to reduce any potentially significant cumulative effects.

The Zone of Influence (ZOI) for environmental topics is explained within EIAR Appendix 14.1. The ZOI is unique to each environmental factor and is the area within which significant cumulative effects may potentially occur.

The term 'other developments' refers to consented developments and those in construction.

The NSIP guidance sets out a staged approach for assessing potential inter-cumulative effects with other existing and/ or approved development which is detailed in EIAR Appendix 14.1. Significance criteria for other developments taken to Stage 4 (Assessment) are provided below.

Significance Criteria

The significance criteria for cumulative effects (intra or inter) are detailed in Table 14.1.

Table 14.1: Significance criteria in the assessment of cumulative effects

Significance		Definition
Significant adverse or beneficial	Very Large (adverse or beneficial)	Where the cumulative intra or inter-project effects of the proposed development in association with other existing or more than likely / near certain future major development upon an individual or collection of environmental receptors would be highly significant.
	Large (adverse or beneficial)	Where the cumulative intra or inter-project effects of the proposed development in association with other existing or more than likely / near certain major 'other' developments

¹ Gov.uk (2025) Guidance: Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment Available at: <https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-cumulative-effects-assessment> [Accessed: 16.07.2025]

Significance		Definition
		upon an individual or collection of environmental receptors would be significant.
	Moderate (adverse or beneficial)	Where the cumulative intra or inter-project effects of the proposed development in association with other existing or more than likely / near certain major development upon an individual or collection of environmental receptors would be noteworthy but not significant.
Not significant adverse or beneficial	Slight (adverse or beneficial)	Where the cumulative intra or inter-project effects of the proposed development in association with other existing or more than likely / near certain future major developments upon an individual or collection of environmental receptors would be slight.
Neutral	Neutral	Where the cumulative intra or inter-project effects of the proposed development in association with other existing or more than likely / near certain future major developments would balance.

14.4 BASELINE CONDITIONS

As outlined in EIAR Chapter 1 (Introduction) planning permission in principle (PPIp) was sought and granted for the existing port at Ardersier. This existing port is considered to be part of the 'baseline' scenario for the purposes of this assessment.

14.4.1 Intra-cumulative effects

Baseline conditions for each environmental topic are described in the relevant EIAR Chapters 6 to 13.

14.4.2 Inter-cumulative effects

The existing and/ or approved developments to be assessed and included in the short list are presented in EIAR Appendix 14.2.

14.5 POTENTIAL IMPACTS

For intra-cumulative effects, receptors relevant to the cumulative assessment include:

- Local residents and / or the wider community;
- Construction workers (during the construction phase only);
- Operation workers;
- Ecological sites;
- Protected species;
- Landscape features;
- Historic environment; and
- Water environment.

Potential impacts for each environmental topic are described in the relevant EIAR Chapters 6 to 13.

14.6 MITIGATION AND ENHANCEMENT

14.6.1 Embedded mitigation

The proposed development design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the proposed design. This is referred to as embedded mitigation (or design interventions). The principles of the design and mitigation hierarchy outlined in EIAR Chapter 2 (Methodology) have been followed.

The first principle being to avoid potential adverse impacts, if at all practicable, before seeking to minimise or mitigate for any unavoidable impacts. Embedded mitigation for the proposed development is reported in EIAR Chapter 3 (Project Description) which also includes a description of the design alternatives that have been considered, including the environmental factors which have influenced the decision-making. Mitigation measures will seek to reduce impacts during both construction and operation phases. Any effects which cannot be mitigated or reduced are referred to as residual effects.

14.6.2 Mitigation

Mitigation arising from technical assessments is included in the Outline Construction Environmental Management Document (CEMD). The Outline CEMD will be developed into the finalised CEMD for implementation during construction, along with task specific CEMPs. Further information on the Outline CEMD is provided within EIAR Chapter 3 (Project Description). EIAR Chapter 15 (Schedule of Mitigation and Enhancements) provides a summary of the mitigations identified within this EIAR.

No further specific mitigation or enhancement measures were identified for cumulative effects within EIAR Chapters 6-13.

14.6.3 Enhancements

No specific enhancement measures were identified for cumulative effects within EIAR Chapters 6-13.

14.6.4 Monitoring

No specific monitoring measures were identified for cumulative effects within EIAR Chapters 6-13.

14.7 ASSESSMENT OF SIGNIFICANT EFFECTS

14.7.1 Inter-cumulative effects

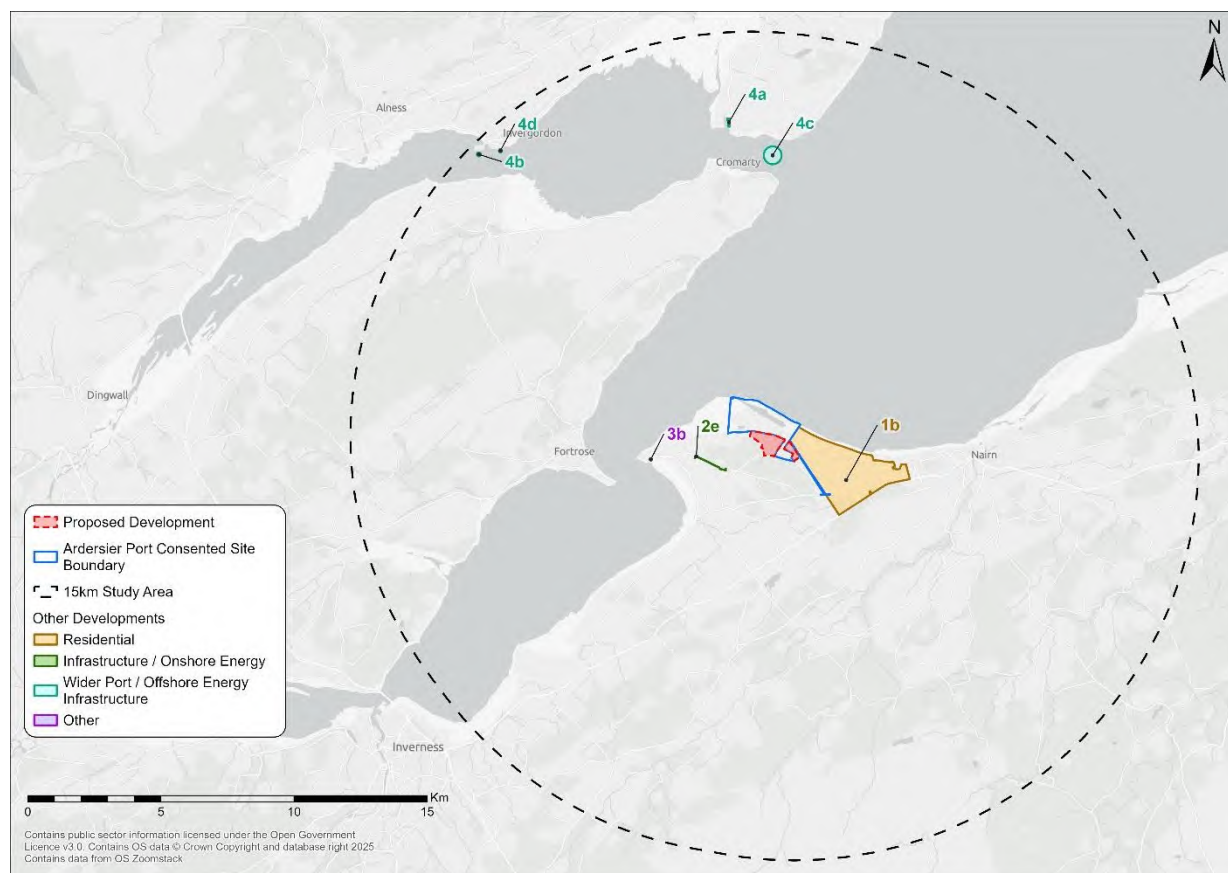
In total, 32 other developments in the long list were within the 15km ZoI (see EIAR Appendix 14.2 and accompanying Figure). Therefore, the criteria established in EIAR Appendix 14.1 were only applied to these other developments.

