Outline Method Statement and Programme of Works

Foreshore Licence Application for Marine Site Investigation Surveys at Dognose, Corkbeg, Whitegate, Co. Cork

February 2025

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1. Introduction

The Port of Cork Company (PoCC) ('the Applicant') is submitting a Foreshore Licence Application (FLA) for Marine Site Investigation (SI) surveys at Dognose Bank, Corkbeg, Whitegate, Co. Cork (hereafter referred to as 'Foreshore Licence Application Area (FLAA)) to the Foreshore Section of the Department of Housing, Local Government and Heritage (DoHLG&H).

This Outline Method Statement (MS) and Programme of Works has been prepared as part of the application by MWP. A more detailed MS and Programme of Works will be produced by the contractor following appointment. The extent of the FLAA and the key elements of the surveys will not change from what has been applied for.

A Schedule of Works briefly describing and quantifying the survey works that will be conducted within the licence area has also been submitted as part of the application.

The FLA is being sought solely to facilitate SI surveys associated with the future port infrastructure identified in the recently launched Port of Cork Masterplan 2050, and in particular Offshore Renewable Energy (ORE).

1.1 Subject Site Location

The marine SI surveys proposed by the Applicant, will be undertaken at Dognose Bank, Corkbeg, Whitegate, Co. Cork. The FLAA is circa 98.20 hectares (ha) and is located approximately 1.6 km west of Whitegate village (**Figure 1-1**). **Figure 1-2** shows the FLAA map and indicative survey locations.

