

ScottishPower Renewables and Shell New Energies Joint Venture

MarramWind Offshore Wind Farm

Geotechnical Site Investigation Method Statement

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Revision Control

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1 Introduction

1.1 Project Overview

- 1.1.1 Scottish Power Renewables UK Limited (SPR) and Shell New Energies UK Ltd (Shell), have formed MarramWind Limited, a Joint Venture to develop the MarramWind floating offshore wind farm (OWF).
- 1.1.2 Located 75 km off the north-east coast of Scotland, the proposed MarramWind OWF has an intended installed capacity of 3 GW. The MarramWind OWF array site is within the Marine Scotland Sectoral Marine Plan (SMP) development plan area NE7 as shown in Figure 1.2.
- 1.1.3 A geophysical and environmental survey, including shallow (upper 6 m below seafloor) geotechnical investigation works, was conducted over the MarramWind offshore windfarm site, between May and August 2022.
- 1.1.4 A Geotechnical Site Investigation, comprising geotechnical borehole drilling, sampling in-situ testing, laboratory testing, and associated data processing and reporting is required over the offshore windfarm site in 2023. This will aid with ground truthing of the 2022 geophysical surveys.
- 1.1.5 The water depth across the MarramWind OWF array site varies between 87.8m and 133.7m relative to Lowest Astronomical Tide (LAT). Considering a separation of 2.38m between LAT and Mean High Water Spring (MHWS), the water depth across the MarramWind OWF array site varies between 90.2m and 136.1m relative to MHWS.
- 1.1.6 All the geotechnical site investigation works over MarramWind OWF array described in this document will require to be conducted below MHWS level.

1.2 Purpose of the Method Statement

- 1.2.1 The purpose of this Method Statement is to provide a description of the methodology that will be implemented to execute the Geotechnical Site Investigation, in support to the Marine License application.

1.3 Acronyms

1.3.1 The following acronyms are used in this Method Statement.

| Acronym | Meaning |
|---------|--|
| CDM | Construction, Design and Management |
| CPT | Cone Penetration Test |
| ERP | Emergency Response Plan |
| FEED | Front-End Engineering and Design |
| HSSE | Health, Safety, Security and Environment |
| LAT | Lowest Astronomical Tide |
| MCA | Maritime and Coastguard Agency |
| MHWS | Mean High Water Spring |
| MPA | Marine Protected Area |
| OAA | Option Agreement Area |
| OSS | Offshore Sub-Station |
| OWF | Offshore Wind Farm |
| PMF | Priority Marine Feature |
| SAC | Special Area of Conservation |
| SOPEP | Shipboard Oil Pollution Emergency Plan |
| SSC | Suspended Sediment Concentration |
| UXO | Unexploded Ordnance |
| WTG | Wind Turbine Generator |

Table 1.1 List of Acronyms



2. Project Description

2.1 Site Investigation Objectives and Outline Scope

- 2.1.1 The overall objective of this characterisation geotechnical investigation is to provide geotechnical information and soil parameters that will be used to develop the site's engineering ground model that will be used for feasibility studies and up to FEED-level design and installation assessment of WTG floater anchors, OSS fixed foundation and inter-array cable routing, cable burial and cable installation assessment. In addition, the resulting information and material will be used to complement the geoarchaeological baseline as required in the Project's Environmental Statement.
- 2.1.2 For this purpose, the scope of work of the Geotechnical Site investigation comprises the execution of sampling boreholes, in-situ testing boreholes (including CPT, seismic CPT, and P-S logging) and seabed CPT tests (including seismic CPT at selected locations) across the OWF array, with associated laboratory testing, data processing and reporting. In addition, the execution of in-situ thermal conductivity tests is considered as an optional item.