Each of the environmental specialists have reviewed the long list of developments and the short list reflects the totality of projects that were identified as relevant across all of the environmental topics. Table 14.2 outlines the list of other developments which have been included in the short list (i.e. Stage 2) based on the environmental specialists assessments. Figure 14.1 shows the other developments identified in the short list.

Table 14.2: Short list of 'other developments' considered in the cumulative assessment

Development name and description	Planning application number	REF ID (as shown on Figure 14.1)
Mixed use development of 300 houses; tourism and heritage, equestrian and ecological centres; hotel and conference facilities; championship golf course, clubhouse and golf academy; community woodland and country park with associated infrastructure	08/00080/OUTNA	1b
Land 270m SE of Fort George, Ardersier: The installation of a Multi-Use Games Area with 3m high fencing (5m at goal ends) to include paths and ground drainage.	18/00514/FUL	3b
Land 585m SE of Kirkton, Ardersier: New span of 11kV overhead line to link existing spurs to reinforce network for new wastewater treatment works. Permission implemented and operational.	20/01116/S37	2e
Land 430M NW Of Nigg Welding School Nigg Tain: Proposed Engineering works to form a new berthing quay on the east side of the Inner Dock at the Port of Nigg	24/02674/FUL	4a
Invergordon Service Base Phase 5 Development Marine Licence – Construction – Invergordon Service Base Phase 5 Development – 00011084 Marine Licence – Capital Dredging and Sea Deposit – Invergordon Service Base Phase 5 Development – 00011085	No reference available	4b
Maintenance Dredging and Sea Disposal - Port of Nigg, Cromarty Firth - 00010122	10122	4c
Marine Licence - Maintenance Dredging - Port of Cromarty Firth - 00009232	00009232	4d

Figure 14.1: Location of other developments identified within a ZoI of 15km (short list)



Each environmental specialists has assessed the long list of developments provided in EIAR Appendix 14.2. For EIAR Chapter 11 (Marine Mammals) additional developments to those in EIAR Appendix 14.2 were considered due to the mobility of the marine species. Further details is provided in EIAR Chapter 11 (Marine Mammals) and associated appendices.

The environmental specialists' cumulative assessments are provided within their respective chapters in EIAR Chapters 6 to 13. A summary of the findings is provided below:

- **Airborne Noise:** Of all the applications reviewed, only 08/00080/OUTNA has potential to have a cumulative effect. However, the necessary environmental assessments are unavailable, therefore it is **not possible to determine the cumulative effects**.
- **Landscape, Seascape and Visual:** Visibility interactions with the Mixed-Use Development at Delnies (08/00080/OUTNA) and the Invergordon Service Base are limited due to distance, intervening high ground, and differences in development scale. This results in no significant cumulative or sequential visual effects. No potentially significant cumulative landscape, seascape or visual effects with the proposed development have been identified.
- **Historic Environment:** Developments within 5km of the site, such as 18/00514/FUL and 20/01116/S37, were reviewed and found to have **no significant cumulative effects** on Fort George or unknown historic environment remains in conjunction with the proposed development.
- **Hydrology and Hydrogeology:** A review of developments within 15 km of the site focused on the surface water catchment area. The proposed mixed use development at Delnies (08/00080/OUTNA), over 4km away, would discharge into a different coastal waterbody and is

not expected to have a significant effect. Ports within the Zol (Cromarty Firth and Nigg) discharge into different waterbodies, resulting in **negligible cumulative effects** on water quality.

- Coastal processes and geomorphology: For coastal processes and geomorphology the assessment focused on a Zone of Influence (ZOI) surrounding the application site incorporating the harbour, intertidal extents including saltmarsh, and receiving coastal waterbody (Hilton of Cadboll to Whiteness Head coastal water body). Two active ports are present within 10km of the application site (The Port of Nigg and Cromarty Firth). Both ports discharge into the Cromarty Firth, which is classified as a different coastal waterbody (Outer Cromarty Firth) than that of the proposed development. Given the distance from the site and the nature of the surrounding geography and bathymetry, there is **no significant cumulative** effect on coastal processes and geomorphology from these developments.
- Marine Mammals: The assessment reviewed disturbances from piling, dredging, vessel traffic, and seal haul-out sites. Potential effects identified are low or negligible, resulting in **no significant cumulative effects** on marine mammals during both construction and operations.
- Terrestrial Ecology: The cumulative assessment found no overlapping habitat loss, fragmentation, or disturbance to the same Important Ecological Features (IEFs). Embedded mitigation and compensation measures further reduce potential effects, predicting **no significant cumulative effects**.
- Ornithology: Reviews of other projects found no substantial overlap in impacts on key ornithological receptors. Minor overlaps are mitigated by standard measures like timing restrictions and buffers, predicting **no significant cumulative effects** on bird populations or designated sites.

