Ardersier Port (Scotland|) Ltd

# Ardersier Port Permitting Support

## MD-LOT Consultation Response Letter

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Louise Treble
Marine Directorate
Scottish Government,
5 Atlantic Quay,
150 Broomielaw,
Glasgow,
G2 8LU

Dear Louise,

Our ref: 00011871, 00011872 & 00011873 - Ardersier Port Ltd - Ardersier Port Expansion Project - Ardersier Port - Consultation End and Additional Information Request.

Response to Marine Directorate - Ardersier Port Expansion Project

Ardersier Port Ltd (hereafter referred to as 'the Applicant') extends its gratitude to Marine Directorate and their consultees for their response on our application for a Marine Licence to expand and develop the port, the expansion includes the construction of an expanded harbour area to support offshore wind assembly and related port activities.

The information provided within this letter has been submitted to address the specific comments made by the Marine Directorate and their consultees and received on the 6 July 2026, in relation to commercial fisheries, coastal processes and geomorphology, socio-economics, navigation, aviation, ornithology, communication, and the historic environment.

This letter provides information within Appendix A on the specific points raised below in relation to commercial fisheries, with responses presented in the same order as the points listed below:

1. Alleged Impacts from Phase 1 Dredging Activities;
2. Risk of Repeating or Amplifying Impacts During Phase 2;
3. Adequacy of the Commercial Fisheries Assessment and EIA;
4. Compliance with National Marine Plan Fisheries Policies;
5. Consultation and Engagement with the Fishing Industry;
6. Effectiveness of Mitigation Measures;
7. Increased Vessel Traffic and Navigational Risk;
8. Ecosystem, Wildlife and Coastal Process Concerns; and
9. Cumulative Loss or "Squeeze" of Fishing Grounds.

In addition, this letter provides information within Appendix B on the specific points raised below in relation to sediment transport processes:

- Concerns around sedimentation within Nairn Harbour due to the proposed, and previously carried out dredging activities; and
- Concerns around sedimentation with Findhorn Bay and Burghead Harbours due to the proposed, and previously carried out disposal activities.

Furthermore, the Applicant has provided full responses to each individual point raised by the Marine Directorate and their consultees, for the other above mentioned receptors, within Appendix C.

Ardersier Port will separately respond to the formal request for Additional Information under The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

Thank you in advance for consideration of our responses and the supporting information.

Kind regards,

Dr. Jack Poleykett
Principal Environmental Consultant – Xodus

On behalf of

Dr. Campbell Fleming
Head of Consenting – Ardersier Port (Scotland) Ltd.

Enclosed:

- Appendix A: Commercial fisheries
- Appendix B: Coastal processes and geomorphology
- Appendix C: Gap analysis

# APPENDIX A COMMERCIAL FISHERIES

This Appendix has been provided in response to the concerns raised by Scottish Fishermen's Federation (SFF) and Northwest and Southwest Regional Inshore Fisheries Group (RIFG) during the Ardersier Port's Energy Transition Facility (EFT) (also referred to as 'Phase 2' Expansion) EIA Consultation. SFF provided its consultation response on behalf of the 450 plus fishing vessels in membership of its constituent associations: the Anglo Scottish Fishermen's Association (ASFA), Fife Fishermen's Association (FFA), Fishing Vessel Agents and Owners Association (FVAOA), Mallaig & North West Fishermen's Association (MNWFA), Orkney Fisheries Association (OFA), Scottish Pelagic Fishermen's Association (SPFA), the Scottish White Fish Producer's Association (SWFPA) and Shetland Fishermen's Association (SFA).

It is noted that many of the comments relate to Ardersier Port's completed Phase 1 expansion. As the SFF and Northwest and Southwest RIFG representations raise similar concerns, the comments are grouped together and responded to here.

### 1. Alleged Impacts from Phase 1 Dredging Activities

#### Stakeholder Concern

Fishing representatives report substantial reductions in catches, gear damage, harbour silting, loss of species, declines in biodiversity, dead shellfish, seabird impacts and marine debris, which they attribute to the Phase 1 capital dredging and disposal campaign.

#### Response

The concerns raised by local fishermen are acknowledged and recognised as important. However, no evidence has been provided that demonstrates actual impacts or any direct causal link between the reported observations and the Phase 1 works at Ardersier.

Ardersier Port undertook Phase 1 activities in accordance with the marine licence granted and maintained detailed dredging and disposal records throughout the works between 3 May 2025 to 18 July 2025. Pre- and post-dredge bathymetric surveys of the Burghead disposal site were completed in 31 March 2025 and 27 July 2025, respectively. These show that deposited material remained largely within the designated disposal area, and the completed surveys indicated that the accumulation (<3 m) was primarily contained within the disposal site, and that limited dispersion beyond the authorised footprint has occurred, as shown in Figure 1.

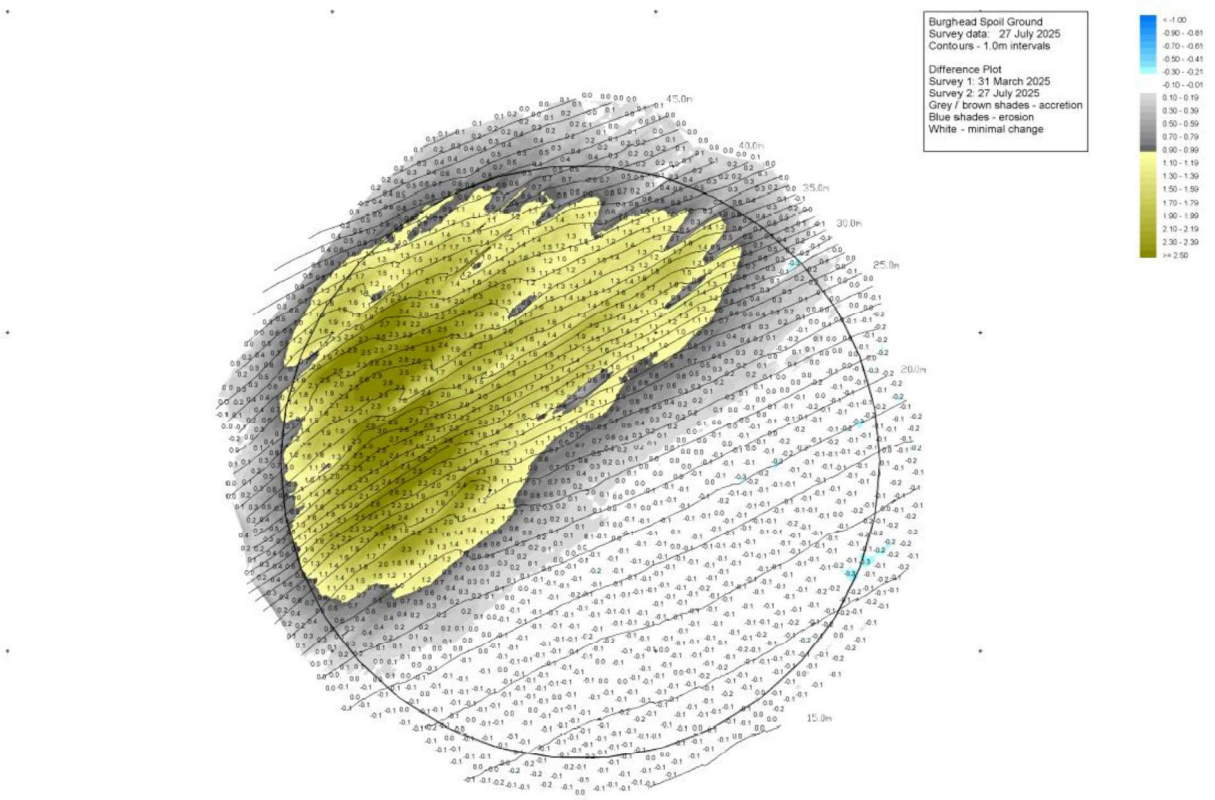



*Figure 1 Dredged material accumulation at the Burghead disposal site from pre-dredge to post-dredge period*

The dredged material was predominantly composed of sand (circa 75%) with minor silt and gravel content which is significantly less likely to remain suspended and travel long distances. It is also noted that the dredger carries out dewatering of the dredged material within the barge that removed much of the silt content in the water, and does not transport the fine particles to the sea disposal site. This further limits the amount of sedimentation at the sea disposal site. Additional assessments of tides, currents, wave conditions and sediment characteristics concluded that widespread dispersal was unlikely, this assessment is provided in Appendix B.