2.2 Scope of Work Overview

- 2.2.1 The Geotechnical Site Investigation scope of work overview is presented in *Table 2.1* below, for the field works only. For simplicity the onshore laboratory, the data processing, and reporting elements of the scope of work are not included in this overview for the purpose of Marine License application.

| Test/Sample Types | Target depth (m below seabed) | Number of Locations | Volume of sediment removed by drilling (m ³) per location | Comments |
|--|----------------------------------|-----------------------|---|---|
| Borehole: continuous sampling | 40m (min: 30m / max: 50m) | 24 | 2.5 | Co-located with continuous CPT borehole. Optional: downhole P-S logging at selected locations (provisionally at 6 locations). |
| Borehole: continuous CPT profile | 40m (min: 30m / max: 50m) | 24 | 2.5 | Co-located with continuous sampling borehole. Optional: downhole P-S logging at selected locations (provisionally at 6 locations). |
| Borehole: Alternate sampling and CPT | 80m (min: 60m / max: 100m) | 4 | 5 | 1 at each of the pre-selected Offshore Sub-Station locations. The number of potential Offshore Sub-Station locations is 2 to 4. |
| Seabed CPT | 40m or refusal | 36 | 0 | Seabed CPT thrust capacity: 20 tons minimum. 24 locations co-located with continuous CPT and sampling boreholes. |
| Shallow in-situ thermal conductivity testing | 5m | 6 (TBC - Optional) | 0 | Optional. Provisionally 6 locations for planning purposes. |

Table 2.1 Scope of work overview for the field works

- 2.2.2 The quantities and the maximum target penetration depths indicated in *Table 2.1* are considered as the high-estimate case scenario. These are subject to further adjustment depending on the ongoing processing and interpretation of the 2022 Geophysical and Environmental survey results, as well as the actual soil conditions observed during the execution of the Geotechnical Site Investigation.
- 2.2.3 Considering the activities that will be undertaken in this Geotechnical Site Investigation, it is noted that a Marine License is required for sediment sampling in cases where the volume of sediment removed exceeds 1m³ per location. Henceforth this Method Statement will focus on borehole drilling and sediment sampling to support the Marine License Application (Doc ID: MAR-GEN-GEO-PER-SCW-000001).

2.3 Site Investigation Locations

- 2.3.1 The geotechnical investigation locations will be positioned within the OWF site (Figure 1.2) along the intersection of geophysical seismic lines acquired during the 2022 Geophysical and Environmental survey in order to enable direct correlations between seismic and geotechnical survey results. The selection of geotechnical investigation locations will aim at characterising the various seismic facies to provide the most robust integration of seismic and geotechnical data for the development of the site-wide ground model and the characterization of geohazards.
- 2.3.2 The selection of geotechnical investigation locations will consider key constraints, including but not limited to:

- The avoidance of sensitive seabed habitats, Priority Marine Features (PMF's) or other features that could be affected by the geotechnical operations;
- The avoidance of any interpreted contacts or seabed features from Multi-Beam Echo Sounder (MBES), Side Scan Sonar (SSS) and magnetometer datasets from the 2022 Geophysical and Environmental survey;
- The assurance of reaching UXO ALARP risk mitigation.

2.3.3 The geotechnical investigation locations are not determined yet. Geophysical and Environmental data from the site acquired in 2022 are currently being processed and reviewed in order to inform the selection of the final site investigation locations.

2.4 Site works duration and timeframe

2.4.1 The estimated maximum duration for the execution of the field works, excluding stand-by due to weather or any other delays, is in the order of 70 days.

2.4.2 Considering weather risks and the current uncertainty on the field work execution planning, the proposed timeframe of operations considered for the purpose of Marine License application is starting on 1st May 2023. The end date for this Marine License application is requested to be on 31st December 2024. While the intent is to survey in 2023, there might be a need to deviate to 2024 due to the scarce availability of vessels. It should be noted that the survey will be carried out in one campaign and will not be spread out.