Based upon the environmental specialists cumulative assessment of other development within a Zol of 15km, it is concluded that it is unlikely that there will be inter-project effects, and no further assessment or mitigation is required, other than that outlined in the individual environmental topic assessments within the EIAR. Therefore, none of the other developments from the short list are progressed into Stage 4 (Assessment) as per the methodology outlined in EIAR Appendix 14.1.

14.7.2 Intra-cumulative effects assessment

A summary of the reported construction and operation intra-cumulative effects is provided in Table 14.2. The following environmental topics have no significant adverse or beneficial residual effects identified:

- EIAR Chapters 6 Airborne Noise,
- EIAR Chapter 7 Landscape, Seascape and Visual Effects,
- EIAR Chapter 9 Hydrology and hydrogeology,
- EIAR Chapter 10 Coastal processes and geomorphology,
- EIAR Chapter 11 Marine Mammals,
- EIAR Chapter 12 Terrestrial Ecology, and
- EIAR Chapter 13 Ornithology.

Only one environmental topic has identified significant residual effects as a result of the proposed development, and there are **no potential intra-cumulative effects** between environmental topics on receptors during construction or operation of the proposed development.

Table 14.3: Potential intra-cumulative effects between environmental topics on receptors during construction and operation of the proposed development

Receptor/Feature	Environmental Topics								Mitigation Proposed	Significance of intra-project effects
	Airborne Noise	Landscape, Seascapes and Visual	Historic Environment	Hydrology and Hydrogeology	Coastal Processes and Geomorphology	Marine Mammals	Terrestrial Ecology	Ornithology		
Construction										
Unknown Historic Environment Assets	No predicted residual significant effects.	No predicted residual significant effects.	While the archaeological potential of the site is assessed as low, the magnitude of impact from construction would be high where such remains are present. The residual effect is assessed as minor to major adverse depending on the value of any assets encountered. This is considered to be potentially significant .	No predicted residual significant effects.	No predicted residual significant effects.	No predicted residual significant effects.	No predicted residual significant effects.	No predicted residual significant effects.	Specific historic environment mitigation measures are set out in the EIAR Chapter 8 (Historic Environment).	Significant cumulative effects on historic environmental receptors during operation are not expected as a result of the proposed development.
Deposits of Palaeoenvironmental Interest			Although previous development has likely disturbed some areas, undisturbed paleoenvironmental deposits may survive. The residual effect is assessed as minor to major adverse and is therefore potentially significant .						Specific historic environment mitigation measures are set out in the EIAR Chapter 8 (Historic Environment).	Significant cumulative effects on historic environmental receptors during operation are not expected as a result of the proposed development.
Operation										

Receptor/Feature	Environmental Topics								Mitigation Proposed	Significance of intra-project effects
	Airborne Noise	Landscape, Seascape and Visual	Historic Environment	Hydrology and Hydrogeology	Coastal Processes and Geomorphology	Marine Mammals	Terrestrial Ecology	Ornithology		
Fort George (ORCA 11, LB1721)	No predicted residual significant effects.	No predicted residual significant effects.	The temporary presence of offshore wind turbines under construction and floating bases would result in a major short-term (temporary) adverse effect on the setting of Fort George, a Category A Listed Building. This is considered significant .	No predicted residual significant effects.	No predicted residual significant effects.	No predicted residual significant effects.	No predicted residual significant effects.	No predicted residual significant effects.	Specific historic environment mitigation measures are set out in the EIAR Chapter 8 (Historic Environment).	Significant cumulative effects on historic environmental receptors during operation are not expected as a result of the proposed development.

14.8 STATEMENT OF SIGNIFICANCE

This chapter presents a summary of the findings of the cumulative assessment of the proposed development. The assessment took account of the potential for significant cumulative effects (both inter and intra effects).

For intra-cumulative effects, only one environmental topic has identified significant residual effects as a result of the proposed development, and there are **no potential intra-cumulative effects** between environmental topics on receptors during construction or operation of the proposed development.

For the inter-cumulative assessment, 'other' developments in the Zone of Influence of 15km, including consented planning applications, were identified and cumulatively assessed by the environmental specialists. No other developments were taken beyond the short-list stage and information gathering stage (Stage 2 and 3). This was due to lack of environmental information available in the public domain to identify any potential effects of these future developments in isolation, and if these effects had the potential to be significant when considered in-combination with the proposed development. As such, **no significant inter-cumulative effects** have been identified for the proposed development.

ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION



November 2025



Chapter 15 Schedule of Mitigation and Enhancements

Ardersier Port Extension

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Technical Reviewer	Campbell Fleming

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15 SCHEDULE OF MITIGATION AND ENHANCEMENTS

15.1 INTRODUCTION

The proposed development design has been an iterative process. The environment team has worked in close collaboration with the infrastructure design team to avoid or reduce environmental impacts through the proposed design. This is referred to as embedded mitigation (or design interventions). Embedded mitigation for the proposed development is reported in EIAR Chapter 3 (Project Description) where three items of fundamental highest level embedded mitigation are identified as:

- Adoption of the approach described in The Highland Council Guidance Note on the Construction Environmental Management Process for Large Scale Projects, August
- 10. To initiate this process, an Outline Construction Environmental Management Document (CEMD) has been prepared; and
- Designing a channel width and dredge pocket to avoid any encroachment into the intertidal area of the Whiteness Spit (described below).
- Compensatory planting of 120 acres of Scots Pine at an offsite location.

This chapter summarises the mitigation measures, which have been identified following the assessment of impact significance, which are considered necessary to further reduce or compensate for potential impacts. The stated mitigation measures have been identified through the Environmental Impact Assessment (EIA) process, and whilst some of these are also necessary to achieve separate legislative compliance (e.g. protected species licences), they are included as they still encompass mitigation commitments of this EIAR. All contractual and legally binding mitigation measures are highlighted within Table 15.2 and these will be included within the Outline Construction Environmental Management Document (OCEMD) (provided in EIAR Appendix 3.2) where they relate to the construction stage once the application process has concluded.