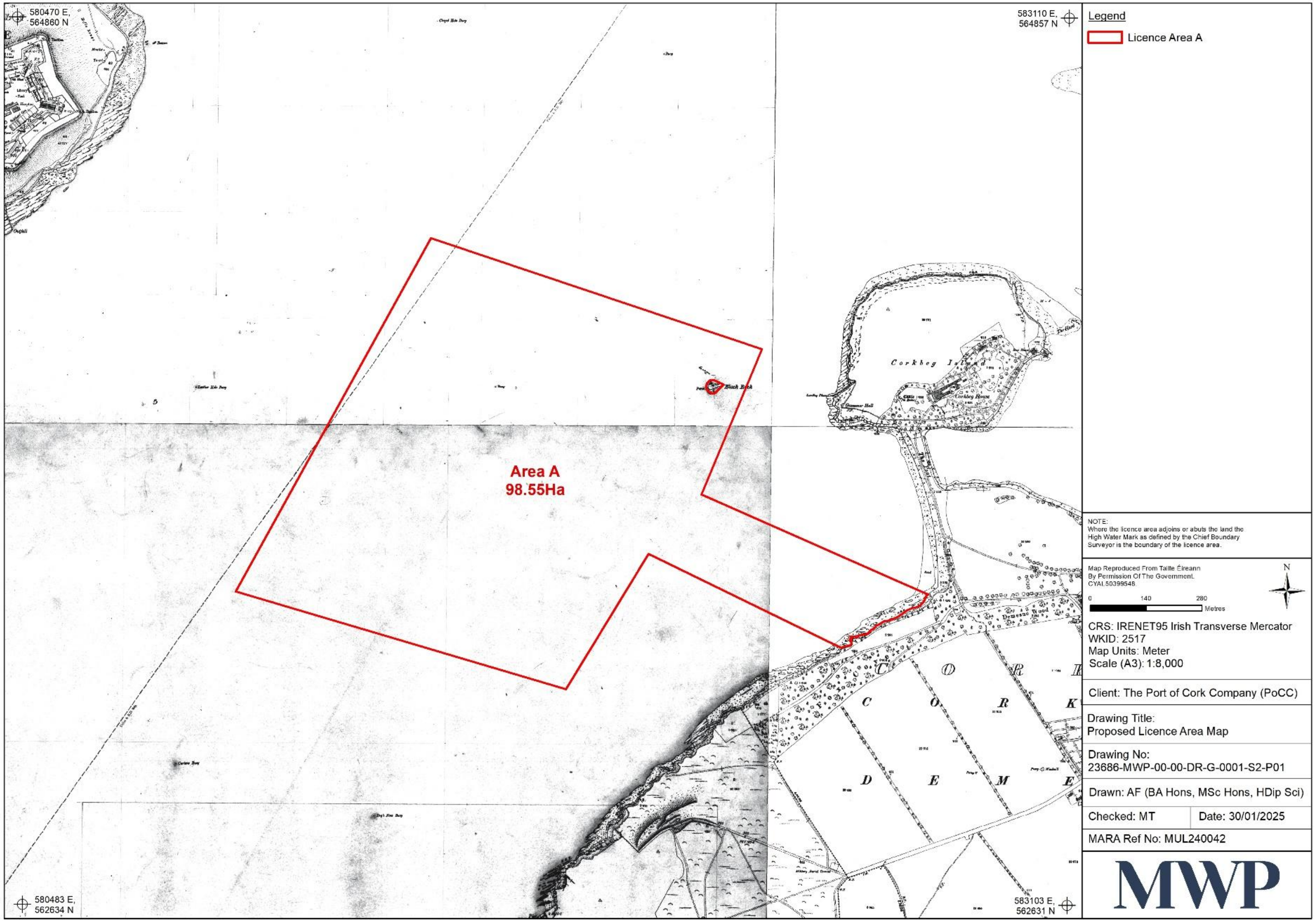

Figure 1-1: Foreshore Licence Map - Location of proposed surveys

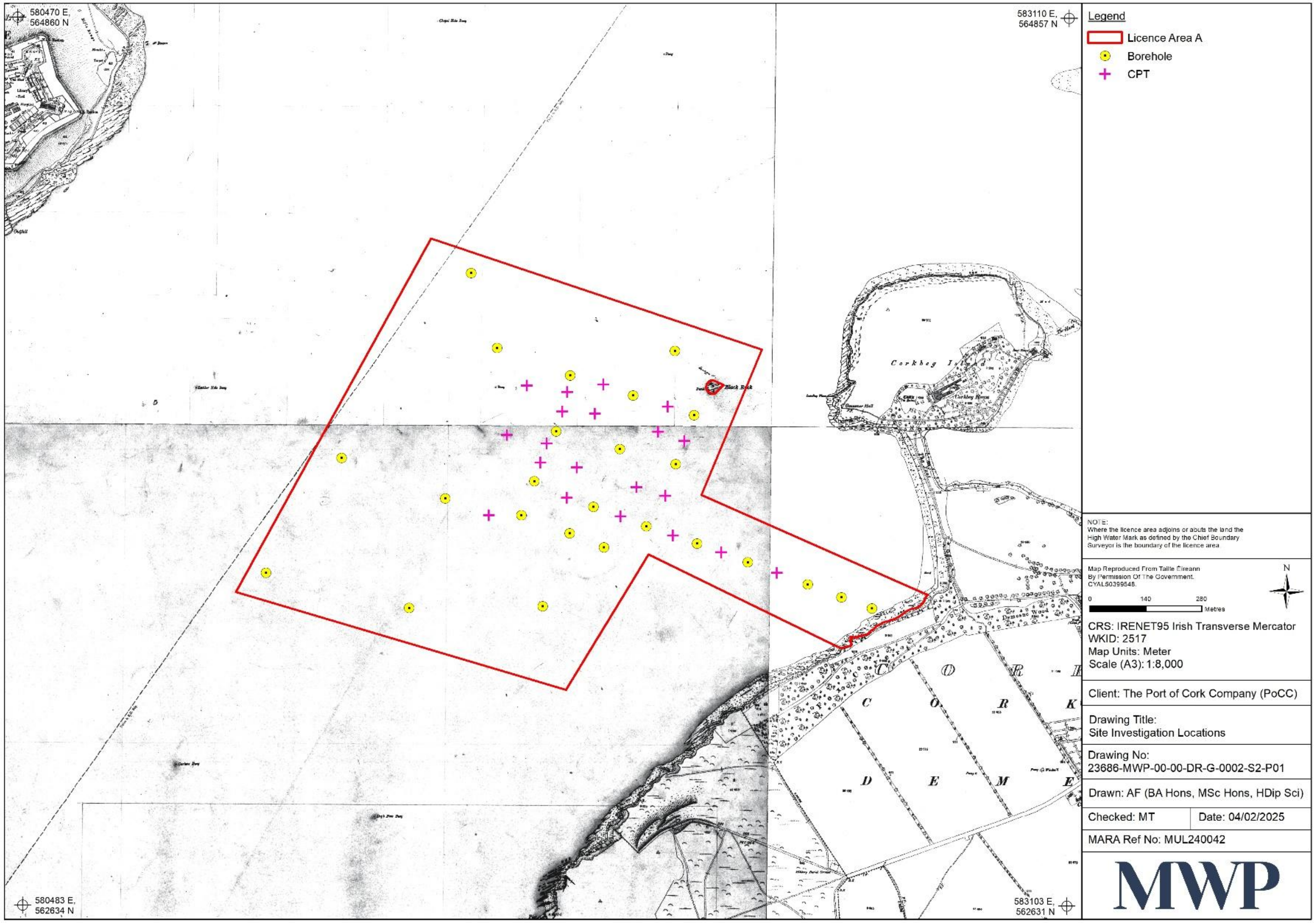

Figure 1-2: Site Layout Map and Indicative Survey Locations

2. Site Investigation Activities - Summary of Proposed Surveys

The proposed marine SIs (geophysical surveys, geotechnical survey, environmental surveys (including sub-tidal benthic and subtidal video surveys), intertidal benthic survey and marine mammals survey) will enable:

- Detailed mapping of nearshore shallow geological and seabed character;
- Reconnaissance level mapping of seabed relief and features (e.g. archaeology);
- Greater understanding of the seabed and sub-seabed conditions;
- Evaluation of the nature and mechanical properties of the superficial seabed sediments along the survey corridor;
- Aid in the classification of submerged habitats;
- Greater understanding of bird, marine mammal and reptile distribution and abundance; and
- Baseline environmental mapping (i.e. habitats and species).

The knowledge gained from the proposed SI surveys will be used to minimise uncertainty in ground conditions at an early design stage.

Data acquired during the proposed SIs will be used to inform the design and assessment of any future projects in the area by providing information on the baseline environment and allowing impacts to be predicted, and subsequently appropriate mitigation to be developed, as applicable. The results of the proposed SIs may also be used at a later date to provide a baseline against which to monitor effects of construction, operation and decommissioning of marine infrastructure.

The proposed programme of SI to be undertaken within the FLAA is discussed in Sections 3 to 7.

3. Geophysical Survey