3. Survey Execution

3.1 Proposed Vessels

- 3.1.1 One or several vessels will be required for the survey works. The first vessel will execute the Seabed CPT works and the (optional) shallow in-situ thermal conductivity testing. The same vessel, or another vessel will execute the borehole works. The specific vessel provider and their availability are yet to be confirmed and are subject to a current tender process
- 3.1.2 If needed, the survey vessels may interchange with other survey vessels of similar vessel specifications throughout the survey duration.
- 3.1.3 The vessels are expected to mobilise from Aberdeen or another location to be agreed with MarramWind.

3.2 Proposed Equipment and Methodology – Boreholes

- 3.2.1 The execution of geotechnical boreholes consists in drilling a cased borehole and conducting soil sampling, rock coring or in-situ testing down the hole as the borehole progresses. A suit of tools is lowered at the bottom of the hole in successive sequence to enable push sampling, piston sampling, rock coring, CPT testing or other in-situ testing or borehole logging.
- 3.2.2 Borehole drilling is typically conducted using rotary drilling techniques. Seawater is used as flushing medium with the addition of biodegradable polymer or (drilling mud) as and when required. Alternatively, the use of percussion drilling, bailer and augers may also be considered.
- 3.2.3 It is envisaged that the geotechnical borehole drilling will be executed with a vessel-mounted drilling rig, as described below, although alternative solutions using a seabed drilling rig may be considered.
- 3.2.4 Once the vessel is positioned at the target borehole location, the seabed frame is lowered on the seabed. The drill pipe assembly is then built from the vessel to the seabed, through the seabed frame. Drilling, sampling, and testing operations can then commence. Rotary drilling progresses with sequences of downhole sampling and testing, until reaching the target borehole depth. At this point, the drill pipe assembly and the seabed frame can then be recovered on the vessel.
- 3.2.5 For this project all the recovered samples and cores will be processed and described onboard before being stored for further laboratory processing when delivered in the onshore laboratory.
- 3.2.6 Where the downhole CPT test also comprises seismic CPT tests as a mean of measuring the in-situ shear wave and compression wave velocity, the CPT test is halted at the desired depth, the hammer (seismic source) mounted on the seabed frame is activated to propagate shear and compression wave signals directly in the ground, and the signals are recorded through the instrumented cone. The seismic source adopted here is of mechanical nature, rather than acoustic, and is directly acting on the ground, rather than on the water column. By adopting this methodology, we obtain the best possible results for foundations and warranty assurance purposes.

- 3.2.7 The seabed frame and drill pipe assembly constitute a temporary structure that is set on the seabed, with the drill pipes being advanced into the ground, for the duration of the borehole execution. These are recovered immediately following completion of the borehole.
- 3.2.8 The maximum volume of sediments removed from the ground for each borehole is 2.5m³ per 50m borehole, or 5m³ per 100m borehole. These drill arisings will primarily consist of clay, silt, and sand size particles. These will be flushed out of the borehole during rotary drilling and be naturally redeposited at the seabed in the direct vicinity of the borehole position or be transported by the current.
- 3.2.9 Typical characteristics of drilling, sampling and in-situ testing equipment are described in the *Table 3.1* below. It should be noted that the survey contractor and equipment provider are yet to be confirmed.

| Equipment | Characteristics |
|---|---|
| Drilling rig | Base case: vessel-mounted heave compensated rig. Alternatively: seabed drilling rig. |
| Seabed frame | Submerged weight: 10-20 tons. Footprint (in plane dimensions): up to 3.5m x 3m. Height: up to 4.5m. |
| Drill pipes | API or Geobor-S or equivalent |
| Drill bit | Type: Wing Bit, Drag Bit, Roller Bit, PDC, Geocube, Diamond, etc (variable dependent on soil conditions) Outer diameter: maximum 230 mm |
| Downhole sampling tools | Push sampling, piston sampling, hammer sampling, rock coring |
| Downhole CPT tools | Instrumented cone: Cross section area of 5cm ² , 10cm ² or 15 cm ² |
| Seismic (mechanical) source for seismic CPT test | Hammer on striking plate mounted on the seabed frame or mounted on a separate frame. |
| P-S logging (optional) | Geovista DPS micro-seismic or Roberston P-S logger probe or similar. Self-contained downhole probe with transmitter and receivers. |