The outline CEMD includes all the construction related measures provided below and has been prepared and describes methods and techniques that will be employed to ensure compliance with legislation and good practice. Prior to construction the OCEMD will be fully finalised and submitted to THC for approval. The appointed Contractor will then take the CEMD and prepare a series of detailed CEMPs (Construction Environmental Management Plans) which build upon the requirements laid out in the Schedule of Mitigation.

With regards to the operation of the proposed development, there is a Port Operational Environmental Management Plan (POEMP) currently in place for the consented port. This plan will be reviewed and updated to include the proposed extension site area and operations and will be implemented to ensure that environmental effects associated with the operational phase are effectively managed, monitored, and mitigated. The POEMP sets out clear procedures, responsibilities, and performance indicators for ongoing environmental management. It will also establish monitoring and reporting mechanisms to ensure compliance with relevant legislation, environmental standards, and best practice guidance. Regular review and updating of the POEMP will ensure continual improvement in environmental performance throughout the entire port's operation including the extension area.

The Schedule of Mitigation table gives each of the measures a reference, and an approximate location as to where the measure should be applied i.e. whole project extents or specific location). The timing of mitigation could also vary, and the table sets out when it should be applied i.e. a detailed design requirement, or implemented prior to construction, or during construction or operation of the proposed development or a combination of all.

It should be noted that some of the measures provided in Table 15.2 were identified as embedded mitigations. Those measures have already been incorporated into the Indicative Design and are shown in green text below, whereas all measures in black font are for mitigation that should be considered and implemented by the Contractor and the Project Team during the future design and construction phase. There are also some measures recommended for the operational phases.

Please note that this Schedule of Mitigation and Enhancements should be read and applied in conjunction with the latest version of the following documents which the appointed Contractor will be responsible for producing, updating as required, and upholding:

- Construction Dust Management Plan
- Waste Management Plan

Drafts of these are provided in EIAR Chapter 5 (Supporting Information and Assessments) based upon the plans that were in place for the existing consented site.

15.2 OTHER CONSENTS REQUIRED

In consultation with The Highland Council, the Marine Directorate, and the Statutory Consultees, it is understood that the proposed development will also require the following consents.

Table 15.1: Additional Consents

Consent	Why is it required	Further Details
European Protected Species (EPS) Licences	Protected species licences may be required from Scottish Natural Heritage (SNH) due to disturbance or destruction to a species and (or) its habitat, as a result of the proposed development.	EIAR Chapter 11 (Terrestrial Ecology)
Habitat Regulation Assessment (HRA) – Appropriate Assessment (AA)	An AA to consider impacts upon the Inner Moray Firth Special Protection Area (SPA) and the Moray Firth SPA, Special Area of Conservation (SAC).	The AA will be carried out by the Competent Authority but will draw from information provided as part of this EIAR including EIAR Appendix 13.9 and EIAR Appendix 11.6
Controlled Activity Regulations (CAR) Licences	The following licences are required in accordance with the Water Environment (Controlled Activities) (Scotland) Regulations 2011: Complex Licence – Engineering Licence including Construction Site Licence. Simple Licences - Engineering Licences, Abstraction Licences and Drainage Licences. All other activities are covered by General Binding Rules (GBR). <i>NB - We are aware that there are potential changes coming in to this licensing regime but anticipate that the</i>	EIAR Chapter 9 (Hydrology and Hydrogeology)

Consent	Why is it required	Further Details
	<i>proposed development will require these or the relevant new equivalent.</i>	

Table 15.2: Schedule of Mitigation.

Ref	Timing	Mitigation Required	Responsible person(s)
Noise			
NoiseV1	Construction	Implementation of best practice methods of noise control, especially in the vicinity of property NSR-A (Starlight Wellness Center). Appropriate conditions to minimise noise and vibration would be imposed on the Contractor as part of their contract requirements. Noise control measures incorporated into the CEMP include (but are not limited to) the following: • Selecting inherently quiet plant; • Using, where necessary and practicable, enclosures and screens around any noisy fixed plant; • Limiting site work hours, where possible; and • Adhering to relevant British Standards. Mitigation for building services and fixed plant include the following measures, which are not exhaustive: • Procurement of 'quiet' non-tonal plant. • Locate plant and air vents away from NSRs. • Acoustic enclosures. • In-duct attenuators. • Acoustic louvres. • Using, where necessary and practicable, enclosures and screens around any noisy fixed plant; • Plant to be located, as far as is reasonably practicable, away from adjacent occupied buildings or as close as possible to noise barriers/bunds or site hoardings where these are located between the plant and the buildings. • Isolation of plant from building structure. As minimal information is available at this stage on vehicle movements within the proposed development, some generic advice can be provided to ensure that noise levels do not adversely affect NSRs. • Only vehicles conforming to relevant national or international standards, directives and recommendations on noise and vibration emissions will be used. • Site hoarding and screens will provide acoustic screening where necessary where vehicle movements are in close proximity to NSRs. • Personnel will be instructed on BPM to reduce noise and vibration as part of their induction including training as required prior to specific work activities. • When transporter engines are not required to be running, i.e. other than unloading, engines should be turned off so they do not contribute unnecessarily to the prevailing noise climate. • Where possible, vehicles should be fitted with broadband reversing alarms rather than tonal types.	Principal Contractor
NoiseV2	Construction Operation	Installation of noise barrier/bund on boundary between site and NSR-A. (Starlight Wellness Centre) Installation of an appropriate length screen of 2m height between the site and receptor.	Principal Contractor