Claims relating to reduced catches, shellfish mortality, loss of sand eels, seabird declines and other ecological changes have not been supported by monitoring data or evidence establishing a connection with the project. While these observations are noted, they can be neither conclusively verified nor attributed to the Ardersier development.

Similarly, suggestions that dredging activities released industrial contamination are not supported by sediment testing results. Extensive chemical analyses demonstrated that Phase 1 dredged material was suitable for sea disposal, with contaminant concentrations either below regulatory thresholds or only marginally exceeding precautionary screening levels while remaining well within acceptable limits.

Regarding debris, the dredger mouth's size is incapable of dredging up large pieces of industrial debris. The only dredge method used to supply the sand and gravel to the barge vessels was cutter suction. This involves a rotating cutterhead with teeth to dig the sediment and behind that cutterhead sits a diaphragm through which a mixture of around three parts seawater and one part sediment is drawn. That mixture flows through pipework before being

discharged into either the reclamation area on shore (at the start of the dredge) or into the barges (barge hoppers). Figures 2 and 3 below show the dredger's cutter head and debris entangled into the head. It is importantly noted that the three apertures in the diaphragm through which everything has to flow are 25 cm in diameter each, restricting the size of substances and objects that could be picked up by the dredger. It is therefore unlikely that any debris found is related to the dredging campaign for Ardersier Phase 1 expansion. In fact, extensive debris removal was undertaken before dredging commenced, and any debris recovered during operations was removed to licensed facilities onshore (Figure 4). The same method of cutter suction is currently planned for the Phase 2 dredge, which for the reasons above means that debris such as chain scaffolding poles etc cannot be mixed into the sands for disposal.



*Figure 2 Cutter suction dredger head*



*Figure 3 Debris entangled into the dredged head*



*Figure 4 Debris removed prior to Phase 1 dredging*

Overall, while the concerns are understood, the available evidence does not support the conclusion that the reported impacts were caused by the Phase 1 dredging campaign.

## 2. Risk of Repeating or Amplifying Impacts During Phase 2

### Stakeholder Concern

The proposed Phase 2 dredging and disposal campaign may repeat or worsen the impacts allegedly experienced during Phase 1, resulting in cumulative environmental damage, contamination and loss of fishing grounds.

### Response

Ardersier Port does not consider there to be evidence that Phase 1 activities caused the impacts reported by fishing industry representatives and therefore does not agree that Phase 2 represents a continuation of demonstrated harm.

As discussed in the response above, the assessment supporting the application indicates that dredged material disposal will largely be confined to the designated Burghead disposal site, which exists specifically for this purpose. Modelling and monitoring show that sediment movement outside the disposal area is expected to be limited due to the nature of the material, disposal depth and prevailing hydrodynamic conditions. This is further discussed in Appendix B of this letter.

The dredged material has also been subject to extensive chemical testing and is considered suitable for sea disposal. There is no evidence that disposal activities have resulted, or will result, in contamination pathways affecting commercial catches or marine ecosystems beyond the disposal site.

Consequently, Ardersier Port does not consider that Phase 2 will generate significant environmental effects beyond the immediate project footprint, nor result in the widespread impacts suggested by fishing industry representatives. The Project's EIA assessments concluded that impacts on marine mammals, migratory fish, seabed ecology, and coastal processes would not be significant. NatureScot was content that significant effects on bottlenose dolphin and other marine mammals are not anticipated subject to the proposed mitigation measures, while the migratory fish assessment concluded that significant effects on diadromous fish are not expected.

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## 3. Adequacy of the Commercial Fisheries Assessment and EIA

### Stakeholder Concern

The Environmental Impact Assessment is said to underestimate impacts on fisheries, particularly smaller inshore vessels, and fails to adequately reflect local fishermen's knowledge and observations.

### Response

Ardersier Port acknowledges that industry datasets have limitations, particularly regarding vessels under 15 metres, and this limitation is transparently recognised within the EIA.

However, the assessment does not rely solely on one dataset and considers multiple sources of fishing activity information alongside professional judgement. The assessment also recognises that local fishing patterns may not be fully represented in available datasets.

Most importantly, the conclusions of the assessment are based on the scale and location of project activities. All the dredging works proposed occur within the Inner Harbour Area where fishing activity does not take place, while dredged material disposal occurs within an established disposal site specifically designated for that purpose.

We are open to engagement with local fishing organisations, and this is considered beneficial. However, Ardersier Port does not consider that the available information identifies a credible pathway that would lead to significant adverse impacts on commercial fisheries. Consequently, the EIA conclusions remain unchanged, and Marine Directorate – Science, Evidence, Data and Digital (MD-SEDD's) review of the commercial fisheries assessment of the EIA concluded that even with the limitations of the data, there are no further issues that need addressed. MD-SEDD further concluded that due to the short term, highly localised nature of the dredging and piling, alongside the coarse sandy sediment type meaning sediment plumes will be very limited, the impacts to commercial fisheries in adjacent areas to the development are not likely to be significant.

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## 4. Compliance with National Marine Plan Fisheries Policies

### Stakeholder Concern

The project is alleged to conflict with National Marine Plan policies relating to protection of fishing interests, fisheries sustainability and coexistence.

### Response

Ardersier Port considers that the project has been assessed against relevant National Marine Plan policies through the EIA process and supporting assessments.

The Commercial Fisheries Assessment specifically considered fishing activity, economic value and potential impacts on fisheries, concluding that effects would be minor and not significant. The assessment also considered cumulative effects and interactions with other marine users.

The project footprint is primarily restricted to existing port areas and a designated disposal site. As a result, the port's position is that existing fishing opportunities are largely preserved and that impacts on fishing activity are limited, localised and temporary.

Ardersier Port therefore believes the project is consistent with relevant marine planning policies and that claims of policy conflict are not substantiated by the evidence available. Consideration of the relevant policies within Scotland's National Marine Plan (GEN 1 – GEN 5, GEN 7 – GEN 13, and GEN 18 – GEN 21) and the proposed development's compliance with those policies, is provided in the application forms submitted as part of the application.

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## 5. Consultation and Engagement with the Fishing Industry

### Stakeholder Concern

Fishing organisations state that there has been insufficient engagement with local fishermen and fishing representatives.

### Response

Ardersier Port accepts that engagement with the fishing industry could have been broader and acknowledges concerns regarding the level of direct engagement with local fishers.

However, consultation with fishing organisations was undertaken during preparation of the EIA through the Scoping exercise, and the Commercial Fisheries Assessment was included specifically in response to requirements identified during the scoping process a total of four fishing organisations (SFF, North East Coast Inshore Fishermen's Group, Scottish Creel Fishermen's Federation and Scottish Whitefish Producers Organisation) were consulted, and only the SFF responded, noting concerns raised by local inshore fishers and recommending that those directly affected should provide input to the EIA.

In addition, two statutory pre-application public consultation events were held before submission of the planning and marine licence applications. While attendance from fishing representatives was evidently absent, the opportunity to participate was provided.

Ardersier Port is committed to engagement with the fishing industry organisations and welcomes further discussion to ensure that local concerns are understood and considered throughout development and operation of the project.

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## 6. Effectiveness of Mitigation Measures

### Stakeholder Concern

The proposed mitigation measures are considered inadequate and place the burden of adjustment on fishermen.

### Response

Ardersier Port considers the mitigation measures to be proportionate to the scale and nature of the predicted effects.

Key project activities occur either within the Inner Harbour Area or within the designated disposal site, both locations specifically intended for the activities proposed. Modelling and assessment indicate that impacts beyond these areas will be limited on any receptors such as migratory fish, marine mammals, fishing and many others. Dredging-related vessel activity is expected to involve 13 to 23 barge movements per day over approximately ten weeks, and thus the impacts are short-lived and not expected to significantly increase from the baseline.