Table 3.1 Borehole drilling – typical equipment characteristics

3.3 Engagements

- 3.3.1 MarramWind will make arrangements before the offshore operations begin to inform those involved in the local fishing and maritime industries of the intended offshore operations.
- 3.3.2 Temporary structures that are set on the seabed for the execution of the works, such as seabed frame, drill pipes, etc. will be recovered following completion of each CPT test or borehole.
- 3.3.3 MarramWind will retain the services of an Archaeologist throughout the works. This person will be consulted during the offshore operations should anything relevant to their discipline be encountered. Unexpected finds could be inadvertently recovered through geotechnical survey works and must be stored and then reported in line with the project's Protocol for Archaeological Discoveries (PAD) and an Geoarchaeological method statement. This PAD

and Geoarchaeological Method statement will be prepared by MarramWind and their consultants during project preparation.

Navigation – Marine Safety

- 3.3.4 Navigational risk will be minimised via consultation with the Northern Lighthouse Board (NLB) and the Maritime and Coastguard Agency (MCA). Notice to Mariners will also be issued prior to the works. In addition, all vessels are subject to marine assurance.
- 3.3.5 Ten days prior to works commencing, a Notice to Mariners will be placed in the Kingfisher Fortnightly Bulletin. The project will issue a copy of this notification to the following parties:
- Local mariners and fishermen's organisations including the Scottish Fishermen's Federation;
 - Marine Scotland;
 - Northern Lighthouse board;
 - The Maritime and Coastguard Agency; and
 - The UK Hydrographic Office.
- 3.3.6 Following completion of works, a notification will be sent to the parties listed above.

3.4 Environmental Risks and Mitigation Measures

- 3.4.1 There is a requirement for a marine licence application to be submitted to Marine Scotland in relation to the proposed geotechnical survey works. Specifically, application applies to the removal of sediment samples because each borehole drilled will represent more than one cubic metre. To support the Marine Licence application, this report takes into consideration both designated sites and Priority Marine Features.

Designated Sites

- 3.4.2 The nearest designated site to the survey area is the Southern Trench MPA (shown in Figure 1.2), which is located 53.1 km from the survey area and is designated for benthic habitats and species, and minke whale. This site, along with all other surrounding sites designated for non-cetacean features are considered to be well outside of the potential zones of influence (Zols) of the survey activities, which will be limited in impact to within the boundary of the survey area (e.g. direct habitat loss from borehole drilling). As such, the benthic features of these sites do not need further consideration here.
- 3.4.3 There are two sites located within 150 km of the survey area designated for cetaceans, which are considered further here based on the potential zone of influence of underwater sound, and the high sensitivity of cetaceans to underwater sound. These sites include:
- Southern Trench MPA; and
 - Moray Firth SAC.
- 3.4.4 The Southern Trench MPA is of importance to minke whale, and the Moray Firth SAC supports the only known resident population of bottlenose dolphin in the North Sea, which

is estimated to be around 130 individuals¹. Bottlenose dolphins are present all year round, and, while they range widely in the Moray Firth, they appear to favour particular areas.

3.4.5 Information on the specific qualifying features of these designated sites can be found in **Error! Reference source not found.** below.

