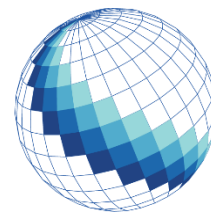
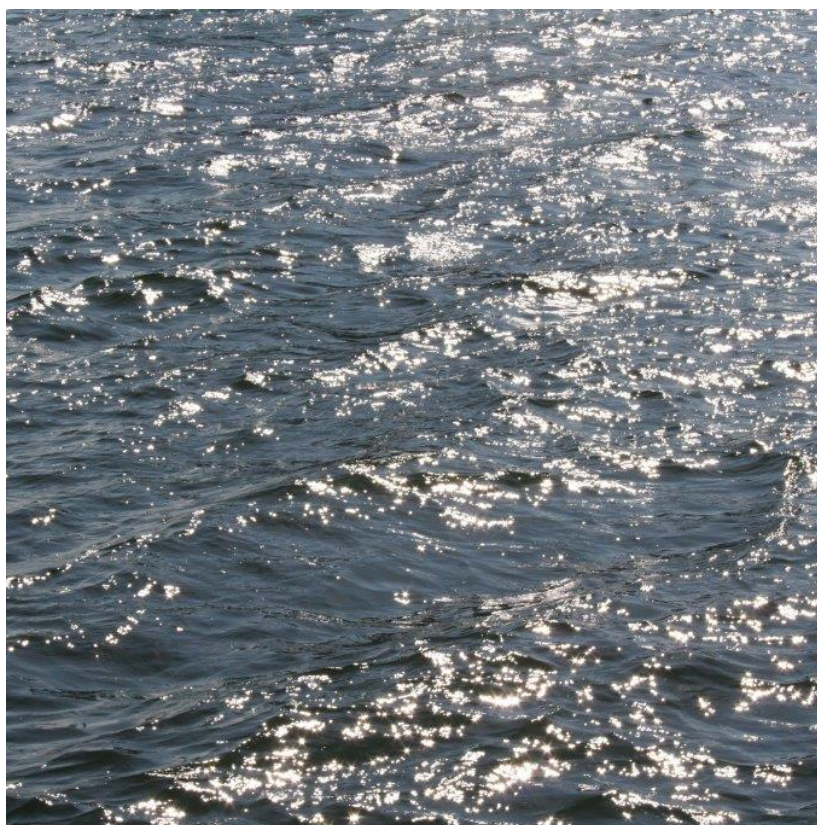


# MarineSpace

Making Sense of the Marine Environment™



## Erebus Geophysical Survey Water Framework Directive Assessment



Document Ref: J/5/24/20	Originator: Damien Kirby
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# Erebus Geophysical Survey Water Framework Directive Assessment

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## 1. Introduction

MarineSpace is seeking a Band 2 Marine License to cover geotechnical and geophysical survey along the potential cable route and wind farm array of the Erebus Project. As part of this application Natural Resources Wales (NRW) requires that a Water Framework Directive (WFD) Assessment is completed for the proposed works.

Under the WFD, all proposed schemes with the potential to impact upon WFD-designated water bodies must be assessed to ensure:

- No deterioration of the current status or potential of any WFD quality elements;
- Future attainment of 'good' status or other objectives of any WFD quality elements is not prevented.

This report follows guidance provided in NRW Operational Guidance Note (OGN) 072 for the production of a WFD Assessment Report.





## 2. Method Statement

The work proposed is geotechnical and geophysical survey along the potential cable route and wind farm array of the Erebus Project.

### Geotechnical surveys

This will include: Piezo-Cone Penetration Tests (PCPT), vibrocore samples and piston samples to an approximate depth of 20 m, taken within the offshore array area + 1 km buffer, and along the export cable corridor. There will be up to 20 samples within the array area, and 30 samples along the export cable corridor.

The geotechnical survey area comprises the following sections:

- Windfarm array area: (43.5 km<sup>2</sup>) and 1 km buffer;
- Offshore section of the export cable route: defined as >15 m water depth contour seaward to windfarm array area with a corridor width of 500 m;
- Nearshore section of the export cable route: defined as <15 m water depth landward to the intertidal area with a corridor width of 500 m;

### Geophysical surveys

This will include acquisition of multibeam echosounder, side scan sonar, magnetometer and sub-bottom profiler data within the offshore array area + 1 km buffer.