Navigation management, Notices to Mariners, operational coordination and ongoing engagement form part of the mitigation strategy. Given that significant effects on commercial fisheries have not been identified through the assessment process, additional compensation or more extensive mitigation measures are not considered necessary.

Ardersier Port's position is therefore that the proposed mitigation is appropriate to the nature of the identified risks.

## 7. Increased Vessel Traffic and Navigational Risk

### Stakeholder Concern

The project will substantially increase marine traffic, resulting in navigational conflict, gear loss and reduced access to fishing grounds.

### Response

The current applications will result in temporary vessel movements associated with the proposed dredging and disposal campaign. Operational vessel movements associated with the wider port development have already been assessed as part of the consented phase 1 and are not materially increased by the current applications.

Dredging-related barge movements are temporary, occurring over approximately a ten week period and generating 13 to 23 barge movement per day that will utilise the established route between Ardersier Port and the designated Burghead sea disposal site. Operational vessel traffic is based on a maximum worst-case scenario of 400 vessel calls per year which was assessed and approved as part of the Phase 1 project. Phase 2 therefore presents no increase to the current baseline.

The current proposal includes up to 26 turbine towage operations per year, generally averaging one tow per week during the April to September towage season. Towed turbines will travel slowly and use established shipping routes. Due to the low frequency of these towage events, impacts on other sea users will be non-significant.

The assessment therefore concluded that navigational and operational effects on fisheries would be limited and not significant, although continued dialogue with fishing representatives is welcomed to minimise any disruption.

## 8. Ecosystem, Wildlife and Coastal Process Concerns

### Stakeholder Concern

There are concerns regarding impacts on dolphins, migratory fish, seabirds, coastal erosion, sandbanks, Fort George and wider marine ecosystems.

### Response

The project has been subject to detailed EIA covering marine mammals, fish, seabed habitats, sediment transport and coastal processes.

The dredged material has been tested and demonstrated to be suitable for sea disposal through chemical testing. Sampling undertaken during the Phase 1 work as well as the current application indicate that contaminant concentrations are not elevated above acceptable levels. Environmental assessments concluded that impacts on fish,

marine mammals and other ecological receptors would be temporary, localised and not significant. NatureScot also agreed with these findings and concluded that subject to the proposed mitigation measures, significant effects are not anticipated.

Sediment transport monitoring undertaken during Phase 1 has not identified evidence of project-related changes to wider coastal sediment budgets. Neither the Riff Bank nor Whiteness Sands was dredged or reduced during the Phase 1 dredging campaign. The dredging currently proposed is restricted to the Inner Harbour and therefore will not directly alter these features or the wider coastline of the Inner Moray Firth. NatureScot's review of the hydrodynamic modelling also concluded that changes to coastal processes would be minor and localised.

Monitoring data and assessment findings therefore do not support claims that the project will result in significant impacts on dolphins, migratory fish populations, protected coastal features or wider ecosystem health.

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## 9. Cumulative Loss or "Squeeze" of Fishing Grounds

### Stakeholder Concern

The project contributes to a broader cumulative reduction in available fishing grounds across the Inner Moray Firth and wider region.

### Response

Ardersier Port recognises wider concerns about increasing marine development activity but does not consider that this project will materially contribute to a significant loss of fishing grounds.

Project activities occur within the Inner Harbour Areas where there is no fishing, or at the designated Burghead disposal site. As such, direct other interactions with active fishing grounds are limited. The proposed capital dredging and disposal campaign will last approximately 10 weeks, and involve only 13 to 23 vessel movements per day, and thus the impacts are short-lived and not expected to significantly increase from the baseline.

A cumulative assessment was undertaken as part of the EIA and concluded that cumulative impacts on commercial fisheries would not be significant. Operational vessel traffic was assessed as part of the consented phase 1 development and the Phase 2 does not present an increase to the already approved vessel traffic. Operational vessel traffic will largely follow existing shipping routes and therefore represents a continuation of established marine use patterns rather than the creation of new exclusion areas.

While broader industry concerns regarding cumulative development pressures are acknowledged, the evidence indicates that this project would not contribute to any regional displacement of fishing activity for the reasons above and that operational movements are very similar to those already assessed as part of the consented phase 1. Appendix 5.7 of the EIA assessed in detail cumulative effects and concluded they would not be significant.

Ardersier Port does not consider compensation to be warranted because the assessment concluded that impacts on fisheries would be minor, temporary and not significant.

Unlike developments that permanently remove access to extensive fishing grounds, the Ardersier project is largely confined to existing port infrastructure and a designated disposal site. Consequently, no significant loss of fishing opportunity is anticipated due to a ten-week dredge disposal exercise.

Ardersier Port therefore considers that compensation mechanisms are not justified on the basis of the evidence available and the scale of the predicted effects.

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## Overall Conclusion

While the concerns raised by fishing organisations and individual fishermen are recognised and taken seriously, Ardersier Port's position is that the objections rely largely on anecdotal observations that have not been supported by evidence demonstrating a direct link to the project. In contrast, the application is supported by environmental assessments, sediment testing, hydrodynamic modelling, disposal site monitoring, bathymetric survey data and regulatory review. Collectively, this evidence indicates that project effects are localised, temporary and largely confined to the port area and designated disposal site, with no significant impacts predicted for commercial fisheries, marine ecology, navigation or coastal processes. Ardersier Port nevertheless are open to constructive engagement with the fishing industry as the project progresses.

# APPENDIX B COASTAL PROCESSES AND GEOMORPHOLOGY

## B.1 Non-Technical Summary

Ardersier Port is currently in the process of seeking consent for a proposed Port Extension development, which includes the construction of an expanded harbour area to support offshore wind infrastructure assembly and related Port activities. As part of these works, up to 2,000,000 $m^3$ of sediments are to be dredged from the inner harbour in order to achieve the required operational depths. Dredged material is to be disposed of at the licensed Burghead (CR030) offshore disposal site (Haventus, 2025a)[1].

During consultation, concerns were raised regarding the potential for sediments released into the water column during dredging activities to be transported towards Nairn Harbour, located approximately 8 kilometres (km) southeast of the dredge channel. Concerns were also raised regarding the potential for sediments released during disposal activities to be transported towards Findhorn Bay and Burghead Harbour, located approximately 8 km and 2 km southwest of the disposal site, respectively. It was suggested that such transport could affect the rate or extent of sediment deposition and accumulation within these areas, with stakeholders postulating that dredging and disposal activities undertaken during the previous campaign may have already contributed to increased sediment deposition or accumulation within Nairn Harbour, Burghead Harbour or Findhorn Bay.

To address these concerns, the likely transport and fate of sediments disturbed during dredging and disposal activities was assessed. The assessment considered the potential for these sediments to lead to enhanced sedimentation within Nairn Harbour, Findhorn Bay and Burghead Harbour.

Figure 5 presents a map of the study area marking the dredge channel within the limits of Ardersier Port, the proposed disposal site at Burghead and the location of Nairn Harbour, Findhorn Bay, and Burghead Harbour relative to the proposed works.