Ref	Timing	Mitigation Required	Responsible person(s)
NoiseV3	Pre-construction Construction Operation	Reduction of fixed plant noise levels associated with operational use of the site. During detailed design (or other appropriate stage of development) consider the location, dimensions and noise level of proposed plant. Ensure the location does not create directivity and that the quietest appropriate plant is used.	Principal Contractor
NoiseV4	Pre-construction Construction	Site Noise Management Plan (can be part of an overall Site Management Plan). Review potential operations that could be noise generating and reduce the potential noise levels where possible (these could include, but are not limited to • vehicle/forklift movement, or • lifting/lowering of objects by crane)	Principal Contractor /Ardersier Port
Landscape, Seaside and Visual			
LSV1.	Construction	Retention of existing woodland supplemented by new planting (both underplanting and new woodland) to create a continuous 20m wide landscape buffer with limited visual permeability on the landward side of the site. Detailed design and implementation of a structural peripheral landscape scheme.	Principal Contractor/Ardersier Port
Historic Environment			
HistorE1	Pre-construction Construction	Preparation of a Project Design in consultation with The Highland Council's Historic Environment Team that would outline the approach to Historic building recording undertaken on the standing remains of ORCA 09.	Principal Contractor/Ardersier Port
HistorE2	Pre-construction Construction	Preparation of a Project Design in consultation with The Highland Council's Historic Environment Team that would outline the approach to the assessment of existing borehole logs and watching brief (if required) to THC HET and deposited with the Highland Historic Environment Record (HER).	Principal Contractor/Ardersier Port
HistorE3	Pre-construction Construction	Preparation of a Project Design in consultation with The Highland Council's Historic Environment Team that would outline the approach to an archaeological watching brief during ground clearance of extension lands.	Principal Contractor/Ardersier Port
Hydrology and hydrogeology			
Hydro1	Pre-construction Construction Operation	Ensure mitigation measures outlined in the EIAR are followed during construction and operation. Production of a CEMD and POEMP, with a suitable qualified Environmental Clerk of Work (EnvCoW) to monitor works, production of a pollution incidence response plan and follow best practise and relevant guidance.	Ardersier Port
Hydro2	Construction	Treat surface water runoff from the extension areas. Silt fencing and bunds around open ground and stockpiles, early-phase planting of slopes, employ temporary settlement measures, only undertake vegetation stripping where necessary.	Principal Contractor
Hydro3	Construction	Suitable site drainage – site compounds. Runoff treated through construction drainage features and foul drainage in a close system and disposed off-site	Principal Contractor

Ref	Timing	Mitigation Required	Responsible person(s)
Hydro4	Construction	Minimise concrete runoff and impact on the water environment. Undertake concrete batching, handling and placement in line with GPP6 and in line with CEMP	Principal Contractor
Hydro5	Pre-construction Construction Operation	Minimise the risk of oil, fuel or vehicle spillage contamination. Storage of fuels and oils in line with GPP2 and GPP8 and vehicles and vessels to carry spill kits	Principal Contractor
Hydro6	Pre-construction Construction Operation	Minimise the risk of sediment discharges into the water environment from dredge activities or construction of marine infrastructure. Undertake in accordance with conditions of marine licence and BPEO.	Principal Contractor
Hydro7	Operation	Control surface water runoff and erosion. SuDS drainage measures, creation of diversion cut-off ditches, inlet screening on road culverts.	Principal Contractor
Coastal Processes and Geomorphology			
CPG1	Construction	Identify the measures and procedures shall be in place during construction, including on chemical usage, waste management, dredging and any port related environmental policies.	Principal Contractor
CPG2	Operation	Identify the measures and procedures shall be in place during operation, including on chemical usage, waste management, dredging and any port related environmental policies. This plan is already implemented by Ardersier Port.	Principal Contractor Ardersier Port.
CPG3	Pre-construction Construction Operation	Setting measurable environmental objectives and targets supported by a management programme that measures and monitors performance. Involve and consult interested parties on environmental issues where appropriate. Systematically identify and assess environmental risks associated with port related activities. Strive to achieve continual improvement in environmental management systems and performance. This plan is already implemented by Ardersier Port.	Principal Contractor Ardersier Port.
Marine Mammals			
MarineM1	Construction Operation	Bunkering Procedures, and Port Oil Spill Contingency Plans - Identification of potential pollution sources and how the Ardersier Port will respond to these spill events. This plan is already implemented by Ardersier Port.	Principal Contractor Ardersier Port
MarineM2	Construction	Marine Mammal Mitigation Plan (MMMP) - For piling activities, a 500 m mitigation zone (MZ) shall be employed to ensure that instantaneous PTS can be effectively mitigated. For dredging activities, there shall be no distance-specific MZ around the dredge vessel. Instead, it is proposed that prior to dredging operations commencing, the MMO will be required to conduct a pre-dredging search of the entire Phase 2 dredging area. This ensures that the inner harbour area is monitored for the presence of seals (the species most likely to be present within the inner harbour area) and other marine mammals.	Principal Contractor/Ardersier Port

Ref	Timing	Mitigation Required	Responsible person(s)
		The MZ that should be monitored during spoil disposal operations on the approach to, and at the spoil disposal site, is a 200 m MZ established around the spoil disposal vessel.	
MarineM3	Construction	Construction Environmental Management Plan (CEMP) - Identifies the measures and procedures shall be in place on chemical usage, waste management, and any port related environmental policies.	Principal Contractor
MarineM4	Construction Operation	Navigational Safety Risk Assessment (NRA) - The NRA shall employ mandatory pilotage which ensures vessels are guided safely through the harbour, reducing the risk of collision and accidents. An inhouse traffic management system, as well as coordination with nearby ports and maritime authorities shall manage vessel traffic and prevent congestion. As part of the NRA, implementation of vessel movement plans and marine management strategies shall be required to protect local wildlife. This plan is already implemented by Ardersier Port.	Ardersier Port
MarineM5	Construction Operation	Marine Environmental Policy - Setting measurable environmental objectives and targets supported by a management programme that measures and monitors performance. Involve and consult interested parties on environmental issues where appropriate. Systematically identify and assess environmental risks associated with port related activities. Strive to achieve continual improvement in environmental management systems and performance. This plan is already implemented by Ardersier Port.	Principal Contractor Ardersier Port
MarineM6	Construction Operation	Port Waste Management Plan (PWMP) - Reduce environmental impact, promote resource efficiency, and maintain compliance with the Waste Framework Directive and national waste regulations. This plan is already implemented by Ardersier Port.	Principal Contractor Ardersier Port
Terrestrial Ecology			
TerresE1	Pre-construction Construction	Project governance (CEMD → CEMP, HMP) Implement the Outline CEMD, develop the CEMP and Habitat Management Plan (HMP) covering all measures, constraints plans, buffers, toolbox talks, stop-work procedures, and incident response across all work areas. Approve CEMP/HMP before mobilisation; brief all site staff; maintain daily compliance logs; Environmental Clerk of Works (EnvCoW) to audit and advise on sensitive tasks and maintain a live constraints register.	Principal Contractor Ardersier Port principally
TerresE2	Pre-construction Construction Operation	Designated sites (e.g., Inner Moray Firth Ramsar adjacent) Maintain existing 3 m bund (consented area) as visual/noise screen; maintain ≥10 m buffers to wetland features; install silt fencing/bunding on water directed slopes; avoid light spill toward designated habitats.	Principal Contractor