The proposed geophysical survey programme involves a multi-disciplinary approach that is designed to acquire a full suite of data which includes a sub bottom profiler single channel seismic reflection, underwater multichannel analysis of surface waves (UMASW) and seismic refraction surveys. The surveys are likely to take 3 weeks to complete, subject to tidal and weather conditions. The collected data will be used to better understand the water depths, topography and relief structure of the seabed and the subsurface structure, in particular the sub-surface stratigraphy, determining sediment strata and the elevation of competent bedrock. The process is non-physically intrusive and at no point will the equipment used make contact with the seafloor. The exact equipment to be used will be confirmed following a tender process to procure the SI contractor.

The objectives of the geophysical survey are to:

- Map type and thickness of sediments;
- Establish sediment stiffness;
- Map the depth to bedrock across the survey area;
- Map variation in bedrock type and rock quality; and
- Determine engineering parameters.

To meet these objectives, the geophysical survey will undertake the following tasks:

- Identify the distribution and thickness of superficial sediments and rock head where possible (sub bottom profiling and seismic refraction);
- Identify the distribution of subsea geological features such as areas of exposed bedrock (sub bottom profiling and seismic refraction);
- Identify the location, extent and nature of any impediments such as wrecks, debris on seafloor, rock outcrop, other cables, pipelines etc.; and
- Identify the seabed and sub-seabed conditions within the survey area (UMASW, seismic refraction).

The interpretation of the geophysical survey will better inform the scope of work for the subsequent intrusive geotechnical surveys. The geophysical survey is non-invasive.

3.1 Sub bottom profiler (SBP) Single Channel Seismic Reflection

Shallow Sub-Bottom Profiling aims to create a 2-D image of the subsurface up to potential depths of approximately 10-50 m below seabed, depending on the geological conditions encountered and the choice of system used. Different types of SBP are available including chirp, boomer (Figure 3-1), pinger (Figure 3-2), sparker (Figure 3-3) and parametric chirp systems.