[1] *Haventus (2025a). ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION, Chapter 3 Project description.*

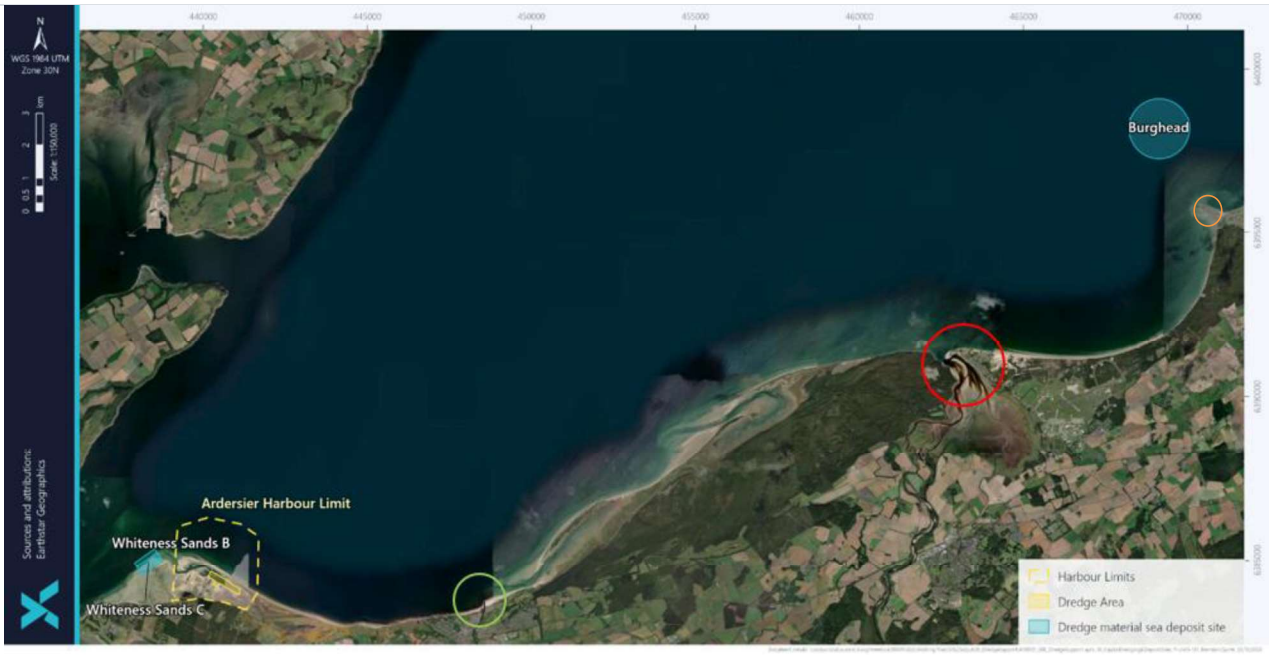



*Figure 5 A map of the study area. The designated disposal site at Burghead, and the dredge channel within the limits of Ardersier Port are noted. The relative locations of Nairn Harbour, Findhorn Bay, and Burghead Harbour are marked by the green, red, and orange circles, respectively. Figure reproduced from Xodus (2026)[2]*

Sections B.1.1 and B.1.2 provide a non-technical summary for these concerns, with Section B.2 providing a detailed technical assessment on the issues raised.

### B.1.1 Sedimentation within Nairn Harbour

The potential for dredged sediments to affect Nairn Harbour which is located approximately 8 km to the southeast of Ardersier Port, was identified as a concern. To investigate this, an assessment was carried out to understand how far sediment released during dredging could travel and whether there is any realistic pathway by which it could reach Nairn Harbour and contribute to increased sediment build-up. The detailed assessment is provided in Section B.2.

Dredging will be carried out using specialist dredging vessels that remove sediment from the Port area and transfer it into a barge hopper. Most of the dredged material remains within the dredging equipment and vessels. While a small amount of sediment can be released into the water during the process, sediment sampling has shown that the material to be dredged is made up mainly of sand, with only small amounts of finer sediment. As sand settles quickly, only a small proportion of fine grained material has the potential to remain suspended in the water for any length of time.

The assessment found that even the finest sediment likely to be released during dredging would be expected to travel no more than around 600 m before settling back onto the seabed. Although a small amount of silt released may remain in the water and travel farther than 600 m, it would become increasingly diluted and transported in the direction of both the flooding and ebbing tide rather than continuously towards Nairn Harbour. Wave heights and

[2] *Xodus (2026). Ardersier Port Permitting, Support Best Practicable Environmental Option Assessment.*

current speeds within the harbour are generally low, meaning that settled sediments are unlikely to be disturbed and transported elsewhere. As the dredging area is located considerably further from the Port entrance than the expected distance of transport (800 m – 1800 m away), these sediments are expected to remain within the Port limits and would not be transported towards Nairn Harbour. Therefore the proposed dredging works are not expected to increase sedimentation within Nairn Harbour.

These findings are consistent with the findings of the Environmental Impact Assessment Report (EIAR, Chapter 10 Coastal Processes and Geomorphology; and Appendix 10.3 Coastal Processes Assessment), which concluded sediment plume effects were localised and short-lived, and suspended solids measured at the Port during the 2025 dredge indicated no significant increase in suspended solids during the dredge. This conclusion is also consistent with the consultation response from MD-LOT/SEDD, which agreed that effects on coastal processes and geomorphology were not considered significant.

### B.1.2 Sedimentation within Findhorn Bay and Burghead Harbour

During consultation concerns were raised that dredged material disposed of at the Burghead (CR030) disposal site could eventually be transported into Findhorn Bay and/or Burghead Harbour and contribute to sediment build-up, potentially affecting navigation and access. To investigate this, an assessment was undertaken to determine whether sediment placed at the disposal site could be transported towards these locations. The detailed technical assessment is provided in Section B.2.

When dredged material is disposed of at sea, most of it settles rapidly onto the seabed close to the point of release. Typically, around 90 to 95% of the material reaches the seabed almost immediately, while only a small proportion remains suspended in the water and is available to be carried by tidal currents.

The dredged material to be disposed consists mainly of sand, with only small amounts of finer sediment. The dredging process removes most of the finer sediments before the material reaches the disposal site. This means that the material ultimately deposited at the disposal site will mostly contain coarse and medium sand, and gravel sediments, which settle quickly and are unlikely to be carried long distances by currents.

The assessment found that even the small amount of fine sediment that may remain in suspension following disposal would be expected to settle within approximately 1.6 km of the disposal site, while coarse sand sediments (which form most of the material to be disposed) will settle within 500 m. By comparison, Findhorn Bay is located approximately 8 km away, and Burghead Harbour is located 2 km away. This indicates that suspended sediments released during disposal are unlikely to reach the bay or the harbour. The tidal currents that are responsible for sediment transport are broadly oriented east north-east and west south-west, and therefore sediment will not be transported in the direction of Burghead Harbour, located towards the southeast of the disposal site.

The assessment also considered what happens after the sediment has settled on the seabed. Water depths at the disposal site are relatively deep and local waves and currents are generally too weak to pick up and transport the deposited material over long distances. This conclusion is supported by bathymetric surveys undertaken before and after disposal activities, which show that reworking of sediments is localised around the disposal site, with no evidence of significant volumes of sediment being transported away from the site. It should be noted that all dredged material is deposited within the Burghead Sea Disposal Site and, as evidenced by bathymetric surveys, remains predominantly contained within the designated disposal area. This site is designated for the disposal of clean dredged material by

the Scottish Government in order to minimise interaction with the environment and other sea users. This site has been in use for several years. Furthermore, Moray Council, as the Statutory Harbour Authority for Burghead Harbour, is responsible for maintaining the safe operation and navigability of the harbour. Therefore, any material change in sediment accumulation affecting navigational depths would be expected to be identified through its ongoing harbour management and maintenance activities.

With regards to concerns raised on the previous campaign already contributing to sedimentation in Findhorn Bay, it is noted that the bay is recognised as a natural sediment sink, with infilling driven by sediment inputs from the River Findhorn and surrounding coastal systems. Previous studies have identified the bay as an area of significant sediment accumulation and a natural repository for fine sediments transported by the river. These findings indicate that sedimentation within the bay is predominantly controlled by established natural and local sedimentary processes, which are unlikely to be affected by offshore disposal activities. The historic disposal activities are therefore not expected to have increased sedimentation within Findhorn Bay and/or Burghead Harbour (for the reasons stated above), neither are the proposed future disposal activities.

Based on the evidence currently available and presented above and within the technical assessment provided in Section B.2, Ardersier Port is unable to substantiate the claims made by SFF or Findhorn Fairways Committee regarding sedimentation of Burghead Harbour and Findhorn Bay. This conclusion is also consistent with the consultation response from MD-LOT/SEDD, which agreed that effects on coastal processes and geomorphology were not considered significant.