Ref	Timing	Mitigation Required	Responsible person(s)
		Demarcate no-go zones on drawings and on the ground; install sediment controls before earthworks; embed pollution prevention (bundled fuels, designated refuelling, spill kits); implement directional, shielded lighting per plan.	
TerresE3	Construction Operation	Pollution prevention / soils & water Install sediment controls prior to ground disturbance; contain/spoil manage within site; no untreated discharge to waterbodies; secure/bund fuels and chemicals; spill kits at points of use; staff trained in spill response. Pollution Prevention Plan within CEMP; daily plant/fuel checks; inspections after heavy rain; immediate containment/recovery of spills; export non-reusable arisings to licensed facility.	Principal Contractor
TerresE4	Pre-construction Construction Operation	Lighting (all phases) Use directional, downward-facing, shielded luminaires; maintain dark corridors along woodland edges and commuting routes; do not illuminate watercourses/retained habitats. Implement Lighting Strategy within CEMP; pre-commission lux checks at habitat edges; timers/curfews; introduce temporary screens if spill identified by monitoring.	Principal Contractor
TerresE5	Construction	Noise & vibration (construction) Comply with project noise/vibration limits; prioritise daytime for high noise tasks; apply species specific standoffs (e.g., near setts, dens, roosts); use soft start for heavy plant adjacent to sensitive features. Construction Noise & Vibration Plan; ECoW to advise and adjust stand-offs/sequence if triggers exceeded or sensitive fauna noted.	Principal Contractor
TerresE6	Construction Operation	Traffic & access Use designated routes only; enforce site speed limits Traffic Management Plan; driver induction and toolbox talks; periodic compliance checks.	Principal Contractor
TerresE7	Pre-construction Construction	Habitats – general Retain habitat boundaries/margins wherever practicable to maintain connectivity; phase vegetation clearance; protect downslope edges with sediment controls.	Ardersier Port

Ref	Timing	Mitigation Required	Responsible person(s)
		Vegetation Clearance Method Statement; or Site Environment Team present during sensitive works; stop work if protected species encountered.	
TerresE8	Pre-construction Construction Operation	Habitats – woodland (Scots pine plantation; upland birchwood) Retain boundary woodland blocks and connectivity; edge enhancement (selective thinning to increase light; create standing deadwood/brush piles; reuse suitable forest soils) to increase structure; deliver offsite compensatory planting with ~10% native broadleaf and habitat features. Tree works under ecological method statement; implement compensation with NatureScot/Scottish Forestry agreement; aftercare and monitoring (establishment, survival, structure) per HMP.	Ardersier Port
TerresE9	Pre-construction Construction	Habitats – heath (dry lowland h1a5; wet heath with cross-leaved heath h1a7) Retain margins; protect hydrology; recreate heath mosaics within 2 ha on-site donor area (location/design at detailed stage). Detailed habitat design at planning/CEMP stage; soil handling to conserve seedbank; establish heather/heath species; manage grazing/encroachment through HMP.	Ardersier Port
TerresE10	Pre-construction Construction	Habitats – grasslands (lowland dry acid g1a; other lowland acid g1d; other neutral g3c) Retain margins where possible; salvage and reuse suitable soils/turves; reinstate with appropriate seed mixes to replicate structure; manage to deliver varied sward and avoid nutrient enrichment. Soil/vegetation method statement; seed/hay specifications in HMP; post establishment cuts; invasive control; ECoW checks.	Ardersier Port
TerresE11	Pre-construction Construction	Habitats – ponds (acid peat-stained lakes & ponds r1c7) Protect retained features with buffers and pollution controls; recreate acid peat stained ponds within 2 ha onsite wetland area (location/design at detailed stage). Detailed design at planning/CEMP; earthworks and profiles per ecologist's spec; no nutrient inputs; monitor hydrology and vegetation colonisation; adaptive management.	Ardersier Port
TerresE12	Pre-construction Construction	Bats – general (trees & activity areas)	Principal Contractor

Ref	Timing	Mitigation Required	Responsible person(s)
		Avoid works near roosts in core occupancy where practicable (summer May–Sept; hibernation Nov–Mar); retain ≥10 m tree belts for connectivity; maintain dark corridors; pre-felling PRF checks by licensed bat worker (≤3 months pre-felling). Bat SPP; derogation licence where required; toolbox talks; emergency stop-work if bats found; schedule noisy works in daylight; avoid plant movement at dusk/dawn near roosts/commuting routes.	
TerresE13	Pre-construction Construction	Bats – Juniper Cottage Buildings 2 & 3 (confirmed roosts) Secure EPS derogation licences; carry out licensed exclusion and supervised demolition; install compensatory roosts in advance (Schwegler box suite incl. hibernacula types e.g., 1FW/1WQ as appropriate) and a purpose built bat roost ("bat barn") to support maternity capability; keep adjacent corridors dark. Licence method statements (timing outside occupancy where possible); exclusion by licence holder; install/commission bat barn and boxes before demolition; post-installation monitoring and maintenance.	Principal Contractor
TerresE14	Pre-construction Construction	Badger Maintain ≥30 m buffers to active setts (≥100 m for high noise/vibration); retain commuting corridors; direct lighting away from setts; if unavoidable, implement artificial sett creation and licensed exclusion/closure only 1 July–30 Nov with pre-feeding to alternative sett; apply speed controls and signage on access tracks. Badger SPP; repeat pre-construction survey ≤3 months pre-start; NatureScot licence for works within buffers or closures; ECoW supervision; post-works monitoring of sett activity and foraging behaviour.	Principal Contractor
TerresE15	Pre-construction Construction	Red squirrel Programme felling outside Feb–Sept where practicable; buffers: 50 m to breeding dreys; 20 m to standard dreys; retain ≥10 m perimeter tree belt for connectivity; stagger felling/soft-start; install artificial drey boxes in retained and compensation woodlands; consider licensed translocation if necessary, under the Scottish Code. Red Squirrel SPP; NatureScot licence if dreys affected; repeat preworks checks ≤3 months prestart and during breeding season; driver speed controls and signage.	Principal Contractor
TerresE16	Pre-construction Construction	Pine marten	Principal Contractor