The SBP system will be used to determine the stratigraphy across the survey area and quantify the variability in the lateral and vertical extents to a depth of at least 50m below seabed if necessary.

The exact equipment used will be confirmed following the appointment of a survey contractor. The Seatronics Edgetech 3300 may be taken as an indicative example of a hull-mounted pinger system and would have an expected operating frequency range of approximately 2-16 kHz with sound pressure levels of 200dB re1µPa at 1 metre range. The Applied Acoustics may be taken as an indicative example of a boomer source and would have an expected operating frequency of approximately 2.5 kHz with sound pressure levels in the range of 208- 215dB re1µPa at 1 metre range. The Geo-Source 200 or the Applied Acoustics Squid 500 may be taken as an indicative example of a towed sparker system, with sound pressure levels in the range of 204-216dB.

This survey is non-intrusive therefore does not interact with the seabed. It may be undertaken across the FLAA to a suitable percentage coverage.

Figure 3-1: Boomer Sub-Bottom

Figure 3-2: Pinger Sub-Bottom

Figure 3-3: Example of Sparker sub-bottom profiler

3.2 Underwater multichannel analysis of surface waves (UMASW) and Seismic refraction surveys

The geophysical investigations where possible will involve seismic refraction. The multichannel analysis of surface waves (MASW) is a seismic method used to evaluate the shear-wave velocities of the subsurface materials through the analysis of the dispersion properties of surface waves. Marine seismic refraction is similar but works at a deeper level where profiles are produced defining the interface between the differential layers by the P-Wave velocities.

Both survey techniques will be performed around the FLAA area to provide information on subsurface sediment layers and thickness. A series of geophones will be laid out across the intertidal area and an impact (typically from a sledgehammer or similar impact method) onto a metal plater will be used to send an acoustic energy wave into the sediments, which travel vertically and laterally and refracts/reflects from the "harder or variable density" layers below the beach surface. The outgoing and returning impulse will be recorded on a portable logger co-located along the same survey line (seismic refraction line) of interest. Figure 3-4 below represents the general principle of marine seismic refraction survey.

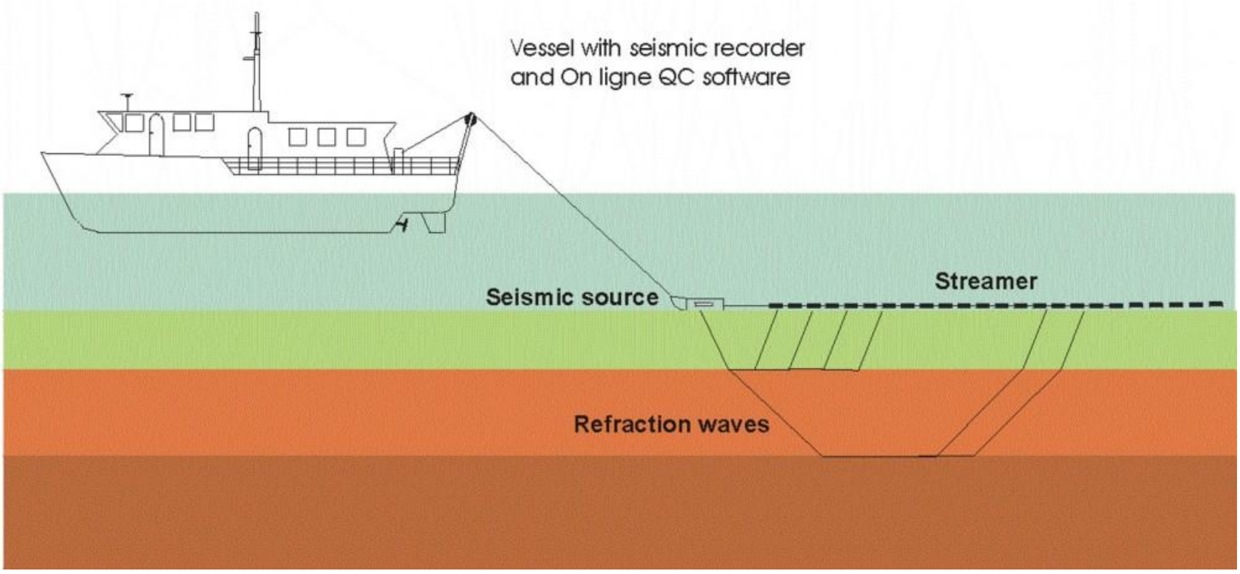

Figure 3-4: General principle of marine seismic refraction survey

4. Geotechnical and Environmental Sampling

The purpose of the geotechnical survey is to evaluate the nature and mechanical and chemical properties of the superficial seabed sediments along the survey corridor. These methodologies will ensure that a comprehensive understanding of the subsurface is achieved to a suitable depth.