### Sequence of Works

It is currently proposed the geophysical survey will be completed first as can then be used to inform the geotechnical scope of work (i.e. the PCPT and sampling locations). However, in the event that both the geophysical and geotechnical survey scopes are to be undertaken simultaneously, the geophysical survey scope (which is focused on the Array Area (plus 1 km buffer)) shall be undertaken before the geotechnical acquisition is undertaken in the Array Area, because the results of the geophysical survey can then be used to inform the geotechnical scope of work (i.e. the PCPT and sampling locations).

The geophysical surveys are expected to commence in March 2021 and the geotechnical survey to start in May 2021.

### 3. Screening and Scoping

NRW OGN 072 provides details of certain activities that are not considered to present a risk of deterioration of water body status, of preventing a water body from achieving its objective. It is stated that *“Sediment (grab) samples where the total sample volume across all samples in the total application is no more than 4 cubic metres. The density of grab samples should not exceed 50 samples within any one hectare”* can be screened out to assessment. However, the sediment samples proposed for the present application (PCPT, vibrocore samples and piston samples) are not considered to qualify as *“sediment (grab) samples”*. In accordance, the proposed activities are taken forward to the Scoping stage.

The scoping assessment is completed using the scoping template provided by UK Government (UK Gov, 2017), in conjunction with NRW guidance (NRW, 2018). A completed assessment can be found overleaf. This determines that an impact assessment of the works is required in relation to water quality and WFD protected areas.

## Water Framework Directive assessment: scoping template for activities in estuarine and coastal waters

Use this template to record the findings of the scoping stage of your Water Framework Directive (WFD) assessment for an activity in an estuary or coastal water.

If your activity will:

- take place in or affect more than one water body, complete a template for each water body
- include several different activities or stages as part of a larger project, complete a template for each activity as part of your overall WFD assessment

The [WFD assessment guidance for estuarine and coastal waters](#) will help you complete the table.

Your activity	Description, notes or more information
Applicant name	Blue Gem Wind Ltd
Application reference number (where applicable)	Unknown
Name of activity	Project Erebus geotechnical and geophysical surveys
Brief description of activity	Geotechnical Survey  Piezo-Cone Penetration Tests (PCPT), vibrocore samples and piston samples to an approximate depth of 20 m, taken within the offshore array area + 1 km buffer, and along the export cable corridor. There will be up to 20 samples within the array area, and 30 samples along the export cable corridor.

	Geophysical Survey  Acquisition of multibeam echosounder, side scan sonar, magnetometer and sub-bottom profiler data.
Location of activity (central point XY coordinates or national grid reference)	37835, 28404 (easting, northing)
Footprint of activity (ha)	5 m <sup>2</sup>
Timings of activity (including start and finish dates)	The geophysical surveys are expected to commence in March 2021 and the geotechnical survey to start in May 2021. A marine licence is sought to cover 12 months, from March 2021 to February 22, to ensure sufficient contingency and reduce the need for subsequent licence variations, should works be delayed.
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	A total of up to 20 samples will be collected within the array area, and 30 samples along the export cable corridor. The overall total volume of sediment removed will not exceed 4 m <sup>3</sup> .
Use or release of chemicals (state which ones)	No

Water body <sup>1</sup>	Description, notes or more information
WFD water body name	Pembrokeshire South
Water body ID	UKGB611008590003
River basin district name	Western Wales

Water body type (estuarine or coastal)	Coastal
Water body total area (ha)	413.126
Overall water body status	Good
Ecological status	Good
Chemical status	Good
Target water body status and deadline	Good status already achieved
Hydromorphology status of water body	High
Heavily modified water body and for what use	No
Higher sensitivity habitats present	Polychaete reef.
Lower sensitivity habitats present	Subtidal soft sediments like sand and mud.
Phytoplankton status	High
History of harmful algae	Not monitored
WFD protected areas within 2km	Bathing waters x15; nutrient sensitive area x 1; SPA x1; SAC x2

