NRW Band 3 Marine Licence Application Supporting Information

Geotechnical Survey Technical Note

PREPARED FOR

Partners in UK offshore wind

DATE
06 December 2024

REFERENCE
0756129

DOCUMENT DETAILS

The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.	
DOCUMENT TITLE	NRW Band 3 Marine Licence Application Supporting Information
DOCUMENT SUBTITLE	Geotechnical Survey Technical Note
PROJECT NUMBER	0756129
DATE	11 December 2024
VERSION (delete field if unneeded)	2.0
AUTHOR	Grace Leyton-Smith, Bethan Owens
CLIENT NAME	bp and Energie Baden-Württemberg AG (EnBW)

DOCUMENT HISTORY

				ERM APPROVAL TO ISSUE		
VERSION	REVISION	AUTHOR	REVIEWED BY	NAME	DATE	COMMENTS
Draft	01	Grace Leyton-Smith	Jonny Lewis	Jillian Price	12 12 24	1st Tech Review
First draft for client review	1.0	Grace Leyton-Smith	Jonny Lewis	Adam Pharaoh	30 12 24	Client Review
Final draft for client review	2.0	Grace Leyton-Smith	Jonny Lewis			Final Client Review
Final	3.0	Grace Leyton-Smith				Ornithology updates

SIGNATURE PAGE

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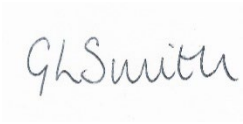
0756129



Grace Leyton-Smith
Marine Consultant

Bethan Owens
Senior Marine Consultant

Jonny Lewis
Partner

2nd Floor, Exchequer court,

33 St Mary Axe,

London

EC3A 8AA

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
API	American Petroleum Institute
bsb	Below seabed
BGL	Borehole Geophysical Logging
CFLO	Commercial Fisheries Liaison Officer
CPTu/uCPT	Cone Penetrometer Testing
DCO	Deemed Consent Order
EnBW	Energie Baden-Württemberg AG
HPD	High Pressure Dilatometer
LAT	Lowest Astronomical Tide
MCZ	Marine Conservation Zone
MLT	Marine Licensing Team
MMO	Marine Management Organisation
MLA	Marine Licence Application
MPA	Marine Protected Area
NRW	Natural Resources Wales
PCPT	Piezo-cone Penetration Test
PPDT	Pore Pressure Dissipation Tests
SAC	Special Area of Conservation
SCPTu	Seismic CPTu
SPA	Special Protection Area
SSC	Suspended Sediment Concentration
SSSI	Site of Special Scientific Interest
TRT	Thermal Resistivity Test
UXO	Unexploded Ordinance
WFD	Water Framework Directive
WNMP	Welsh National Marine Plan
WTG	Wind Turbine Generator

1. INTRODUCTION

Bp and Energie Baden-Württemberg AG (EnBW) have been awarded preferred bidder status for two offshore wind leases in the Irish Sea as part of The Crown Estate Offshore Wind Leasing Round 4. Bp and EnBW have named these proposed project areas Mona and Morgan. To inform the development of these projects, bp and EnBW intend to carry out a marine geotechnical survey campaign commencing in the Spring of 2025. ERM is acting as the licensing agent to obtain relevant consents for this survey campaign.

While this survey campaign will be undertaken in both English and Welsh waters (within the Morgan and Mona array areas, respectively) this Supporting Information Document (SID) and associated Marine Licence Application (MLA) refers only to the works within the Mona array area, i.e. in Welsh waters only. Therefore, this SID and associated MLA will only be issued to Natural Resources Wales (NRW).

Bp and EnBW have an existing licence, RML2444, for up to 80 deep boreholes. An additional 25 boreholes are required to sample the 100 Wind Turbine Generator (WTG) locations, as well as shallow geotechnical samples, not previously licenced, across the Mona array. Hence, a new MLA is being sought instead of a licence variation to gain consent for the additional 25 boreholes and shallow geotechnical surveys not previously licenced under RML2444.

The surveys will inform foundation design, ground conditions and placement of the WTGs within the array areas. The surveys proposed within this Welsh MLA for the Mona Array Area consist of:

- Deep geotechnical surveys up to 90m depth below seabed, within the Mona array area. Individual boreholes may be a combination of soil and rock core sampling and/or downhole testing, including:
  - Cone Penetration Tests (CPT); and
  - Discretionary Pore Pressure Dissipation Tests (PPDT) and High-Pressure Dilatometer (HPD) downhole Pressuremeter testing may also be conducted.
- Shallow geotechnical surveys up to 6 m bsb, within the Mona array area including:
  - Vibrocore (or piston core),
  - Piezo-Cone Penetrometer Testing (PCPT), and
  - Thermal Resistivity Testing (TRT).

As the PPDT, HPD, PCPT and TRT do not involve the removal of any seabed sediment, these are considered non-licensable activities under the Marine and Coastal Access Act (see Section 2.1); these activities have been included in this technical note for completeness and for information only. Further information on the survey methodology is provided in Section 5.

A Marine Licence for the Morgan geotechnical investigations within English waters is also being sought from the Marine Management Organisation (MMO). ERM is acting as the agent to obtain relevant consents for this geotechnical survey.

This technical note sets out the proposed scope of the survey, relevant legislative and policy context, associated potential impacts and mitigation measures to help inform the marine licensing decision-making process in Welsh waters.

2. RELEVANT LEGISLATION AND POLICY

2.1 MARINE AND COASTAL ACCESS ACT 2009

Under the Marine and Coastal Access Act 2009, a Marine Licence is required for carrying out a 'licensable marine activity', including construction works on the seabed, depositing of any object, certain removals from the seabed, dredging and aggregate extraction. The Welsh Government is the licensing authority for the Welsh inshore and offshore region. The Marine Licensing Team (MLT) in NRW administer Marine Licences on behalf of the Welsh Government.