The geotechnical sampling includes:

- 20 boreholes (cable percussive with rotary follow-on);
- 20 Cone Penetration Tests (CPTs); and
- Surface grab samples (as necessary)

Indicative geotechnical exploratory locations are shown in **Figure 1-2**. Typically, individual geotechnical SI locations correspond to key structure locations. However, the positioning of individual geotechnical SI locations also needs to take into consideration environmental constraints such as the position of sensitive habitats or archaeological features.

The exact location and spacing of the geotechnical and environmental sampling, within the survey corridor will be determined following interpretation of the geophysical data.

Depending upon the requirement identified from interpretation of the geophysical data, approximately 20 boreholes (cable percussive with rotary follow-on) and 20 CPTs will be required in total, along with associated sampling and laboratory testing. Surface grab samples will also be taken for chemical testing. The intrusive investigation works are likely to take 12 weeks to complete.

Boreholes will be drilled using a cable percussion rig and a rotary coring rig. Each borehole will have a seabed footprint of approximately 0.5m^2 and risings of approximately 11m^3 (assuming a borehole depth of up to 25m) will be dispersed around the drill site as a cuttings pile. The borehole will be left to collapse naturally following completion of drilling where the cuttings are likely to fall back down the hole.

Boreholes will likely be drilled from a jack-up platform. The number of legs used for the operations is dependent on seabed conditions, current strength and wave action. For the application area, four legs are the most likely scenario; however, this may vary with weather conditions.

The Piezocone penetrometer for CPT shall have a minimum 10 tonne capability. The CPT is undertaken by pushing an instrumented cone into the ground at a constant speed, with continuous measurement of the cone end resistance, the friction along the sleeve of the cone, and the pore water pressure.

Surface grab samples (using Van Veen grab sampler or equivalent) will be taken for laboratory testing. The objective of the testing is to provide results to be used for contaminant assessment and classification for disposal at sea or on land.

4.1 Borehole Sampling

The borehole sampling will be located in various water depths and will be performed by a geotechnical drilling rig mobilised on board a jack-up barge (**Figure 4-1**). This scope of work shall comprise of sampling boreholes and CPT boreholes that may be co-located. This shall provide in situ soil properties and recover soil samples or rock cores for the full depth range of interest.

During drilling, borehole wall integrity will be maintained using drilling mud mixed with sea water. This drilling fluid is typically comprised of biodegradable miscible guar gum. This drilling mud and any drill risings will disperse into the water column. During fieldworks, the retrieved samples and cores shall be logged, and the CPT data processed and interpreted, to produce borehole and CPT logs that includes interpreted stratigraphy.

Figure 4-1: Example of Jack-up Barge

4.2 Cone Penetration Test (CPT)

Seabed CPTs involve mobilizing a self-contained and automated CPT test unit housed within a seabed frame. This frame is typically kept on the deck of a dynamically positioned vessel and may be deployed using a dedicated Launch and Recovery System (LARS) - such as an A-frame. The vessel will hold station over the target position and deploy the CPT unit. The CPT is connected to the vessel via an umbilical, which acts as a lift wire and data transfer umbilical. Depending on the CPT unit, the CPT rods may need to be built up overboard prior to deployment through the water column. Once on seafloor, the cone is pushed into the seabed until it reaches refusal. Refusal is defined as the point where one of the following criteria are met: target penetration depth is reached, maximum system thrust is reached, excessive load on the tip or the sleeve, or excessive cone inclination occurs, or a combination of these. The objective of the survey will typically define the size and configuration of the CPT unit. A lightweight CPT unit with maximum penetration depth of 10m, may weigh about 5 tonnes. The test typically takes 2 to 5 minutes, depending on the target penetration depth, however total time taken to be deployed and recovered may be in order of one to two hours. If at each location the technical requirements of the project are met, the CPT unit is lifted back on to the vessel and the vessel moves on to the next location.