Water body <sup>1</sup>	Description, notes or more information
WFD water body name	Milford Haven Outer
Water body ID	UKGB641008220000
River basin district name	Western Wales
Water body type (estuarine or coastal)	Transitional
Water body total area (ha)	35.391
Overall water body status (2015)	Moderate
Ecological status	Ecological
Chemical status	Fail
Target water body status and deadline	Good by 2021
Hydromorphology status of water body	Not high
Heavily modified water body and for what use	No
Higher sensitivity habitats present	Seagrass; saltmarsh; maerl; mussel beds; cobbles, gravel and shingle.
Lower sensitivity habitats present	Intertidal soft sediments like sand and mud; rocky shore.
Phytoplankton status	High

History of harmful algae	Not monitored
WFD protected areas within 2km	Bathing waters x3; Shellfish water x1; SPA x1; SAC x2

## Specific risk information

Consider the potential risks of your activity to each of these receptors: hydromorphology, biology (habitats and fish), water quality and protected areas. Also consider invasive non-native species (INNS).

## Section 1: Hydromorphology

Consider if hydromorphology is at risk from your activity.

Use the water body summary table to find out the hydromorphology status of the water body, if it is classed as heavily modified and for what use.

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	Requires impact assessment	Impact assessment not required	No high status water body within the vicinity.
Could significantly impact the hydromorphology of any water body	Requires impact assessment	Impact assessment not required	Core collection will result in removal of benthic sediment. However, the overall total volume of sediment will not exceed 4 m <sup>3</sup> . This is considered insufficient to affect local hydromorphology.
Is in a water body that is heavily modified for the same use as your activity	Requires impact assessment	Impact assessment not required	Water body not heavily modified.

Record the findings for hydromorphology and go to section 2: biology.



## Section 2: Biology

### Habitats

Higher sensitivity habitats <sup>2</sup>	Lower sensitivity habitats <sup>3</sup>
chalk reef	cobbles, gravel and shingle
clam, cockle and oyster beds	intertidal soft sediments like sand and mud
intertidal seagrass	rocky shore
maerl	subtidal boulder fields
mussel beds, including blue and horse mussel	subtidal rocky reef
polychaete reef	subtidal soft sediments like sand and mud
saltmarsh	
subtidal kelp beds	
subtidal seagrass	

<sup>2</sup> Higher sensitivity habitats have a low resistance to, and recovery rate, from human pressures.

<sup>3</sup> Lower sensitivity habitats have a medium to high resistance to, and recovery rate from, human pressures.

Consider if the footprint <sup>4</sup> of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5km <sup>2</sup> or larger			Footprint <0.5 km <sup>2</sup>
1% or more of the water body's area			Footprint <1% of water body extent

Within 500m of any higher sensitivity habitat	<b>Yes to one or more – requires impact assessment</b>	<b>No to all – impact assessment not required</b>	Yes, may be within 500m of mearl and seagrass habitat.
1% or more of any lower sensitivity habitat			Footprint <1% of lower sensitivity habitat

<sup>4</sup> Note that a footprint may also be a temperature or sediment plume. For dredging activity, a footprint is 1.5 times the dredge area.

## Fish

Consider if fish are at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	Continue with questions	<b>Go to next section</b>	Works take place within an estuary, but not expected to impact migratory fish physiology/behaviour.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	Requires impact assessment	Impact assessment not required	n/a
Could cause entrainment or impingement of fish	Requires impact assessment	Impact assessment not required	n/a

Record the findings for biology habitats and fish and go to section 3: water quality.

### Section 3: Water quality

Consider if water quality is at risk from your activity.

Use the water body summary table to find information on phytoplankton status and harmful algae.

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	Requires impact assessment	Impact assessment not required	Core removal will result in highly localised short-term increase in SSC/turbidity. However, this is expected to disperse rapidly.
Is in a water body with a phytoplankton status of moderate, poor or bad	Requires impact assessment	Impact assessment not required	No
Is in a water body with a history of harmful algae	Requires impact assessment	Impact assessment not required	No

Consider if water quality is at risk from your activity through the use, release or disturbance of chemicals.