Ref	Timing	Mitigation Required	Responsible person(s)
		Survey likely denning features; buffers: 30 m (non-breeding dens), 100 m (breeding dens); avoid Mar–Aug where practicable; phase/stagger felling to encourage dispersal; do not illuminate woodland; install artificial den boxes in quiet, connected woodland; apply speed controls. Pine Marten SPP; NatureScot licence if dens affected; den checks in breeding season; consider licensed conservation translocation if appropriate; monitor den box uptake.	
TerresE17	Pre-construction Construction	Otter Repeat pre-construction survey ≤3 months pre-start to 200 m of works; maintain dark riparian corridors; avoid bank obstruction; implement Otter SPP and speed controls near water crossings. Licence if holt/resting place affected; toolbox talks; ECoW to monitor for fresh signs and advise stand-offs/timing; stop-work and consult if discovered.	Principal Contractor
TerresE18	Pre-construction Construction	Reptiles (common lizard) & common amphibians Before clearance, lay reptile refugia (mats) across suitable habitat and allow settling; systematic check and translocate to preidentified receptor habitat; hand dismantle refugia (stone/brush/log piles) under ecological supervision; schedule works Apr–Sept (avoid hibernation); create refugia from felled timber and enhance south facing banks/varied swards. Reptile SPP; ECoW supervision and capture logs; receptor prepared/approved pre-start; post-works habitat enhancements in HMP. (GCN eDNA negative—no GCN licence required.)	Principal Contractor
TerresE19	Pre-construction Construction	INNS / Biosecurity (precautionary) None recorded; maintain biosecurity to prevent import/spread (clean-down plant and materials); monitor retained/created habitats and rapid-response if any INNS detected. Biosecurity Method Statement in CEMP; inspection schedule; quarantine and treat/dispose per best practice if discovered; keep auditable records.	Principal Contractor
TerresE20	Pre-construction Construction Operation	Off-site compensation (woodland creation) Deliver compensatory planting to replicate Scots pine dominated plantation with ~10% native broadleaf, early birch for structure, and habitat features (refugia/shelter); acknowledge ~30year maturity horizon for structure equivalence. Implement under NatureScot/Scottish Forestry approvals; establishment plan (stock, protection, weeding, beating-up, deer control); annual performance reporting.	Ardersier Port

Ref	Timing	Mitigation Required	Responsible person(s)
Ornithology			
Ornitho1	Pre-construction Construction Operation	Site-wide – Pollution prevention & sediment control Implement PPG/GPP-compliant pollution prevention and sediment control across all working areas, with a focus on interfaces to intertidal/shoreline habitats, drainage outfalls, laydown/fuelling areas. Measures include: silt fencing/settlement, bunding/cofferdams at water interfaces, secondary containment, designated refuelling/maintenance zones away from water, spill kits/response drills, drainage isolation/booms as needed, weather-triggered stop-works, and turbidity/visual monitoring where an ornithological pathway to intertidal habitats exists. Through the CEMD Pollution Prevention Plan (incorporating SEPA GPPs), method statements and RAMS; emergency spill response plan; toolbox talks; verification and record-keeping in the mitigation log. Where applicable, align with Marine Licence conditions for works at the water interface.	Principal Contractor
Ornitho2	Pre-construction Construction	Waders (Inner Moray Firth SPA/Ramsar; Whiteness Head SSSI) Establish -verified setback buffers to mapped high-tide roosts and intertidal frontage adjacent to Ardersier Port; confirm when works occur near shorelines. Outline CEMD → CEMP (Bird Protection Plan); vantage watches and buffer plan appended to Method Statement; site briefings	Principal Contractor
Ornitho3	Pre-construction Construction	Waders (Inner Moray Firth SPA/Ramsar; Whiteness Head SSSI) Temporal management of noisiest tasks (e.g., piling, concentrated HGV runs) outside peak high-tide windows and severe cold snaps to minimise disturbance. Construction programme controls in CEMP; tide/meteorology check; Port sign-off.	Principal Contractor
Ornitho4	Pre-construction Construction Operation	Waders (Inner Moray Firth SPA/Ramsar; Whiteness Head SSSI) Directional lighting for quay/yard/tall items: downward facing, shielded, reduced spill toward intertidal; dimming/curfew where practicable. Lighting Plan approved by ECoW; night commissioning checks; records in Mitigation Log	Principal Contractor
Ornitho5	Pre-construction Construction Operation	Waders (Inner Moray Firth SPA/Ramsar; Whiteness Head SSSI)	Principal Contractor

Ref	Timing	Mitigation Required	Responsible person(s)
		Traffic discipline along shore-adjacent corridors: fixed access routes, speed limits, consolidated runs; no ad-hoc access at beach edge. Traffic Management Plan within CEMP; toolbox briefings; weekly ECoW inspections.	
Ornitho6	Construction	Waders (Inner Moray Firth SPA/Ramsar; Whiteness Head SSSI) Contingency quiet roost (e.g., supratidal scrape/berm) if monitoring evidence sustained displacement pressure. Triggered by monitoring; implemented via HMP addendum and Method Statement; Ardersier Port approval.	Principal Contractor
Ornitho7	Construction Operations	Inner Moray Firth SPA/Ramsar and Moray Firth SPA (nonbreeding divers, grebes, sea ducks, shag) Maintain roost buffers; temporal management at peak high tide windows/cold snaps; bund screening; directional/curfewed lighting; disciplined access; and vessel protocol for assembly/towout (slow, predictable transits on agreed routes; avoid peak periods where practicable; limit RIB speed/turns; on water observation and adaptive response if notable displacement observed). All towout activities must adhere to the vessel management protocol, maintaining a speed of no more than 3–4 knots throughout the harbour area until clear of the site. EIAR Appendix 13.9 measures transposed to CEMD → CEMP / HMP; Method Statements; Ardersier Port signoff; Marine Licence / planning conditions as applicable; briefings and compliance checks	Principal Contractor Ardersier Port
Ornitho8	Pre-construction Construction Operation	Intertidal/shoreline birds (SPA/SSSI assemblage) Maintain existing ~3 m consented bund along consented boundary; install an additional ~2 m eastern bund (location to be confirmed) to reduce line-of-sight disturbance to roosts. Shown on design drawings; earthworks Method Statement within CEMP; verification and maintenance checks.	Ardersier Port
Ornitho9	Pre-construction Construction	Breeding birds (onsite habitats) Pre-works nesting bird checks within 48 hours of clearance March–August; apply species-appropriate 10–50 m buffers; pause works until fledging if active nests found.	Ardersier Port