Marine licensable activities, as defined under the Marine and Coastal Access Act 2009, can be summarised as:

- Deposit any substance or object, in the sea or on or under the seabed;
- Construct, alter or improve any works either in or over the sea or on or under the seabed;
- Use a vehicle, vessel, aircraft, marine structure or floating container to remove any substance or object from the seabed; and
- Carry out any form of dredging, whether or not involving the removal of any material from the sea or seabed.

The proposed survey works include the removal of seabed sediment using a vessel and constitute a marine licensable activity under the Marine and Coastal Access Act 2009. Therefore, a MLA is required from NRW MLT for the survey within Welsh waters.

2.2 WELSH NATIONAL MARINE PLAN

The Welsh Government adopted the first Welsh National Marine Plan (WNMP) (Welsh Government, 2019) covering Welsh inshore and offshore waters in November 2019. The plan has been developed in accordance with the Marine and Coastal Access Act 2009, the UK Marine Policy Statement and the Marine Spatial Planning Directive.

Under the Marine and Coastal Access Act, all public authorities must consider relevant Marine Plans when making decisions regarding the marine area, in this case the WNMP. This ensures that marine resources are used in a sustainable way in line with high-level marine objectives.

A summary of the WNMP policies relevant to the proposed survey is outlined in Table 2-1.

TABLE 2-1 SUMMARY OF THE WELSH NATIONAL MARINE PLAN POLICES RELEVANT TO THE PROPOSAL

Relevant Welsh National Marine Plan Policy	How the survey adheres to the Policy
ELC_01: Low carbon energy (supporting) wind **ELC_01 a:** Proposals for offshore wind energy generation will be supported where they contribute to the objectives of this plan. Proposals should comply with the relevant general policies and sector safeguarding	The geotechnical survey will inform the development of the Round 4 Mona array area, which will contribute up to 1500 MW of renewable energy to Wales. Conducting comprehensive offshore surveys and using the data to inform the design and environmental assessments of the projects

Relevant Welsh National Marine Plan Policy	How the survey adheres to the Policy
policies of this plan and any other relevant considerations. Proposals for wind >350MW will be considered by UK Government in accordance with relevant national policy. In determining an NSIP for a wind proposal, the decision maker will have regard to this plan. Any determination in relation to energy developments of any scale will be taken in accordance with this plan alongside any other relevant considerations. **ELC_01 b:** In order to understand future opportunities for offshore wind development, including floating technologies, this plan supports strategic planning for the sector. Relevant public authorities and the sector are encouraged, in liaison with other interested parties, to collaborate to understand opportunities for the sustainable use of wind energy resources including identification of: • natural resources that provide potential opportunity for future use; • evidence to de-risk consenting for the sector; and • opportunities to define and, once in place, further develop and refine Strategic Resource Areas for offshore wind energy resource safeguarding; in order to support the sustainable development of the sector through marine planning. Relevant public authorities should make appropriate evidence available to support planning and decision making in order to support the sustainable development of the sector through marine planning, where it is appropriate to do so.	can help ensure sustainable marine development, getting the right project in the right location and avoiding environmental and other sensitivities where possible.
ENV_02: Marine Protected Areas Proposals should demonstrate how they:	The proposed survey will not take place within any protected area (see Figure 4-2 which shows Marine Protected Areas (MPA) in

Relevant Welsh National Marine Plan Policy	How the survey adheres to the Policy
• avoid adverse impacts on individual Marine Protected Areas (MPAs) and the coherence of the network as a whole; • have regard to the measures to manage MPAs; and • avoid adverse impacts on designated sites that are not part of the MPA network.	the wider vicinity of the survey areas) and will not have an adverse negative impact on protected areas.
SOC_05: Historic assets Proposals should demonstrate how potential impacts on historic assets and their settings have been taken into consideration and should, in order of preference: a. avoid adverse impacts on historic assets and their settings; and/or b. minimise impacts where they cannot be avoided; and/or c. mitigate impacts where they cannot be minimised. If significant adverse impacts cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding. Opportunities to enhance historic assets are encouraged.	The survey works will not have a significant impact on marine historic assets. The positioning of the boreholes and PCPT locations will be informed by geophysical survey data as well as avoiding known archaeological feature locations and as such will be designed to avoid heritage assets. A Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) will be produced and followed when conducting the works.
GOV_02: Cross-border and plan compatibility Relevant public authorities, in making their decisions, should have regard to: • any applicable policy in a relevant marine plan; • any applicable policy in relevant terrestrial development plans or related documents; • the Natural Resources Policy;	This survey campaign will be undertaken in both English and Welsh waters (within the Morgan and Mona array areas, respectively), however this SID and associated MLA refers only to the works within the Mona array area, i.e. in Welsh waters only. Therefore, this SID and associated MLA will only be issued to Natural Resources Wales (NRW). Relevant consents are being sought from the different authorities as required, including the MMO, and The Crown Estate.

Relevant Welsh National Marine Plan Policy	How the survey adheres to the Policy
• any relevant local well-being plan(s) (including the local well-being assessment); and • evidence in any relevant Area Statement(s) produced by Natural Resources Wales (NRW).	

3. SURVEY LOCATIONS

The survey will be undertaken within the Morgan and Mona array areas, illustrated in Figure 4-2. The Morgan site is located in English offshore waters (approximately 35 km from the English coast at the nearest point), and the Mona site primarily within Welsh offshore waters with a small proportion within English waters (approximately 30 km from the Welsh Coast at the nearest point). This application includes boreholes and shallow geotechnical investigations located within Welsh waters at the Mona site only.