## B.2 Sediment Transport Technical Assessment

### B.2.1 Dredge and Disposal Operations

The dredging works will be undertaken using a Cutter Suction Dredger (CSD) supported by up to two Trailing Suction Hopper Dredgers (TSHD) and two split hopper barges. During dredging operations sediments are disturbed at the cutter head or suction draghead (hereafter referred to as the dredge head), entrained within the dredged slurry, and transported to the receiving hopper of the barge.

Although methodologies vary between dredger types, the mechanisms by which sediments are disturbed and released into the water column are broadly similar. The majority of dredged material is retained within the dredging system; however, a proportion of sediment may be released to the surrounding water column through disturbance at the dredge head and, where applicable, through overflow from the receiving hopper barge[3].

Coarser, sand sized sediments mobilised during dredging are expected to settle rapidly in the vicinity of the dredging activity. In contrast, fine grained sediments released at the dredge head or within overflow waters may remain in suspension for longer periods, transported by prevailing tidal currents before being deposited.

Disposal operations are typically undertaken either through bottom door release or placement via a fall pipe. During disposal, the discharged sediment-water mixture forms a negatively buoyant jet, known as a dynamic plume, which

*[3] This release occurs because dredged material is pumped into the barge hopper as a sediment-water slurry, typically comprising approximately three parts water to one part sediment. As the hopper fills, excess water, together with a proportion of the finer sediment fraction, is generally discharged via overflow.*

rapidly descends through the water column to the seabed due to its density and momentum (Dankers, 2002)[4]. Consequently, the majority of the disposed material is deposited on, or in close proximity to, the release location.

A smaller proportion of the disposed sediment may remain suspended within the water column, forming a passive plume that is subsequently transported by prevailing currents. The behaviour of the passive plume is influenced by factors including sediment characteristics, disposal method and local hydrodynamic conditions. For numerical modelling purposes, the proportion of material contributing to the passive plume is commonly assumed to be between 5% and 10% of the total disposed volume, indicating that up to 90% to 95% of the disposed dredged material is deposited on the seabed at, or close to, the point of release as part of the dynamic plume (Becker et al, 2015)[5].

### B.2.2 Oceanographic Setting

The oceanographic setting has been described in previous reports submitted as part of the marine licence application. The following briefly summarises the local regimes in order to provide suitable context to the reader regarding the site characteristics and key driving processes governing the local sediment transport regime within, and at close proximity, to the Port limits, and at the disposal site. For a comprehensive overview of the local and regional marine and coastal physical processes please refer to EIA Chapter 10 Coastal Processes and Geomorphology (Haventus, 2025b)[6] and Appendix 10.3 Coastal Processes Assessment (Haventus, 2025c)[7].

To further strengthen the evidence base, additional tidal current and wave data was sourced from the Atlas of UK Marine Renewable Energy Resources (Renewable Energy, 2008)[8]. Historic bathymetric data and records detailing the dredging and disposal operations undertaken by Ardersier Port between May and July 2025 were also reviewed to assess post disposal seabed elevation changes and the distribution of deposited material following disposal (Haventus, 2026)[9].

The bathymetry of the dredge channel and of the disposal site influences the behaviour and transport of sediments liberated to the water column during dredging activities. Within Ardersier Port, where the dredging will take place, the navigation channel and outer harbour are currently maintained at water depths of approximately -12.4 m relative to Chart Datum (CD). Water depths within the Burghead disposal site range from circa 17 m to 40 m (Xodus, 2026).

Surficial sediments within the dredge channel are predominantly sandy in nature comprised of fine to medium coarse sand. Down core samples retrieved from 32 borehole locations acquired in 2023 and 2025 across the proposed dredge channel, indicated that the material to be dredged is primarily composed of sand with minor silt and gravel content associated with subsurface sediments (Xodus, 2026).

The tidal range at Ardersier Port varies from a mean neap tidal range of approximately 1.6 m to a mean spring tidal range of 3.3 m, with a maximum astronomical tidal range of 4.6 m. Tidal currents within the dredge channel are

[4] *Dankers, P.J.T., (2002). The Behaviour of Fines Released Due to Dredging - a Literature Review. Technical Report. Hydraulic Engineering Section, Faculty of Civil Engineering and Geosciences, Delft University of Technology.*
[5] *Becker, M., van Eekelen, E.M.M., de Wit, L., van Koningsveld, M., & de Heer, J. (2015). Estimating source terms for far field dredge plume modelling. Journal of Environmental Management, 149, 282–293. DOI: 10.1016/j.jenvman.2014.10.020.*
[6] *Haventus (2025b). ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION, Chapter 10 Coastal Processes and Geomorphology.*
[7] *Haventus (2025c). ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION, Appendix 10.3 Coastal Processes Assessment.*
[8] *Atlas of UK Marine Renewable Energy Resources. (2008). ABPmer. Date of access (01 August 2026) http://www.renewables-atlas.info/.*
[9] *Burghead Spoil Ground: Disposal logs, Survey and Difference Plots, Survey 1: 31 March 2025 and Survey 2: 27 July 2025.*

typically weak, generally remaining below 0.30 m/s (Haventus, 2025c). Peak spring tidal currents at the disposal site are also relatively low, broadly oriented east north-east and west south-west, and range between 0.20 m/s and 0.35 m/s (Renewables Atlas, 2008).

By design, the harbour is largely sheltered, and wave activity is therefore expected to have a limited influence on sediment transport within the harbour limits. Significant wave heights at the disposal site are similarly low, typically <0.83 m (Renewables Atlas, 2008). This reflects the site's naturally sheltered location within the inner Moray Firth, where the semi-enclosed coastal setting limits wave development and reduces exposure to energetic wave conditions in the North Sea.

A conceptual understanding of sediment transport and coastal morphology developed as part of the EIA indicated that transport within the local coastal system outside of the Port limits is predominantly directed towards the northwest (Haventus, 2025c). At the disposal site, sediment transport is generally limited, and directed towards the southwest (Renewable Energy, 2008).

Findhorn Bay is also influenced by substantial local and fluvial sediment inputs. Brew (2001)[10] identified the bay as an area of significant sediment accumulation and concluded that this accumulation cannot be attributed solely to marine-derived sediments. Instead, large scale reworking of glacial sediments by the River Findhorn is considered to be a major influence on sediment dynamics within the coastal margin. The study also noted that accretion patterns within the bay are further complicated by the presence of the extensive wind-blown deposits of the Culbin dunes. Historic geomorphological evidence indicates that the Findhorn sand spit has progressively developed westwards, affecting the position and morphology of the navigational channel (Brew, 2001). These observations demonstrate that changes at the entrance to Findhorn Bay are consistent with a long-term pattern of sediment transport, deposition and morphological evolution.

### B.2.3 Approach to Assessment

To assess the potential behaviour of cohesionless sediments during dredging and disposal activities, consideration was given to both the transport of sediments entrained into the water column and the subsequent behaviour of sediments deposited at the disposal site. Suspended sediment settling velocities and the mobility of deposited sediments were calculated using the widely applied sediment transport equations presented in Soulsby (1997)[11].

To determine whether sediment transport pathways exist between the proposed dredge area and Nairn Harbour, or between the disposal site and Burghead Harbour or Findhorn Bay, the assessment considered:

- The advection of sediments released into the water column during dredging activities; and,
- The potential for deposited sediments to be remobilised and transported under the forcing of local currents and waves.

Assessment of suspended sediment transport and the mobility of deposited sediments provides the basis for evaluating potential sediment transport connectivity between the Port and Nairn Harbour, and between the disposal

[10] *Brew, D. (2001). Moray Geomorphology Scoping Study.*
[11] *Soulsby, R.L. (1997). Dynamics of Marine Sands: A Manual for Practical Applications. Thomas Telford, London. ISBN 0-7277-2584-X.*

site and Burghead harbour or Findhorn Bay. This in turn, enables consideration of whether project related sediment transport could result in a long term increase in the rate or extent of sedimentation within these areas.