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment	Impact assessment not required	No chemicals will be internationally released into the marine environment. Bunding, storage facilities and spill kits will be

			employed to contain and prevent the accidental release of fuel, oils and chemicals associated with the plant, refuelling and construction equipment into the marine environment.
It disturbs sediment with contaminants above Cefas Action Level 1	<b>Requires impact assessment</b>	Impact assessment not required	<p>Sediments may be disturbed during core removal.</p> <p>Sediments within the Pembrokeshire South water body are highly unlikely to contain contaminants above Cefas Action Level 1 given the anthropogenically undisturbed nature of this area.</p> <p>Sediments within the Milford Haven Outer water body may potentially contain contaminant concentrations above Cefas Action Level 1.</p>

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment <sup>5</sup>	Impact assessment not required	No mixing zone associated with these works.

<sup>5</sup> Carry out your impact assessment using the Environment Agency's surface water pollution risk assessment guidance, part of Environmental Permitting Regulations guidance.

Record the findings for water quality go on to section 4: WFD protected areas.

## Section 4: WFD protected areas

Consider if WFD protected areas are at risk from your activity. These include:

- special areas of conservation (SAC)
- special protection areas (SPA)
- shellfish waters
- bathing waters
- nutrient sensitive areas

Use Magic maps to find information on the location of protected areas in your water body (and adjacent water bodies) within 2km of your activity.

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2km of any WFD protected area <sup>6</sup>	Requires impact assessment	Impact assessment not required	Aspects of projects within:  Skomer, Skokholm and the Seas off Pembrokeshire SPA;

			West Wales Marine SAC; Pembrokeshire Marine SAC; Sample site within 500m of the West Angle Bay designated bathing site.
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<sup>6</sup> Note that a regulator can extend the 2km boundary if your activity has an especially high environmental risk.

Record the findings for WFD protected areas and go to section 5: invasive non-native species.

## Section 5: Invasive non-native species (INNS)

Consider if there is a risk your activity could introduce or spread INNS.

Risks of introducing or spreading INNS include:

- materials or equipment that have come from, had use in or travelled through other water bodies
- activities that help spread existing INNS, either within the immediate water body or other water bodies

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS	Requires impact assessment	Impact assessment not required	All equipment, materials, machinery and PPE used will be in a clean condition prior to their arrival on site, and upon removal from site, to minimise risk of introducing non-native species into the marine environment.

Record the findings for INNS and go to the summary section.

### Summary

Summarise the results of scoping here.

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	
Biology: habitats	Yes	Sample collection may take place within 500m of maerl and/or seagrass habitat.

Biology: fish	No	
Water quality	Yes	Core removal may disturb benthic sediments. There is potential for sediments within the Milford Haven Outer water body to contain contaminants at levels in excess of Cefas Action Level 1.
Protected areas	Yes	Works take place within 2 km of 3x Natura 2000 nature conservation areas, and the West Angle Bay designated bathing site.
Invasive non-native species	No	

If you haven't identified any receptors at risk during scoping, you don't need to continue to the impact assessment stage and your WFD assessment is complete.

If you've identified one or more receptors at risk during scoping, you should continue to the impact assessment stage.

Include your scoping results in the WFD assessment document you send to your activity's regulator as part of your application for permission to carry out the activity.



## 4. Compliance Assessment

This section considers the potential impacts from the proposed activities and determines the risk that these activities may prevent any WFD quality element within any water body achieving good status, or may cause deterioration.

The following receptors or features identified as part of the scoping stage have been brought through for detailed assessment:

- Biology: habitats
- Water Quality
- Protected areas

### 4.1. Biology: Habitats

The proposed works envelope extends to within 100 m of known maerl habitat and within 50 m of known seagrass habitat. Both of these habitats are classified as having a high sensitivity to changes in the water environment and should therefore be considered further within this assessment. The proposed development involved removal of sediment samples through the use of PCPT, vibrocore and piston sampling techniques. This may result in the mobilisation of a limited amount of benthic sediment. Such sediment mobilisation may lead to a small increase in sediment deposition at the maerl and seagrass habitats. However, this would be very small in magnitude. Any elevated suspended sediment concentrations would dissipate very quickly and return to background levels within one tidal cycle. As such, any impacts on these higher sensitivity habitats are expected to be negligible temporary changes, and will not pose any threat of adverse effect to the current status of the surrounding water bodies.