The exact locations of the borehole and shallow geotechnical investigations are not yet determined. However, they will be spread across the array area so that the maximum variety of geological and geotechnical conditions can be identified and assessed. The determination of the locations will be based on the results of geophysical survey data acquired in 2021, 2022 and 2023. The locations will also be screened by geophysical survey techniques prior to execution of geotechnical activities for identification of potential hazards such as obstacles, objects or potential unexploded ordnance (UXO). For the deep geotechnical locations this is undertaken using survey data acquired in 2023, while the shallow geotechnical locations will be screened based on a survey to be undertaken by a separate geophysical survey vessel in March 2025 using Side Scan Sonar, Multibeam Echo Sounder and Magnetometer equipment.

The range of water depths is approximately 33 m LAT to 46 m LAT in Mona (LAT = Lowest Astronomical Tide).

FIGURE 4-1 MONA ARRAY MARINE LICENSE AREA

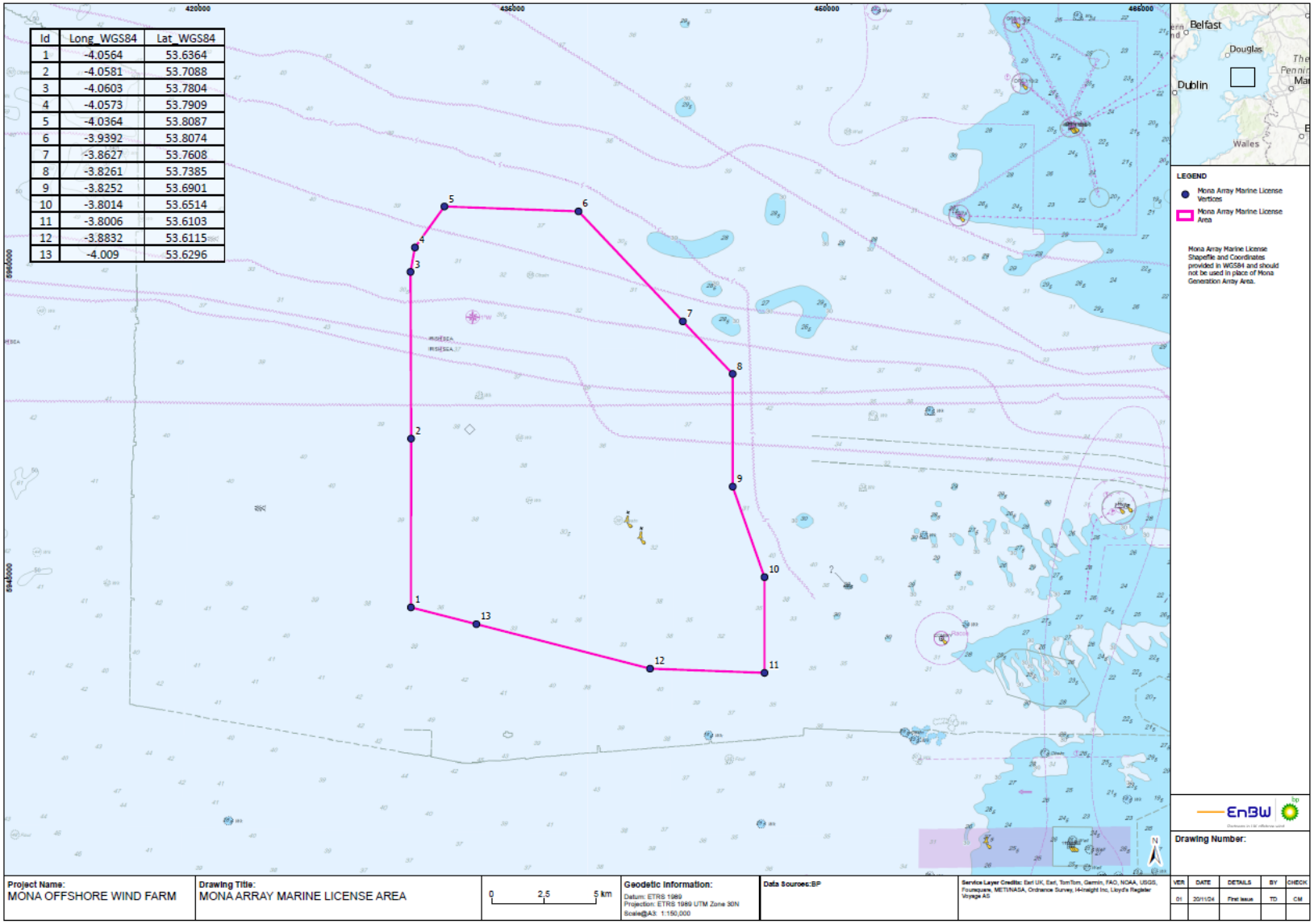
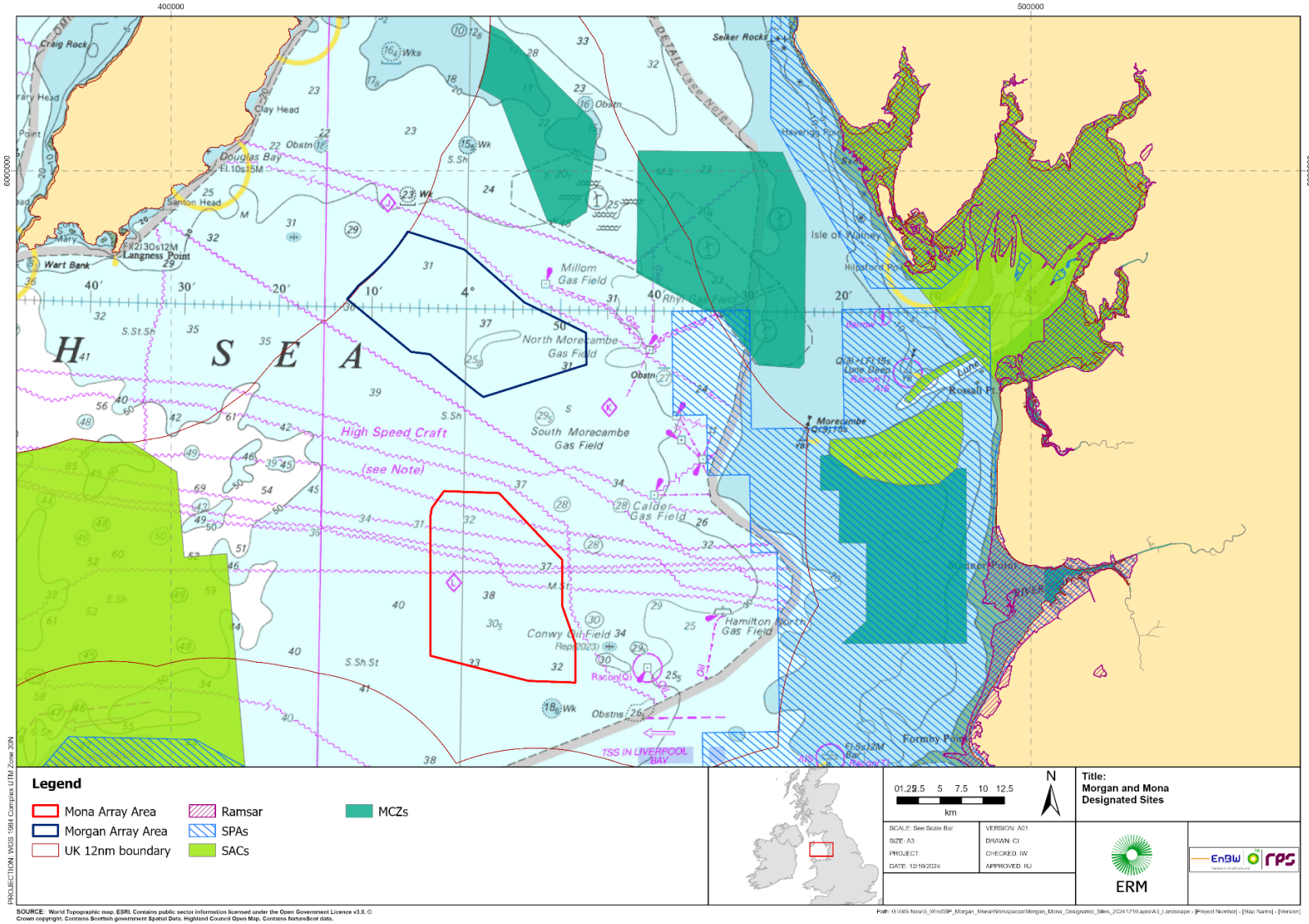