Advection of suspended sediments was assessed by estimating the settling velocities of the range of sediment grain sizes expected to be encountered during dredging, together with their release height within the water column and the prevailing current velocities. This approach enables the potential transport distance of suspended sediments under the prevailing tidal regime to be determined. To represent the worst case scenario, the corresponding settling times (derived using Equation 1) were combined with the maximum current velocity anticipated within the dredge channel (i.e. 0.3 m/s) to calculate the maximum distance that suspended sediment particles could be advected before depositing. Settling velocity was derived as follows:

$$w_s = \frac{\nu}{D^{50}} \left[ \left( 10.36^2 + 1.049\, {D_*}^3 \right)^{\frac{1}{2}} - 10.36 \right] \quad (1)$$

Where $\nu$ is the kinematic viscosity of water, $D^{50}$ is the mean grain size and $D_*$ is the dimensionless particle diameter.

To consider the behaviour and mobility potential of cohesionless sediments deposited within the disposal area, and within the dredge channel, the excess bed shear stress above the critical threshold for sediment transport was determined for a range of sediment size classes using equations 2 to 7.

Seabed sediments are susceptible to entrainment and suspension by tidal currents and wave action[12]. Sediment mobilisation occurs when the frictional drag exerted on the seabed (the 'bed shear stress'; $\tau$) exceeds the submerged weight of the sediment particles, which acts to retain them on the seabed. The threshold at which sediment motion is initiated is known as the 'critical bed shear stress' ($\tau_{cr}$). Where the applied bed shear stress ($\tau$) exceeds the critical bed shear stress ($\tau_{cr}$) sediment particles become mobilised[13] and may be transported in suspension or as bedload.

For cohesionless sediments, generally defined as those with a dimensionless grain size parameter ($D_*$) of > 0.1 (Soulsby, 1997), the threshold of motion under tidal current forcing can be expressed in terms of the bed shear stress ($\tau_{cr}$) using the critical shields parameter ($\theta_{cr}$). This parameter provides a widely accepted basis for assessing the susceptibility of seabed sediments to erosion and transport under prevailing hydrodynamic conditions, as follows:

$$\tau_{cr} = \rho c_d \overline{U_{cr}}^2$$

[12] *Whereas tides exert a time varying bed shear stress on seabed sediments, which varies through the daily tidal cycle[s], spring-neap phase and lunar, equinoctial and nodal cycles. The superposition of the energy generated from waves (and surges) on the energy generated from tides, results in enhancement of the shear-stress acting upon the seabed. Owing to interactions within the turbulent boundary layer, the combined wave-current bed shear stress is non-linear and cannot be determined by simply summing the individual wave- and current-induced stresses. Consequently, when significant wave events coincide with periods of peak tidal currents, such as during spring tides, the resulting bed shear stresses can be substantially elevated and may act as a powerful driver of sediment mobilisation and transport.*

[13] *The term ( $\tau - \tau_{cr}$) defines the 'excess bed stress' representing the shear stress available to drive sediment transport once the critical threshold for sediment motion has been exceeded. Lower values of excess bed stress are indicative of relatively low rates of sediment transport, whereas higher values are associated with greater rates of sediment mobilisation and transport. In the absence of information on the coincident flow components, bed stress alone does not provide an indication of sediment transport direction, except where transport pathways may be inferred from bed stress gradients. However, as a measure of the local hydrodynamic energy available to mobilise sediment, excess bed stress provides a useful indicator of areas where sediment transport processes are likely to be more or less active. By extension, both the magnitude and rate of sediment transport may be expected to increase with increasing excess bed stress.*

(2)

Where:

$$c_d = \left[\frac{0.4}{1 + ln(\frac{d}{12h})}\right]^2$$

(3)

$\overline{U_{cr}}$ is depth-averaged velocity threshold of sediment motion and is defined by:

$$\overline{U_{cr}} = 7\left(\frac{h}{d_{50}}\right)^{\frac{1}{7}} [g(s-1)d_{50}\, f(D_*)]^{\frac{1}{2}}$$

(4)

With:

$$f(D_*) = \frac{0.30}{1 + 1.2\, D_*} + 0.055\,[1 - exp(-0.020 D_*)]$$

(5)

And:

$$D_* = \left[\frac{g\,(s-1)}{\gamma^2}\right]^{\frac{1}{3}} * d_{50}$$

(6)

*Where:*

$s$ = ratio of densities of grain and water
$\gamma$ = kinematic viscosity of water
$h$ = water depth
$g$ = gravitational pull
$d_{50}$ = sediment mean diameter

The bed shear stress under current $\tau_c$ is related to depth-averaged current speed $\overline{U}$ by the quadratic friction law:

$$\tau_c = \rho c_d \overline{U}^2$$

(7)

Where $\rho$ = density of sea water.

Waves can mobilise sediments from the seabed and enhance sediment transport through the generation of wave-induced currents. Waves are generated either due to the effect of local winds; or as swells, which result from distant storms and have a longer period but less spread in period and direction than wind-waves. The influence of waves on sediment transport decreases with increasing water depth. For example, wind-waves commonly have little or no influence on sediment transport in water depth approximately >20 m. The swell components however, penetrate to the seabed and may have an important role in sediment transport in the region. In sufficiently shallow water waves generate oscillatory velocities at the seabed, which exert a shear stress on bed sediments and can initiate sediment mobilisation. In this context, 'sufficiently shallow' is defined as approximately:

$$h < 10H_s$$

(8)

## B.2.4 Sediment Transport Assessment

Within the dredge channel, sediment sampling indicated that the material to be dredged comprises predominantly sand, with only limited proportions of silt and gravel (Section B.2.2). Sand sized sediments disturbed at the dredge head are expected to settle rapidly in the vicinity of the dredging operation and therefore are not considered further in this assessment.

Finer sediments released into the water column through hopper overflow may remain in suspension for longer periods and be transported in the direction of the prevailing tidal currents. However, current velocities within the dredge channel are typically low, generally remaining below 0.30 m/s (Section B.2.2). Consequently, the potential for advective transport of suspended sediments is limited. Based on conservative assumptions regarding water depth and current velocity, suspended fine grained particles are predicted to travel no more than approximately 600 m before settling to the seabed. Table 1 presents the maximum anticipated distance travelled by a cohesionless sediment grain released during overflow from the hopper of the barge.

The dredge channel is located approximately 800 m to 1800 m from the Port entrance (Figure 6). Accordingly, the predicted transport distances indicate that sediments released during hopper overflow would be expected to settle within the Port limits and would not be transported beyond the Port entrance. As a result, there is no credible pathway for sediments released during dredging to reach Nairn Harbour, located approximately 8 km southeast of the dredge channel.

It is noted that Table 1 considers the sand-sized fractions and does not define the maximum transport distance of silt released through hopper overflow. Although silt may remain suspended for longer and travel farther than fine sand, it represents only a minor fraction of the dredged material and would be diluted and dispersed significantly during the longer transport. In addition, the reversing tidal regime (i.e., ebb and flood tides) would limit sustained transport along a single direction towards Nairn Harbour. Consequently, while limited concentrations of silt could potentially be transported beyond the distances predicted for sand in Table 1, there is no credible mechanism by which sufficient amounts of silt sediments could be transported ~ 8 km southeast towards Nairn Harbour.

*Table 1 The maximum distance from source travelled by a cohesionless sediment grain released during hopper overflow. Distance travelled before settling is estimated conservatively based on grain size specific settling*

*velocities, the maximum current speeds predicted within the dredge channel; (0.3 m/sec) and the deepest water levels (i.e. deepest chart datum + the highest astronomical tidal range equating to 12.4 + 4.6 = 17 m)*

| SEDIMENT TYPE | D50 (MM) | DIMENSIONLESS GRAIN SIZE ($D_*$) | $w_s$ (M/S) | WATER DEPTH (M) | SETTLING TIME (MIN)[14] | HORIZONTAL DISTANCE TRAVELLED (M)[15] |
|---|---|---|---|---|---|---|
| Medium-coarse sand | 0.355 | 7.211 | 0.046 | 17 | ~ 7 | ~ 130 |
| Medium sand | 0.250 | 5.078 | 0.028 | 17 | ~ 10 | ~ 180 |
| Medium-fine sand | 0.180 | 3.656 | 0.017 | 17 | ~ 17 | ~ 300 |
| Fine sand | 0.125 | 2.539 | 0.008 | 17 | ~ 33 | ~ 600 |

[14] *Calculated as the water depth divided by the determined settling velocity.*

[15] *The horizontal distance is calculated as time required to settle multiplied by the current speed.*




*Figure 6 The dredge channel within the harbour limits and relative to the harbour entrance. Figure reproduced from (Xodus, 2026)*

As described in Section B.2.1, sand-sized sediments released at the disposal location would be expected to settle rapidly as part of the dynamic plume and therefore remain in the vicinity of the disposal area. In contrast, finer

sediments associated with the passive plume may remain in suspension for longer periods and could be transported by prevailing currents prior to deposition.