3.4.6 As the geotechnical survey activities do not generate noise within harmful range for the species present, it is considered there is no potential for underwater sound generated during the geotechnical survey activities to have any significant effects on the qualifying features of any designated sites. As such designated sites do not need any further consideration here.

| Site name | Designation | Proposed or Designated Biodiversity features | Distance from site (km) |
|-----------------|-------------|--|-------------------------|
| Southern Trench | MPA | <ul style="list-style-type: none"> • Minke whale • Burrowed mud • Fronts • Shelf deeps | 53.1 |
| Central Fladen | MPA | <ul style="list-style-type: none"> • Burrowed mud • Sub-glacial tunnel valley | 58 |
| Moray Firth | SAC | <ul style="list-style-type: none"> • Bottlenose dolphin • Subtidal sandbanks | 117.6 |

Table 3-1 Designated sites which fall within 60 km of the OAA (or 150 km for sites designated for marine mammals)

Priority Marine Habitats and Species

3.4.7 Several PMFs² have the potential to occur in the survey area and could therefore be affected by geotechnical survey work. These could include:

- Benthic habitats;
- Cetacean species;
- Fish species; and
- Shellfish and other invertebrates.

3.4.8 Whilst the precise type and location of PMFs within the survey area is not well known, it is recognised that some priority features could occur within the survey area, and as such they are considered in assessments below where relevant.

¹ JNCC designated site factsheet. Available online: <https://sac.jncc.gov.uk/site/UK0019808>

² Priority Marine Feature list, 2022. Available at: <https://www.nature.scot/doc/priority-marine-features-scotlands-seas-habitats>

3.5 Mitigation measures for designated sites and priority marine features

- 3.5.1 To minimise the potential disturbance to potential or designated sites and their qualifying features, the following mitigation measures are also proposed in support of the Marine Licence application:
- Project vessels shall comply with all relevant health, safety and environmental legislation. This includes compliance with the International Regulations for Preventing Collisions at Sea (1972) and regulations relating to International Convention for the Prevention of Pollution from Ships (the MARPOL Convention 73/78) with the aim of preventing and minimising pollution from ships. Most critically, all vessels shall have a contingency plan for marine oil pollution (Shipboard Oil Pollution Emergency Plan). Pollution prevention strategies would also be expected to be developed and implemented in accordance with the relevant Guidance for Pollution Prevention to reduce the potential for, and the scale of any environmental impacts. This includes development and implementation of an Emergency Spill Response Plan and a Waste Management Plan.
 - Project vessels shall adopt directional and hooded/ shaded lighting as required to minimise unnecessary light spill.
 - Borehole drilling and sediment sampling shall be micro-sited within the survey area to avoid sensitive priority benthic habitats and species (e.g. biogenic reefs) where possible.
 - As part of the SOPEP and Garbage Management Plan, vessels use scupper plugs to prevent any on deck spills reaching the sea. All on-board personnel will have a vessel induction within 24 hours of boarding to familiarise themselves with SOPEP kits and drills. Planned maintenance system includes regular inspection of hydraulic hoses.
 - Whilst in transit to, from or within the OAA site (which will be of limited duration), vessels will travel at speeds of up to 10–15 knots (18.5-27.7 km/h).

Consideration of Effects on Designated Sites and PMFs

- 3.5.2 The proposed geotechnical survey works have the potential to impact designated sites and/or PMFs via a number of impact pathways including:
- Direct loss and physical disturbance to seabed habitats and species;
 - Underwater sound disturbance to marine mammals and fish;
 - Visual disturbance (including artificial lighting) to fish, marine mammals (cetaceans and seals) and seabirds due to the presence of survey vessels;
 - Collision risk between marine vessels and marine mammals (cetaceans and seals), turtles, and basking shark;
 - Direct or indirect (via changes in prey resource) disturbance to habitats and species from changes in marine water quality arising from the mobilisation of sediment-bound contaminants and the accidental release of fuel and chemicals (e.g. oil) from vessels; and
 - Deterioration in offshore water quality due to increased suspended sediment concentrations (SSC) due to drill arisings from borehole drilling.