FIGURE 4-2 MORGAN AND MONA GEOTECHNICAL SURVEY AREAS IN RELATION TO DESIGNATED SITES



4. SURVEY METHODS

To inform the development of the Morgan and Mona offshore wind farms bp and EnBW intend to carry out deep geotechnical offshore survey activities commencing in the Spring of 2025. The survey will inform foundation design, ground conditions and placement of the WTGs within the array areas.

The deep geotechnical surveys will include:

- Up to 25 boreholes (in addition to the quantity already approved on marine licence RML2444) within the Welsh waters of the Mona bidding area. Individual boreholes may be a combination of soil and rock core sampling and/or downhole testing, including:
  - Composite boreholes with downhole in situ testing;
  - Cone Penetration Tests (CPT); and
  - Discretionary PPDT and HPD downhole Pressuremeter testing may also be conducted.

The shallow geotechnical investigations will include:

- Up to 750 shallow geotechnical samples, combined of:
  - Vibrocore (or piston core) sampling;
  - PCPT; and
  - TRT.

The methods for the above survey are outlined in the sections below. In the event that the equipment described below is unavailable, alternative equipment with a similar specification and capability will be substituted.

Ports for use during the survey are not yet confirmed. However, the preferred ports are currently as follows:

- Barrow - preferred port for Gardline Horizon Geodrill and Gardline Observer and possibly Gardline Reliance, although this is to be confirmed for this vessel;
- Holyhead - preferred port for Fugro Synergy; and
- Liverpool is a reserve/alternate port (for all vessels).

4.1 DEEP BOREHOLES

Up to 25 boreholes in the Mona array area (within Welsh waters) will be undertaken. The borehole core diameter will be up to 82mm and the borehole will be up to 90 m deep, as detailed in Table 5-1. Geotechnical samples via coring will be taken for laboratory analysis and testing. All samples will be utilised for testing and analysis. Following sample collection, the boreholes will backfill naturally.

The mobilised equipment shall be capable of drilling/coring, acquiring samples and in situ data to a minimum of 100m below mudline. All in situ tools and sampling equipment shall be of a capacity and robustness adequate for the materials expected, including very hard to extremely hard clays and very dense sands.

TABLE 5-1 BOREHOLE DRILLING OPTIONS AND ESTIMATED SEDIMENT VOLUMES

	No. of boreholes	Diameter (mm)	Maximum Depth (m)	Total Volume collected per sample (m^3)	Total volume collected (m^3)
Mona Array Area	25	82	90	0.48	11.9

Drilling is performed from a dynamically positioned vessel, equipped with a derrick and heave compensated top drive, using soil boring equipment which is lowered through a central moon pool on the vessel. At the start of a borehole the seabed frame is lowered onto the seabed. The seabed frame acts as a fixed entry/re-entry point to locate the borehole and as a reaction force for downhole testing and sampling. The drill string is lowered until the BHA passes through the opened pipe clamp and reaches the seabed to start drilling operations. After drilling and performing the in-situ logging tests (see below) the drill string, including the downhole tools, will be lifted and retrieved to the vessel, as will the seabed frame.

The geotechnical works will result in low frequency sound at a level within the typical sound levels produced by general shipping.