Sediment sampling within the dredge channel indicated that the material to be dredged is predominantly composed of sand, with only a limited fine-grained fraction. As a result, the quantity of fine sediments available for release within the passive plume is expected to be low. Furthermore, fine-grained sediments are preferentially lost during dredging operations through hopper overflow, as excess water is discharged from the receiving vessel. Consequently, the material transported to the disposal site is anticipated to comprise predominantly coarser sand fractions, with only a small proportion of fine-grained sediment remaining available for release following disposal. The potential for the passive plume to generate measurable sedimentation beyond the immediate vicinity of the disposal site is therefore considered limited. Any fine-grained sediments released during disposal would be expected to be rapidly diluted and dispersed during transport and, given the limited fraction available for release, would not be expected to result in significant sediment accumulation at more distant locations, including Findhorn Bay and Burghead Harbour.

Table 2 presents the maximum distance a cohesionless sediment grain released within the passive plume could be transported before settling to the seabed. The assessment indicates that the medium and coarse sand fractions within the passive plume would be expected to settle within approximately 500 m of the disposal location under peak spring tide conditions. In contrast, finer fractions, where present, may be transported up to approximately 1,620 m under the same hydrodynamic conditions before depositing.

These results indicate that the majority of disposed sediments would be expected to settle relatively close to the disposal location (between 90% – 95% will settle immediately on the seabed as part of the dynamic plume), with only the finest sediment fractions having the potential to be transported over greater distances. Given the low proportion of fine-grained material within the dredged sediments, the overall extent and concentration of the passive plume are expected to be limited. Consequently, the potential for sediment released during disposal activities to be transported to Burghead Harbour or Findhorn Bay in quantities sufficient to result in meaningful sediment accumulation is considered negligible.

*Table 2 The maximum distance from source travelled by a cohesionless sediment grain released as part of the passive plume. Distance travelled before settling is estimated conservatively based on the maximum current speeds predicted at the disposal site (0.35 m/sec, as detailed in Section B.2.2) along with the deepest water levels (i.e. 40 m)*

| SEDIMENT TYPE | D50 (MM) | DIMENSIONLESS GRAIN SIZE ($D_*$) | $w_s$ (M/S) | WATER DEPTH (M) | SETTLING TIME (MIN) | HORIZONTAL DISTANCE TRAVELLED (M) |
|---|---|---|---|---|---|---|
| Medium-coarse sand | 0.355 | 7.211 | 0.046 | 40 | ~ 15 | ~ 304 |
| Medium sand | 0.250 | 5.078 | 0.028 | 40 | ~ 24 | ~ 490 |
| Medium-fine sand | 0.180 | 3.656 | 0.017 | 40 | ~ 40 | ~ 720 |
| Fine sand | 0.125 | 2.539 | 0.008 | 40 | ~ 77 | ~ 1620 |

Sediments deposited within both the dredge channel and the disposal site are expected to remain broadly stable under the prevailing hydrodynamic and wave regimes. The assessment indicated that bed shear stresses generated by the representative current and wave conditions remain below the critical thresholds required to initiate sediment movement.

Using conservative assumptions based on the shallowest water depths occurring within the dredge channel and disposal site, together with representative grain sizes for each sediment fraction. Table 3 summarises the critical bed shear stress and current velocity thresholds required to mobilise sediments once deposited on the seabed. Table 4 presents the bed shear stresses generated under representative current conditions at both locations and includes a colour coded assessment of sediment mobility relative to the critical thresholds presented in Table 3.

The results indicated that the critical current velocity thresholds for all sediment fractions exceed the representative peak tidal currents occurring within both the dredge area and disposal site. Consequently, significant sediment remobilisation driven by tidal currents alone is not anticipated following dredging or disposal activities.

Within the dredge channel, wave induced resuspension of deposited sediments is also considered unlikely, as water depths throughout the channel exceed the approximate wave influence criterion (Equation 8), indicating limited wave effects at the seabed.

At the offshore disposal site, the analysis indicated that wave heights of approximately 1.7 m could influence seabed sediments in the shallowest parts of the site (approximately below 17 mCD), while progressively larger wave heights would be required to influence sediment transport in deeper areas. Given the prevailing water depths and the sheltered location of the disposal site within the inner Moray Firth, the potential for widespread sediment resuspension and subsequent transport is considered low.

*Table 3 Critical current speed and shear stress required to mobilise the different sediment fractions present within the dredge channel. The thresholds are presented for water depths at the dredge channel and at the disposal site*

| SEDIMENT TYPE | D50 (MM) | $U_{cr}$ (M/S)[16] | $\tau_c$ (N/M2) |
|---|---|---|---|
| **At the dredge channel (water depth = 12.4 mCD)** | | | |
| **Medium-coarse sand** | 0.355 | 0.454 | 0.237 |
| **Medium sand** | 0.250 | 0.445 | 0.215 |
| **Medium-fine sand** | 0.180 | 0.443 | 0.202 |
| **Fine sand** | 0.125 | 0.442 | 0.190 |
| **At the disposal site (water depth = 17 mCD)** | | | |
| **Medium-coarse sand** | 0.355 | 0.475 | 0.246 |

[16] *It should be noted that the threshold presented here varies slightly from that reported in the propeller wash scour assessment, where a threshold of 0.35 m/s was identified for the erosion of fine sands. The discrepancy is primarily attributable to the consideration of bed slope effects in the propeller wash assessment and the use of a slightly different D50 value to represent fine sediments.*

| SEDIMENT TYPE | D50 (MM) | $U_{cr}$ (M/S)[16] | $\tau_c$ (N/M2) |
|---|---|---|---|
| Medium sand | 0.250 | 0.466 | 0.224 |
| Medium-fine sand | 0.180 | 0.464 | 0.211 |
| Fine sand | 0.125 | 0.462 | 0.198 |

*Table 4 The shear stress acting on the seabed within the dredge channel and at the disposal site, during peak tides of 0.3 m/sec within the dredge channel, and 0.35 m/sec within the disposal site. Green shaded cells indicate sediments that are stable under current forcings*

| SEDIMENT TYPE | D50 (MM) | SHEAR STRESS AT THE DREDGE CHANNEL (WATER DEPTH = 12.4 MCD) (N/M2) | SHEAR STRESS AT THE DISPOSAL SITE (WATER DEPTH = 17 MCD) (N/M2) |
|---|---|---|---|
| Medium-coarse sand | 0.355 | 0.104 | 0.134 |
| Medium sand | 0.250 | 0.098 | 0.127 |
| Medium-fine sand | 0.180 | 0.093 | 0.120 |
| Fine sand | 0.125 | 0.088 | 0.114 |

The combined current and wave assessment indicated that deposited sediments are expected to remain largely stable within both the dredge channel and the disposal site. Predicted bed shear stresses remain below the critical thresholds required to initiate widespread sediment mobilisation, suggesting that any sediment movement is likely to be restricted to minor localised redistribution within the disposal area rather than transport over larger distances. Consequently, sediments deposited within the dredge channel and disposal site are expected to remain largely confined to their respective locations, with negligible potential for remobilisation and transport towards Nairn Harbour, Burghead Harbour or Findhorn Bay.