Direct loss and physical disturbance to priority benthic habitats and species

- 3.5.3 Borehole drilling, CPT, and thermal resistivity testing could lead to the direct loss and/ or physical disturbance of benthic habitats and species. No sites designated for the protection of benthic habitats, or species, occur within proximity to the survey area.
- 3.5.4 Prior to the completion of the geotechnical survey, geophysical survey and DDV data collected during the 2022 array primary site investigation will be reviewed to enable a pre-assessment of seabed habitats, and to identify whether any priority benthic habitats and/ or species may be present at the sampling stations. Should the presence of priority benthic habitats and/or species be confirmed, benthic disturbance/sediment removal activities will be micro-sited to avoid damage to or loss of sensitive priority habitats and species (e.g. biogenic reefs) where possible.
- 3.5.5 With consideration of this mitigation and given the small volume of material expected to be removed from each designated site, the surveys are not predicted to have any significant impact on the extent and integrity of benthic habitats and species. Thus, there is predicted to be no significant effect to any priority benthic habitats or species from direct loss or physical disturbance.

Underwater sound disturbance to marine mammals and priority fish species

- 3.5.6 The hearing range of fish varies widely between species. For most species, sensitivity to sound occurs from below 100 Hz to several hundred hertz, or several thousand hertz in a few species (Mann et al., 2001³; Popper et al., 2014⁴). Those with a swim bladder, such as Atlantic cod (*Gadus morhua*) are sound pressure sensitive at the higher frequencies and some species of herring like fishes, but not the Atlantic herring (*Clupea harengus*), can detect sounds above 20 kHz (ultrasound) (Popper et al., 2014).
- 3.5.7 As the geotechnical survey activities do not generate noise within harmful range, there are no likely effects on fish and so the impact of underwater sound on all priority fish species, including basking shark, as well as fish spawning and nursery areas can be scoped out of further assessment.
- 3.5.8 A variety of cetacean species could occur within the survey area. Especially, the harbour porpoise, white beaked dolphin, bottlenose dolphin, and minke whale are likely to occur most regularly and in the highest abundances. A total of two sites designated for cetacean species including minke whale and bottlenose dolphin are located within 150 km of the survey area.
- 3.5.9 CPT work may include seismic sources however, unlike other seismic sources, this logging is aimed specifically down the length of the drilled borehole or test depth and therefore effects are highly localised, thus there is predicted to be no significant effect to any priority cetacean species from this activity. The borehole drilling may be within audible range for cetacean species in the area however, this activity will be short in temporal and spatial

³ Mann, D.A., D.M. Higgs, W.N. Tavalga, M.J. Souza, and A.N. Popper. (2001). Ultrasound detection by clupeiform fishes. The Journal of the Acoustical Society of America. 109, 3048 – 3054.

⁴ Popper, A.N., Hawkins, A.D., Fay, R.R., Mann, D., Bartol, S., Carlson, T., Coombs, S., Ellison, W.T., Gentry, R., Halvorsen, M.B., Løkkeborg, S., Rogers, P., Southall, B.L., Zeddies, D. and Tavalga, W.N. (2014). ASA S3/SC1.4 TR-2014 Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. Springer and ASA Press, Cham, Switzerland.

scales. As such, there is predicted to be no significant effect to any priority cetacean species.

Visual disturbance (including artificial lighting) to priority fish and marine mammals due to the presence of survey vessels

- 3.5.10 Increased visual stimuli (including artificial light) from the presence of marine vessels can lead to attraction or avoidance behaviour in fish and marine mammals, which could affect breeding or foraging activities, with potential for wider implications for populations.
- 3.5.11 The offshore survey works vessels are expected to require night-time operational lighting. As good practice, this will be directional and hooded/shaded as required to minimise unnecessary light spill.
- 3.5.12 Given the low number of vessels, which are required to undertake the offshore survey and the good practice mitigation outlined above, any change in visual stimuli is predicted to be of low magnitude. Disturbance effects would also be short-term and temporary. As such, there is not predicted to be any significant impacts to fish, marine mammals and seabirds from visual disturbance due to the survey operations. As such, there is predicted to be no significant effect to any PMFs from visual disturbance.