Ref	Timing	Mitigation Required	Responsible person(s)
		Ecologist survey Method Statement; buffer plan annexed to CEMP; maintain survey records and Mitigation Log.	
Ornitho10	Pre-construction Construction	Raptors incl. Schedule 1 (e.g., peregrine) Survey & map active nests; set species-specific exclusion buffers; no felling/disturbance within buffer during breeding; licence only if unavoidable. NatureScot Schedule 1 licence if required; Raptor Protection Plan in CEMP; specialist ornithologist supervision and reporting.	Ardersier Port
Ornitho11	Pre-construction Construction	Pinewood specialists (crested tit [Schedule 1], common crossbill [Schedule 1], woodcock, others) Habitat management in the Scots pine plantation: retain selected mature conifers, create standing deadwood, maintain buffer belts on edges adjoining sensitive areas; phase works to avoid peak breeding activity. Commitments in Habitat Management Plan (HMP); mark-ups on site plans; method statements and audits.	Ardersier Port
Ornitho12	Pre-construction Construction	Scots pine plantation & retained buffers Retain and protect buffer belts (e.g., along plantation edges that interface with intertidal receptors and key movement corridors); avoid unnecessary break-throughs; maintain canopy connectivity. (Specific locations to mirror the 'retained habitats' figure once issued.) Shown on HMP / Project Description figures; fencing/markings; CEMP protection measures; verification; align with forthcoming retained-habitats figure.	Ardersier Port
Ornitho13	Pre-construction Construction	Designated-site bird features (SPA/SSSI/Ramsar) Sediment & pollution control focused at intertidal interfaces: silt fencing, bunding, cofferdams, spill plans to protect intertidal feeding grounds. CEMP Pollution Prevention Plan; trained spill responders; ECoW spot-checks and incident reporting.	Ardersier Port
Ornitho14	Pre-construction Construction	All ornithology receptors Outline CEMD → CEMP adoption (Bird Protection Plan, Lighting Plan, Traffic Management Plan, Raptor Plan) and personnel to oversee implementation and adaptive management. Formal plan approvals; RAMS aligned; ECoW appointment and duties per internal streamlining guidance.	Ardersier Port
Ornitho15	Construction	All ornithology receptors	Ardersier Port

Ref	Timing	Mitigation Required	Responsible person(s)
		Toolbox talks/inductions covering legal protections, buffers, lighting controls, traffic discipline, stop-work triggers and reporting lines. Training records; daily briefings; permit-to-work conditions; spot-checks.	
Ornitho16	Construction	All ornithology receptors Monitoring & reporting: mitigation log and weekly dashboard to PMT; adaptive updates to methods; stop-work if trigger breached. field forms; weekly PMT notes; corrective action tracker filed with CEMP.	Ardersier Port
Ornitho17	Operation	Tall structures/assembly lifts (barrier/collision) Operational protocol for tall lifts: avoid prolonged static positions intersecting common flight bands during peak movement or poor visibility; apply weather/tide-aware lift scheduling. Operational Method Statements; Arddersier Port Team advice; control room checklist before lifts; record exceptions.	Ardersier Port

15.3 ENHANCEMENTS

In addition to the mitigation described above the Haventus project team have been exploring enhancements that could be implemented in and around the proposed development. These are summarised below.

Planting for pollinators

Approximately 2km of verge side vegetation along the port access road will be enhanced to benefit pollinators by seeding, planting of native trees and shrubs, and vegetation management.

Invertebrates and brownfield plants

Where opportunities exist the creation of 'butterfly and bee banks' to support invertebrates and plants that would have naturally colonized the sandy open undeveloped areas of the site. As this enhancement will, at least in part, opportunistically use long-term features on the site it will not be possible to provide a location or final designs for this enhancement until the site plans are finalised.

Island extension (Bird Roosting and Nesting Area)

An island created in 2023 from dredging activity is actively used by breeding terns and roosting waders. A portion of the island was lost during the 2025 dredge campaign. The island could be expanded by approximately 10,000m² to increase the nesting and roosting space for seabirds, waders and seaducks as described in EIAR Chapter 3 (Project Description). The potential impacts upon coastal processes associated with this potential change has also been assessed and is provided in EIAR Chapter 10 (Coastal Processes and Geomorphology).

Wader and Wetland Biodiversity.

The 'lagoon' is artificially created although it is part of the Whiteness Head SSSI and Inner Moray Firth SPA. This area will be enhanced by removing a portion of the bund to reconnect the lagoon with Whiteness Sands. Further enhancements will aim to encourage SPA species to make better use of the lagoon area by creating islands and a network of pools at the landward end of the lagoon.

Whiteness Head SSSI Vegetation Management

A NatureScot condition assessment of the sand dune features of Whiteness Head SSSI list invasive gorse and rosebay willowherb as negative pressures contributing to the decline of some features of the SSSI. Approximately 90% of the gorse will be removed and rosebay willowherb will be reduced on the section of the SSSI within Ardersier Port control.

Wetland Creation

2ha of the development site has been set aside to create a wetland area. The final design of the wetland area is still to be determined but it is envisioned that the design will include a permanent waterbody and a network of ephemeral pools. As the 2ha has been set aside for biodiversity purposes part of it may, if required, be used for mitigation purposes such as transplanting plant communities. This area will also in part be used to translocate/establish habitats as described in EIAR Chapter 12 (Terrestrial Ecology) mitigation section, so whilst the majority of the wetland creation is an enhancement the area as a whole will also include mitigation elements.

Woodland Enhancement

A strip of existing plantation, 20m deep, will be retained as a screen buffer for the road and neighbouring properties. This strip primarily consists of commercial Scots pine plantation with gorse scrub and heath in open areas and a small roadside pond. This strip while in part, being used for mitigation purposes can be further enhanced for biodiversity benefits. The monoculture plantation strip will be enhanced for biodiversity by introducing native broadleaf species, deadwood creation and selective felling to increase light permeability to encourage natural regeneration from the existing seed bank.

Further detailed consideration of each of the above initiatives is provided in EIAR Appendix 15.1. Detailed design and implementation would be carried out in consultation with The Highland Council ecology team and NatureScot should the concepts be approved and permission for the extension obtained.