### 4.2. Water Quality

The removal of sediment samples required for the proposed development may result in the mobilisation of a limited amount of benthic sediment. There is potential for contaminants within this mobilised sediment to be transferred into the water column.

Sediments within the Pembrokeshire South water body are considered highly unlikely to contain contaminants above Cefas Action Level 1 given the anthropogenically undisturbed nature of this area. However, Milford Haven port has historically been used for industrial purposes such as transport of oil cargoes and liquid natural gas. Bioaccumulation of organic and heavy metal chemical contaminant have been recorded in various algal and invertebrate species within Milford Haven Waterway (Langston *et al.*, 2011). As such, there is potential for mobilisation of contaminated sediments within this water body.

Milford Haven Outer is currently at Good status both for chemical quality elements and overall. It is considered unlikely that the proposed scheme will result in a deterioration in this status due to the small volumes of sediments expected to be mobilised, and high potential for dilution. The volume of sediment disturbance during core removal will be small in relation to other local activities such as water injection dredging. It is expected that this limited amount of sediment will be rapidly diluted.

The proposed works within Milford Haven Outer occur within West Angle Bay, at the mouth of Milford Haven Waterway. It is expected that any mobilised contaminants will be transported out into open coastal waters and diluted to background levels within one tidal cycle. As such, any increases in contaminants will be temporary and no deterioration in the current status of this waterbody is predicted.

### 4.3. Protected Areas

Aspects of the proposed works will take place within the following Natura 2000 nature conservation sites:

- Skomer, Skokholm and the Seas off Pembrokeshire SPA
- West Wales Marine SAC
- Pembrokeshire Marine SAC

The Skomer, Skokholm and the Seas off Pembrokeshire SPA is classified for the protection of: European storm-petrel *Hydrobates pelagicus*, Manx shearwater *Puffinus puffinus*, Atlantic puffin *Fratercula arctica*, and lesser black-backed gull *Larus fuscus*, as well as red-billed chough *Pyrrhocorax pyrrhocorax*, short-eared owl *Asio flammeus* and breeding seabird assemblage. The West Wales Marine SAC is designated for the presence of harbour porpoise *Phocoena phocoena* (1351) and Pembrokeshire Marine SAC is designated for estuaries (1130), large shallow inlets and bays (1160), reefs (1170), grey seal *Halichoerus grypus* (1364), and shore dock *Rumex rupestris* (1441).

In addition, works may also take place within 500 m of the West Angle Bay designated bathing water. This site is currently classified as ‘probably not at risk’ of deterioration in status by either 2030 or 2050.

The proposed works may pose a risk to these protected areas through increases in turbidity or contaminant concentrations following disturbance of benthic sediments. However, the volume of sediment disturbed is expected to be small and will therefore rapidly be diluted to background levels. Any changes will be highly localised in terms of spatial extent and limited in duration to within a single tidal cycle. Any changes can therefore be classed as temporary and will not pose a threat of adverse impacts upon any of the protected areas identified.

## **5. Conclusion**

This assessment has considered the potential risks to WFD receptors from the proposed geotechnical and geophysical survey works. All receptors were scoped out of assessment other than Biology: Habitats (maerl and seagrass) and Water Quality, with relation to the Milford Haven Outer water body, and Protected Areas.

Pathways to potential impacts were limited to sediment mobilisation from core removal, and associated changes in turbidity and/or contaminant levels. However, given the temporary and small magnitude of predicted changes the proposed are not expected to pose any risk of deterioration in water body status, or of adverse effects on WFD protected areas. All water bodies scoped into assessment are currently at good status and therefore there is no risk of proposed activities preventing receptors from attaining good status in the future.

It is concluded that the proposed works do not pose any risk to the status or objectives of local WFD water bodies. The impacts assessed have all been determined to have a negligible impact at the scale of the overall water body and as such the proposed activities are considered to be compliant with the WFD.



## 6. References

Langston WJ, O'Hara S, Pope ND, Davey M, Shortridge E, Imamura M, Harino, H, Kim A, and Vane CH, 2011. Bioaccumulation surveillance in Milford Haven Waterway. Environmental Monitoring and Assessment. 184 (1): 289–311

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