Collision risk between marine vessels and marine mammals, turtles, and, basking sharks

- 3.5.13 The risk of collisions between survey vessels and marine mammals (cetaceans and seals), turtles and basking shark is predicted to be negligible. Thus, there is predicted to be no significant effect to any PMFs from collision risk.

Direct or indirect (via changes in prey resource) disturbance to habitats and species from changes in marine water quality arising from the mobilisation of sediment-bound contaminants and the accidental release of fuel and chemicals (e.g. oil) from vessels

- 3.5.14 The disturbance of sediments can lead to the mobilisation of sediment-bound contaminants (e.g. hydrocarbons), which can pose a risk of toxicity to benthic and pelagic species. The accidental release of fuel and chemicals (e.g. oil) from operational vessels could also lead to deteriorations in marine water quality with direct effects to marine habitats and species.
- 3.5.15 Vessels will be required to comply with all relevant health, safety, and environmental legislation. This includes compliance with the International Regulations for Preventing Collisions at Sea (1972) and regulations relating to International Convention for the Prevention of Pollution from Ships (the MARPOL Convention 73/78) with the aim of preventing and minimising pollution from ships. Most critically, all vessels shall have a contingency plan for marine oil pollution (Shipboard Oil Pollution Emergency Plan). Pollution prevention strategies would also be expected to be developed and implemented in accordance with the relevant Guidance for Pollution Prevention to reduce the potential for, and the scale of any environmental impacts. This includes development and implementation of an Emergency Spill Response Plan and a Waste Management Plan. With consideration of this good practice mitigation, the likelihood of an accidental spillage occurring from any of the operational vessels is considered to be very low. However, should a spill occur, the impact would be of very small magnitude and short-term.
- 3.5.16 Mobile receptors such as some fish species and life stages (including migratory species) and marine mammals would be able to move away from adverse water quality conditions and therefore they are considered to have low sensitivity and effects to these receptors would be limited. Although habitats and less mobile species and life stages would be expected to be more vulnerable to potential deteriorations in marine water quality, given the

nature of the impact (e.g. short-term and of very small magnitude), it is unlikely that there would be any discernible effect to the abundance, distribution or functioning of habitats and species populations, even at the local level. As such, the surveys are not predicted to have a significant impact on PMFs via a deterioration in water quality.

Deterioration in offshore water quality due to increased suspended sediment concentrations (SSC) due to drill arisings from borehole drilling

- 3.5.17 The drilling process could cause localised and short-term increases in SSCs at the point of discharge of the drill arisings. Drill arisings would be released in the water column as suspended sediment. Released sediment may then be transported by wave and tidal currents in suspension in the water column.
- 3.5.18 Borehole drilling may release subsurface materials into the water column. Sub-surface sediments have a different physical composition to near-surface sediments and may therefore be more widely dispersed by tidal currents. Coarser sediment would settle out of suspension close to the drilling location with the finer sediments being more prone to dispersion. The small quantities of fine-sediment released are likely to be widely and rapidly dispersed resulting in only low elevations in SSCs within the water column.
- 3.5.19 Increases in SSC are likely to be low and within natural variability away from the immediate release locations. Thus, there is predicted to be no significant effect on offshore water quality due to increased suspended sediment concentrations.

3.6 HSSE & Emergency Response

- 3.6.1 The survey contractor engaged for the execution of the works will be required to adhere to Construction Design and Management (CDM) Regulations 2015. The survey contractor will be appointed as Principal Contractor under the CDM Health and Safety framework.
- 3.6.2 The survey contractor will be requested to submit a Health, Safety, Security and Environment (HSSE) plan detailing the particulars of how HSSE risks associated with the scope of work will be addressed and how MarramWind's, contractors, sub-contractors, and regulatory requirements will be incorporated at all applicable worksites and in all scope activities. The Emergency Response Plan (ERP), forming part of the HSSE plan, will include credible emergency scenarios (including medical and trauma response), associated procedures and resources (personnel, equipment, medications), required drills and training, medical emergency response, etc.