4.1.1 IN SITU TESTING AND SAMPLING

In situ tests shall be performed at every borehole location and will include cone penetrometer testing (CPTu), Seismic CPTu (SCPTu), cyclic CPTu, push sampling and rotary coring. In Quaternary soil layers and bedrock, a flexible configuration between American Petroleum Institute (API) drilling/Geobor-S rotary coring is assumed. Sampling and CPTu will predominantly be undertaken in Quaternary soil layers, whilst rock coring will predominantly be in bedrock.

Downhole testing and sampling is carried out by wireline deployment of tools from the drilling vessel derrick down the inside of the drill string.

For downhole CPTu testing, two types of cones with cross-sectional areas of 5 cm^2 and 10 cm^2 are expected to be used.

CPTus, SCPTus and PCPTs do not involve the removal of any seabed sediment and are therefore considered non-licensable under the Marine and Coastal Access Act. However, PCPTs have been included in this SID for completeness and information only.

4.2 SHALLOW GEOTECHNICAL INVESTIGATIONS

Up to 750 shallow geotechnical samples within the Mona array area (within Welsh waters) will be undertaken. The tests will combine vibrocore (or piston core) sampling, PCPT and TRT all up to 6 m bsb, as detailed in Table 5-2. Geotechnical samples via coring will be taken for laboratory analysis and testing. All samples will be utilised for testing and analysis. Following sample collection, the boreholes will backfill naturally.

TABLE 5-2 SHALLOW GEOTECHNICAL OPTIONS AND ESTIMATED SEDIMENT VOLUMES

	No. of vibrocores (or piston cores)	Diameter (mm)	Maximum Depth (m)	Total Volume collected per sample (m^3)	Total volume collected (m^3)
Mona Array area	750	76.2	6	0.027	20.5

In situ testing will also be undertaken with a PCPT tool. A minimum of two types of cone will be mobilized of cross-sectional areas of 5 cm^2 and 10 cm^2, respectively.

PCPT and TRT do not involve the removal of any seabed sediment and are therefore considered non-licensable under the Marine and Coastal Access Act. However, PCPTs have been included in this SID for completeness and information only.

5. SURVEY PROGRAMME

The deep geotechnical surveys are planned to be undertaken from March 2025, over a total duration of 37 weeks. Most of the deep boreholes (up to 80) will be undertaken under the existing license RML2444 which expires 17 September 2025. It is anticipated that the additional 25 boreholes will take approximately 14 weeks to complete.

The shallow geotechnical investigations are planned to be undertaken 30 April 2025 over a duration of 20.5 weeks, until 15 September 2025.

However, a license is requested from 01 March 2025 extending until 01 March 2026 to allow contingency in the programme should the survey be delayed, for example, due to weather downtime.

6. POTENTIAL ENVIRONMENTAL IMPACTS

This section outlines environmental receptors that could potentially be affected by the survey, detailed in Table 8-1.

TABLE 8-1 POTENTIAL FOR ENVIRONMENTAL IMPACTS

Environmental Receptor	Potential Activity Impact
Physical Processes	Some localised suspended sediment and resettlement may occur due to interaction of equipment with the seabed (total footprint of Mona samples 3.53 m^2)[1]. However, these impacts will be localised and small in scale. Any depressions or marks left in the seafloor following the proposed survey will naturally backfill. It is anticipated given the scale of activities and the mobile nature of the marine environment there will be no long-term impact on physical processes. Chapter 1 of the ES concluded that there will be no significant effects arising from the Mona Offshore Wind Project during the construction, operations and maintenance or decommissioning phases. Impacts arising from increases in suspended sediment concentrations were considered to be negligible adverse significance.
Benthic Ecology	Impacts on benthic ecology are expected to be limited and temporary within the footprint of the survey (total footprint of Mona samples 3.53 m^2). Direct damage via crushing is likely to occur within the equipment footprint. Smothering as a result of sediment settlement following potential increases in suspended sediment concentration (SSC) is possible. However, this impact is likely to be localised and small in scale. The significance of these impacts will depend on the sensitivity of the benthic species to disturbance (including seapens and burrowing megafauna communities', Annex I stony reef and the fragile sponge and anthozoan communities on rocky habitat), however as the impacts are limited in scale, recolonisation from the surrounding seabed is likely to be rapid. The specific locations will further be informed by the 2021, 2022 and 2023 geophysical survey data, as well as the planned 2025 geophysical survey campaign, and by previously undertaken benthic grab samples and drop-down video/ camera data used to avoid sensitive habitats, and therefore any impact of the survey on benthic ecology will be negligible.

[1] Footprint calculation:
Deep Radius $= 82mm \div 2 = 41mm = 0.041m$
Shallow Radius $= 76.2mm \div 2 = 38.1mm = 0.038m$
Area of deep boreholes $= \pi r^2 = (\pi 0.041^2)25 = 0.132m^2$
Area of shallow samples $= \pi r^2 = (\pi 0.038^2)750 = 3.402m^2$
Total Footprint $= 0.132 + 3.402 = 3.53m^2$