In addition to the empirical assessments described above, repeat bathymetric surveys were evaluated to assess patterns of seabed elevation change and determine whether there was evidence of reworking of deposited sediments and transport away from the disposal area. Comparison of bathymetric survey data acquired before and after disposal activities (Figure 7) indicated limited sediment transport and redistribution within the disposal area. Comparison of surveys undertaken between March and July 2025[17] identified localised increases in seabed elevation of up to approximately 3 m, corresponding to reductions in water depth associated with the formation of disposal mounds.

Further review of the disposal records indicated that the disposal activity was concentrated within the deeper central and western parts of the Burghead disposal ground. These areas broadly correspond to the locations where the greatest localised increases in seabed elevation were identified by the bathymetric surveys. Disposal operations were

[17] *Whilst the survey comparison covers a relatively short monitoring period between March and July 2025 and therefore does not capture longer-term sediment redistribution that may occur during more energetic wave or current events, the available bathymetric evidence provides further support for the conclusion that deposited sediments remain broadly stable and that substantial sediment transport away from the disposal area is unlikely.*

undertaken between 3 May and 18 July 2025, within the period bracketed by the pre and post disposal bathymetric surveys. The strong spatial correlation between the areas of concentrated disposal activity and the areas of seabed elevation increase provides strong supporting evidence that the accumulation resulted from disposal operations and remained largely confined to the licensed disposal site, particularly within the grid cells that received the greatest volume of material.

These observations indicated that sediment redistribution has been largely restricted to the disposal area, with the deposited material remaining broadly stable under the prevailing hydrodynamic regime throughout the monitoring period. The bathymetric data do not indicate significant erosion of disposal mounds or widespread sediment dispersion beyond the disposal site. Rather, the observed changes are consistent with limited localised reworking and adjustment of deposited sediments following disposal. These findings are consistent with the sediment mobility assessment, which indicated that deposited material is anticipated to be generally stable under prevailing current and wave conditions.

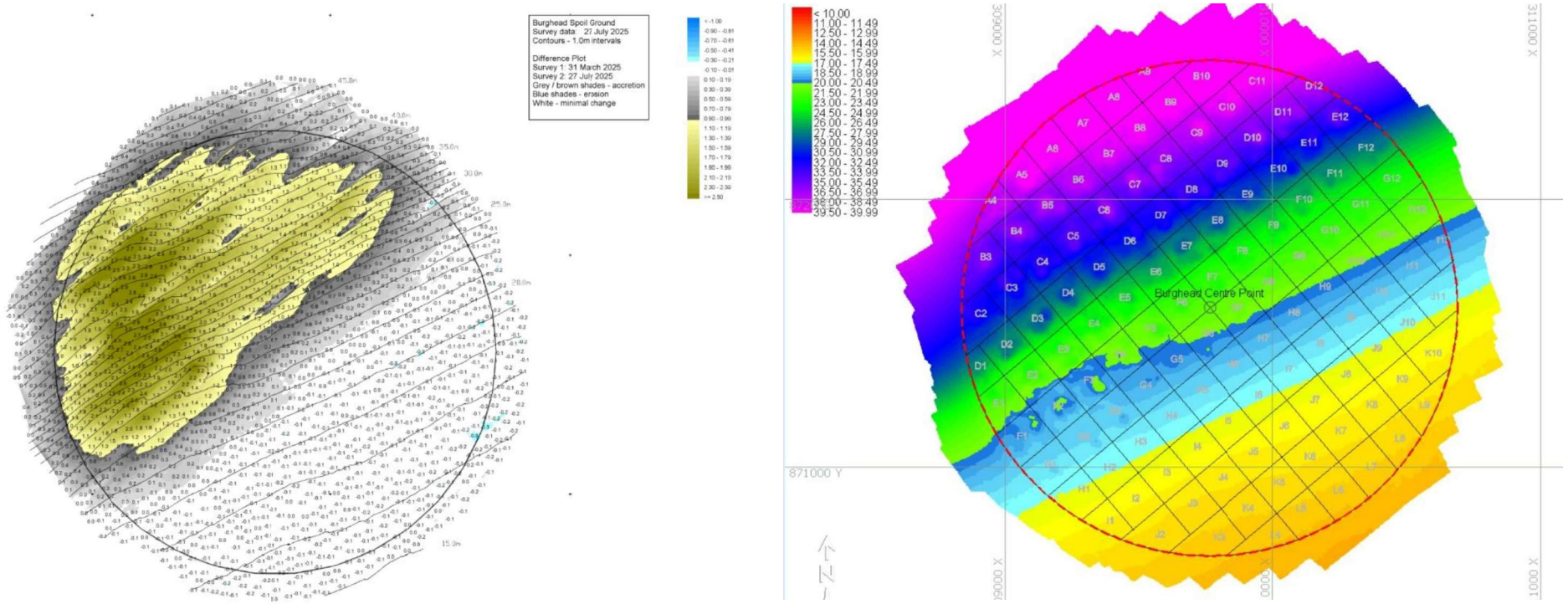



*Figure 7 Bathymetric difference plot showing seabed level changes at the Burghead disposal site between 31 March and 27 July 2025 (Left panel) and grid layout of the Burghead disposal site (Right panel). Figure reproduced from (Haventus, 2026)*

## B.2.5 Concluding Remarks

Given that Nairn Harbour is located approximately 8 km southeast of the dredge channel, the sediment transport assessment performed indicated that sediments of all size fractions considered released into the water column during dredging activities are not expected to reach the harbour. Application of the formulae described by Soulsby (1997), demonstrated that suspended sediments released during hopper overflow would be advected less than 600 m from the dredge channel under representative conditions, indicating that sediment released during dredging activities would remain localised to the vicinity of the works and within the harbour limits. Transported sediments deposited within the dredge channel are not expected to be remobilised under the prevailing hydrodynamic and wave regimes. These findings are consistent with those reported within the EIA, which concluded that sediment plume effects associated with dredging activities would be localised and short-lived. Consequently, sediments released during dredging activities are not expected to contribute to enhanced sedimentation within Nairn Harbour.

Burghead Harbour is located approximately 2 km south from the disposal site, which exceeds the maximum transport distance of approximately 1,620 m predicted for the finest sediments released within the passive plume during dredged material disposal operations. Furthermore, the prevailing tidal currents are oriented broadly east-northeast to west-southwest and therefore do not provide a direct southward sediment transport pathway towards Burghead Harbour. Coarse sand and gravel comprising the dredged material emplaced at the disposal site would settle rapidly as part of the dynamic plume, with only a small proportion of the material (estimated to be less than 10% of the total disposal volume) remaining suspended within the passive plume. Furthermore, the majority of fine-grained material would be removed during hopper overflow, resulting in material transported to the disposal site being composed predominantly of coarser sand fractions. Where present within the passive plume, these coarser sediment fractions are predicted to travel no more than approximately 500 m before settling. Once deposited, sediments at the disposal site are expected to remain broadly stable under prevailing wave and current conditions, with only limited localised redistribution potentially occurring during periods of elevated wave activity influencing sediment transport in the shallower regions of the disposal area. Comparison of pre and post disposal bathymetric surveys demonstrated that deposition and subsequent limited seabed reworking remain localised to the disposal area, with no evidence of significant sediment transport away from the disposal site. Accordingly, the assessment identifies no evidence of a direct pathway between the disposal site and Burghead Harbour, and disposal activities are therefore not expected to contribute to increased sedimentation within the harbour.

Given that sediments released during disposal are not predicted to reach Burghead Harbour, there is no credible pathway for these sediments to reach Findhorn Bay, located approximately 8 km from the disposal site. The assessment therefore concludes that disposal activities will not contribute to sediment accumulation within Findhorn Bay. This conclusion is further supported by evidence indicating that sedimentation within the bay is primarily controlled by long-term fluvial and estuarine sediment inputs rather than the transport of sediment from offshore sources.

In summary, this technical assessment concludes that dredging activities at Ardersier Port and disposal operations at the Burghead disposal site are unlikely to contribute to sedimentation within Nairn Harbour, Burghead Harbour, or Findhorn Bay. This conclusion is consistent with the consultation response from MD-LOT/SEDD, which agreed that effects on coastal processes and geomorphology were not considered significant.

# APPENDIX C GAP ANALYSIS