Environmental Receptor	Potential Activity Impact
	Chapter 2 of the ES concluded that there will be no significant effects arising from the Mona Offshore Wind Project during the construction, operations and maintenance or decommissioning phases. Impacts arising from increases in suspended sediment concentrations were considered to be minor adverse and negligible significance.
Fish and Shellfish Ecology	Potential impacts on fish and shellfish may arise through presence of the survey vessel, noise from the survey and increased suspended sediments. Direct damage via crushing is likely to occur within the equipment footprint (total footprint of Mona samples 3.53 m^2), which may impact shellfish, or benthic fish species that may have limited mobility. Smothering as a result of sediment settlement following potential increases in SSC is possible. However, this impact is likely to be localised and small in scale. These species will likely recover rapidly following the survey via recolonisation from the surrounding seabed. Mobile species are unlikely to be affected, with short term avoidance behaviour likely to mitigate potential injury or mortality. Any impact from installation activities on fish and shellfish will be negligible given the general high mobility of the species in the area, the short duration of the survey and the small footprint of the survey. Chapter 3 of the ES concluded that there will be no significant residual effects arising from the Mona Offshore Wind Project during the construction, operations and maintenance or decommissioning phases. Impacts arising from the generation of underwater noise from geophysical surveys were identified, however noise generation arising from geotechnical surveys is considered to be minimal in comparison.
Ornithology	Potential impacts of survey operations on marine and coastal birds are limited given their wide ranges, the limited duration of the survey and the use of up to four vessels for the licensable activities. Impact pathways including lighting, noise and disturbance have the potential to occur during the survey. It is unlikely that foraging activities will be impacted for ornithological receptors given their high mobility and therefore potential to relocate for the limited period of time during which the survey is undertaken. Additionally, given the existing marine traffic in the Irish Sea, ornithological receptors will likely be habituated to vessel movements. Preferred ports for use during the geotechnical survey are described in Section 4. Of these ports, only the Port of Liverpool (if it is used at all) will involve vessels to transit through the Liverpool Bay SPA. Based on

Environmental Receptor	Potential Activity Impact
	port calls once every 28 days throughout the total survey duration (as per Section 5: 57.5 weeks or 402.5 days) for all four vessels, this will equate to a maximum (as the worst case scenario) number of vessel transits of 115 through the Liverpool Bay SPA (equating to up to 48 November-March inclusive). However, the likely number of vessel transits will be much lower as the Port of Liverpool is a reserve/alternate port and may not be needed by all (if any) of the vessels. It should be noted that although the licence period extends for a whole year, works will most likely be undertaken during the summer months (which are the optimum months for survey deployment), thereby avoiding the overwintering period (November-March, inclusive). However, a licence period of 01 March 2025 extending until 01 March 2026 has been requested to allow contingency in the programme should the survey be delayed, for example, due to weather downtime. It is therefore determined that any impacts on birds will be negligible. Chapter 5 of the ES concluded that there will be no significant effects arising from the Mona Offshore Wind Project during the construction, operations and maintenance or decommissioning phases. Impacts arising from disturbance and displacement from airborne noise underwater sound and presence of vessels and infrastructure were determined to be minor adverse and negligible. Distances of the Mona array to surrounding SPAs are summarised in Table 8-2; a detailed list of distances and designated sites can be found in Chapter 5 of the ES.
Marine Mammals	Potential impacts on marine mammals may arise through presence of the survey vessel and noise generation from the survey. The geotechnical survey will result in low frequency sound at a level within the typical sound levels produced by general shipping. Therefore, it is considered that there is no potential for injury, and any possible temporary disturbance would likely result from vessel presence rather than borehole or other geotechnical activities. There is the potential for foraging activities to be disrupted within a limited region as a result of suspended sediment and noise. However, this impact is likely to be both localised and temporary. Further, marine mammal receptors are highly mobile, and will likely relocate for the duration of the survey. Given the short-term nature of the survey activities, there is unlikely to be a significant impact on marine mammals either in terms of collision or entanglement with equipment. In addition, marine mammals present in the installation area will be familiarised to vessel movements and noise given the level of existing

Environmental Receptor	Potential Activity Impact
	activity. It is therefore determined that any impacts on marine mammals will be negligible. Chapter 4 of the ES for the Mona Offshore Wind Project concluded that minor adverse impacts are to arise from pre-construction site-investigation surveys and are therefore considered not significant.
Protected Species	Potential impacts on protected sites, including Sites of Special Scientific Interest (SSSI), Special Protected Areas (SPAs) and Special Areas of Conservation (SACs) are considered further in Section 8.1 to 8.3 below.
Shipping and Navigation	A notice to mariners will be provided while the survey vessel is operational, and the vessel will display the appropriate navigational signals. As such no impact to shipping and navigation is predicted. Chapter 7 of the ES concluded that there will be no significant effects arising from the Mona Offshore Wind Project during the construction, operations and maintenance or decommissioning phases, aside from impacts on adverse weather routing. However, this will be mitigated throughout the duration of the surveys by establishing continued engagement with relevant stakeholders.
Commercial Fisheries	The survey vessel will be in operation for only a short period, notice to mariners and kingfisher notifications will be provided and the vessel will display the appropriate navigational signals. As such no impacts to commercial fisheries are predicted. A Company Fisheries Liaison Officer (CFLO) has also been active on this project since 2021 to date and they will ensure local fishing stakeholders are updated well in advance of any survey activities. Chapter 6 of the ES concluded that there will be no significant effects arising from the Mona Offshore Wind Project during the construction, operations and maintenance or decommissioning phases following the implementation of embedded and further mitigation measures. Impacts arising from the timings of the surveys to minimise the impacts on fish stocks were considered during stakeholder engagement.
Marine Archaeology and Cultural Heritage	The survey will not have a significant impact on marine historic assets. The positioning of the borehole and PCPT locations will be informed by geophysical survey data as well as known archaeological features and as such will be designed to avoid heritage assets. Chapter 9 of the ES concluded that there will be no significant effects arising from the Mona Offshore Wind Project during the construction, operations and maintenance or decommissioning phases.

Environmental Receptor	Potential Activity Impact
	Adherence to an offshore WSI and PAD, which includes for archaeological input into the planning of any future geotechnical surveys (where relevant) and geoarchaeological assessment of geotechnical data in order to persevere any prehistoric deposits through recording and the protocol for the reporting and protection of any archaeological material that may be discovered during the course of the Mona Offshore Wind Project. The existing Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) will be updated prior to the surveys proposed to commence in the Spring of 2025.
Marine Infrastructure	The survey will not have a significant impact on other existing marine infrastructure. The positioning of the borehole and PCPT locations will be informed by geophysical survey data as well as known infrastructure locations and as such will be designed to avoid interactions with existing infrastructure. Chapter 9 of the ES concluded that there will be no significant effects arising from the Mona Offshore Wind Project during the construction, operations and maintenance or decommissioning phases.

6.1 HABITATS REGULATIONS ASSESSMENT SCREENING

No sites within the UK National Sites Network (including Natura 2000 sites) or Ramsar sites are located within the offshore array areas. Table 8-2 presents the sites that are within the wider vicinity of the survey and the potential for interaction with the survey.

TABLE 8-2 HABITATS REGULATIONS ASSESSMENT STAGE 1 SCREENING: SPECIAL PROTECTION AREAS (SPA) AND SPECIAL AREAS OF CONSERVATION (SAC) WITHIN THE VICINITY OF THE SURVEY

SAC/SPA	Reason for Designation	Distance to Array Area	Potential for Interaction
Liverpool Bay SPA	Classified for the protection of red-throated diver (*Gavia stellata*), common scoter (*Melanitta nigra*), and little gull (*Hydrocoloeus minutus*) in the non-breeding season; common tern (*Sterna hirundo*) and little tern (*Sterna albifrons*) in the breeding season, and an internationally important waterbird assemblage.	10 km	The proposed activities may cause temporary acoustic disturbance to birds during activities or visual disturbance due to vessel presence. However, the level of noise associated with the survey will be low and is unlikely to be discernible above that associated with background vessel activity. Of the classified populations listed for this site, red-throated diver is considered the most sensitive to disturbance or displacement from vessel presence. SNCB advice currently states that disturbance to this species may occur within a range of 10 km (JNCC, 2022). As such, it is considered there is minimal risk of visual disturbance/displacement from activities as the survey will be undertaken at least 10km from Liverpool Bay SPA. Preferred ports for use during the geotechnical survey are described in Section 4. Of these ports, only the Port of Liverpool (if it is used at all) will involve vessels to transit through the Liverpool Bay SPA. Based on port calls once every 28 days throughout the total survey duration (as per Section 5: 57.5 weeks or 402.5 days) for all four vessels, this will equate to a maximum (as the worst case scenario) number of

SAC/SPA	Reason for Designation	Distance to Array Area	Potential for Interaction
			vessel transits of 115 through the Liverpool Bay SPA (equating to up to 48 November-March inclusive). However, the likely number of vessel transits will be much lower as the Port of Liverpool is a reserve/alternate port and may not be needed by all (if any) of the vessels. It should be noted that although the licence period extends for a whole year, works will most likely be undertaken during the summer months (which are the optimum months for survey deployment), thereby avoiding the overwintering period (November-March, inclusive). However, a licence period of 01 March 2025 extending until 01 March 2026 has been requested to allow contingency in the programme should the survey be delayed, for example, due to weather downtime. In view of these points, it is determined that there is no potential for likely significant effects on the classified bird populations of Liverpool Bay SPA.
Anglesey Tern / Morwenoliaid Ynys Môn SPA	Breeding Season: • Roseate tern *Sterna dougallii* • Common tern *Sterna hirundo* • Arctic tern *Sterna paradisaea* • Sandwich tern *Sterna sandvicencis*	21.2 km	The proposed survey may cause acoustic disturbance during survey activities or visual disturbance due to vessel presence. However, the level of noise associated with the survey will be low and is unlikely to be discernible above that associated with background vessel activity. Tern are not considered

SAC/SPA	Reason for Designation	Distance to Array Area	Potential for Interaction
			sensitive to disturbance due to the presence of vessels. SNCB advice currently states that disturbance may occur within a range of 10 km (JNCC, 2022). As such, it is considered there is minimal risk of visual disturbance/displacement from survey activities. In view of these points, it is determined that there is no potential for adverse effects on the classified populations Anglesey Tern/ Morwenoliaid Ynys Môn SPA.
North Anglesey Marine / Gogledd Môn Forol SAC	Annex II species that are a primary reason for selection of this site: • Harbour porpoise *Phocoena phocoena*	22.6 km	The proposed survey may cause acoustic disturbance during survey activities (drilled boreholes) and disturbance from the presence of vessels. The survey area is located within the Celtic and Irish Seas harbour porpoise Marine Mammal Management Unit (MMMU), and the closest SAC is North Anglesey Marine/Gogledd Môn Forol SAC at a distance of 22.6 km. Harbour porpoise are sensitive to frequencies higher than 10 kHz (Dekeling et al. 2014) with an approximate effective deterrent range at 26 km. Geotechnical drilling (Rotary) is typically between 2Hz – 50kHz at 160 dB re 1µPa @ 1m. Higher frequencies do not travel as far as lower frequency noise

SAC/SPA	Reason for Designation	Distance to Array Area	Potential for Interaction
			underwater (JNCC et. al, 2020). Although the rotary drilling will be within the sensitivity range for harbour porpoise, the survey area is located at a reasonable distance from the SAC resulting in much reduced noise levels which will be below the 10 kHz sensitivity threshold. Therefore, no likely significant effect is anticipated from the survey on the classified population of the North Anglesey Marine/ Gogledd Môn Forol SAC.

6.2 MARINE CONSERVATION ZONE SCREENING STAGE ASSESSMENT

No Marine Conservation Zones (MCZ) are located within the survey areas. The nearest MCZ, West of Copeland, designated for subtidal coarse sediment, subtidal sand and subtidal mixed sediments, is located over 20 km to the north of the Mona array area.

Given the distance to the nearest MCZ, the reasons for designation and the small spatial extent and nature of the proposed survey, no interactions are anticipated with these sites.

6.3 SITES OF SPECIAL SCIENTIFIC INTEREST

The survey areas are located over 30 km offshore, at the closest point of the Mona array area. Therefore, there are no anticipated interactions between the survey and any SSSIs.

6.4 WATER FRAMEWORK DIRECTIVE COMPLIANCE ASSESSMENT

Although the survey is located beyond 12 nautical miles from the shore, in line with NRW Marine Licensing Team guidance, a separate WFD compliance assessment has been undertaken. The WFD Screening Assessment (Appendix A) concluded that the survey works do not present any potential implications to WFD objectives.

7. BEST PRACTICE AND PROPOSED MITIGATION MEASURES

The following mitigation measures and environmental best practice will be adhered to throughout the survey work to minimise risk to the marine environment:

- Best practice vessel management measures to minimise disturbance to ornithology will be adhered to (these measures are further described in the DCO Application for the Mona Offshore Wind Project, 2024: Measures to minimise disturbance to marine mammals and rafting birds from transiting vessels. Deadline 5. [J17 F03]), including:
  - Adhering to the Wildlife Safe (WiSe) Scheme;
  - Use of regular vessel transit routes which follow, where possible, established shipping routes to minimise disturbance to ornithology;
  - Where it is necessary for vessels to go outside of established navigational routes during transit to/from port and working areas, routes will be pre-selected to avoid locations where birds are known to aggregate and visible aggregations of rafting birds (inside or outside of the Liverpool Bay/Bae Lerpwl SPA) will be actively avoided within the limitations of vessel safety and manoeuvrability.
- The locations of the boreholes will be informed by geophysical data and environmental benthic data collected during 2021, 2022 and 2023 surveys of the area and will also be screened by geophysical survey techniques prior to execution of geotechnical activities. Therefore, geotechnical locations will be sited to avoid sensitive habitats (such as potential Annex I habitat), potential archaeological features and other potential hazards such as UXOs.
- A project-specific CFLO will develop and issue Notice to Mariners (NtM) and kingfisher notifications will be provided and the vessel will display the appropriate navigational signals at all times.

- No discharge to sea of left-over drilling fluid will occur at the end of the drilling programme and only the use of biodegradable drilling fluid will be used, which is commonly used in the marine environment.
- All equipment associated with the works will be removed on completion of the works.
- Bunding, storage facilities and spill kits will be employed to contain and prevent the release of fuel, oils and chemicals associated with the equipment into the marine environment.
- Coatings and treatments will be suitable for use in the marine environment and are used in accordance with best environmental practice.
- 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. See Appendix B for more details.
- The existing Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) will be updated prior to the surveys proposed to commence in the Spring of 2025.

8. SUMMARY

To inform the development of the Morgan and Mona Offshore Wind Farms , bp and EnBW intend to carry out geotechnical investigations of the Morgan and Mona Array Areas commencing in the Spring of 2025. While this survey campaign will be undertaken in both English and Welsh waters (within the Morgan and Mona array areas, respectively) this SID and associated MLA refers only to the works within the Mona array area, i.e. in Welsh waters only

Bp and EnBW currently have an existing licence, RML2444, for deep boreholes only. An additional 25 boreholes are required to sample the 100 WTG locations, as well as shallow geotechnical samples, not previously licenced, across the Mona array. The geotechnical surveys proposed include deep boreholes, deep PCPTs and shallow vibrocores and shallow PCPTs, using standard and well-known survey methodologies. The data acquired during the 2025 survey will inform foundation design and placement of the wind turbines within the array areas alongside cable routing and design.

This document, along with Appendix A, provides an overview of the survey activities as well as potential interactions with the environment and sensitive features. This document also shows how the proposed surveys are in accordance with the WNMP. Key mitigation measures have also been listed, including in Appendix B. No significant impacts will result from the surveys on any of the receptors outlined in Table 8-1.

9. REFERENCES

Dekeling, R.P.A., Tasker, M.L., Van der Graaf, A.J., Ainslie, M.A, Andersson, M.H., André, M., Borsani, J.F., Brensing, K., Castellote, M., Cronin, D., Dalen, J., Folegot, T., Leaper, R., Pajala, J., Redman, P., Robinson, S.P., Sigray, P., Sutton, G., Thomsen, F., Werner, S., Wittekind, D., Young, J.V., Monitoring Guidance for Underwater Noise in European Seas, Part II: Monitoring Guidance Specifications, JRC Scientific and Policy Report EUR 26555 EN, Publications Office of the European Union, Luxembourg, 2014, doi: 10.2788/27158.

JNCC (Joint Nature Conservation Committee), 2017. JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys. Available online: https://data.jncc.gov.uk/data/e2a46de5-43d4-43f0-b296-c62134397ce4/jncc-guidelines-seismicsurvey-aug2017-web.pdf [Accessed December 2024].

JNCC (Joint Nature Conservation Committee) DAERA (Department of Agriculture, Environment and Rural Affairs) and Natural England, 2020. Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs. Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/889842/SACNoiseGuidanceJune2020.pdf [Accessed December 2024].

JNCC (Joint Nature Conservation Committee), 2022. Joint SNCB Interim Displacement Advice Note. Available online: https://data.jncc.gov.uk/data/9aecb87c-80c5-4cfb-9102-39f0228dcc9a/joint-sncb-interim-displacement-advice-note-2022.pdf [Accessed January 2025].

Welsh National Marine Plan 2019: https://gov.wales/welsh-national-marine-plan-document [Accessed December 2024].

APPENDIX A WATER FRAMEWORK DIRECTIVE COMPLIANCE ASSESSMENT

Attached separate document, 'WFD Assessment Geotechnical Boreholes 2025 v2.0'.

APPENDIX B BIOSECURITY RISK ASSESSMENT

Attached separate document, ‘eng-marine-inns-biosecurity-ra-and-management-plan.docx 1.0 CLEAN’.

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