5. Environmental Surveys

The following section details the environmental surveys required. The exact scope of works will be refined following the desktop review, preliminary site investigation and consultation. The aim of the proposed environmental surveys is to map the distribution and extent of marine benthic biological communities and habitats in the FLAA. This will comprise a video and still photographs or remote operated vehicle (ROV) inspection followed by a benthic sampling programme (using grab samplers). The sampling locations will be selected to sample different habitats. The resulting ground-truthing information (from grab sample and seabed imagery) will be then overlaid on available geophysical data to accurately map biotopes and delineate protected habitats (e.g. biogenic and rocky reefs).

This information is usually then combined to conduct Annex I habitat assessments of any biogenic and rocky reefs present within the FLAA.

5.1 Sub-tidal Benthic Survey

Grab samplers are used to recover samples from approximately the top 0.2 - 0.5m of seafloor. These samples may be used to classify the seabed, or for biological analyses. These samples are generally deployed overboard using a crane from a vessel.

There are various grab sampler types to include but not limited to Van Veen, Hamon and Day Grab samplers. Generally, some variants may come either as single or double, and in a variety of different sizes.

Grab samplers generally comprises of steel buckets that are deployed open and which trigger shut when the sampler is in contact with the seafloor. As the buckets close, sediment and biological material are retained inside the sampler. The grab sampler is then recovered to deck and place on a trestle or table. The retained material is then visually inspected for acceptance and then transferred to adequate container or on to a designated mat for further offshore processing and logging.

Single Van Veen Grab (**Figure 5-1**) is ideal for the collection of sediment samples for biological and environmental sampling. In a range of sizes (0.025m^2, 0.1m^2, 0.2m^2, 0.3m^2) each model has a marine grade stainless steel bucket with hinged access flaps on the top allowing sub sampling of the collected sediment before it is emptied from the grab. The bucket is operated with a pair of stainless-steel lever arms that increase the tension to secure the sample securely in the grab as it is retrieved to the surface. Additional lead weights can be added to the back of the bucket to improve stability in strong currents and to the lever arms to increase the equipment's ability to perform in harder conditions.

Figure 5-1: Single Van Veen Grab

Generally, any grab sampling will be carried out by deploying sampling gear from the vessel, as per standard operation procedure for deck works involving this kind of equipment taking into account the technical specification of the grab in use. Various grabs will be available for the benthic survey provision to ensure adequate sampling equipment for various sediment types. From the grab samples a small amount of sediment can be retained for Particle Size Analysis and Loss on Ignition Analysis.

Van Veen/other suitable methods will be used for soft sediments for quantitative benthic infauna analysis and for physio–chemical analysis. Colonial and epifaunal species will be recorded qualitatively. Sediment samples for physio–chemical analysis will be acquired for later laboratory analysis.

5.2 Sub-tidal Video Survey

In any case where benthic sampling is not possible, sufficient video and stills will be taken from the sample location to identify existing habitats (to include Annex I habitats) and the habitat boundaries.

This survey provides camera footage to aid in the classification of submerged habitats and is a non-invasive survey for habitats and fauna. The survey period for benthic habitats is year round.

6. Intertidal Benthic Survey

This survey involves a series of cores to be taken in the soft sediment intertidal sections of the FLAA. At each site typically

1) a single stove-pipe core (19cm Ø) is taken for macrofaunal analysis.
2) A single sediment scrape is taken from the sediment surface for Particle Size Analysis (PSA) and Loss on Ignition (LOI).
3) A photographic record is taken. Notes of sediment type and obvious epibenthos are recorded.

The survey period for intertidal habitats is April to the end of September.

Mini and Standard Hamon Grabs (0.1m^2 and 0.2 m^2 respectively are particularly used for the collection of samples generally from coarse (sand and gravel) sediment substrates and used for benthic macrofauna and particle size measurement. The grab is relatively simple to operate in almost any water depth.

A 0.1m² sample area is a standard practice used in many benthic sampling applications. The Hamon Grab (**Figure 5-2**) is a box shaped sampling scoop mounted in a triangular frame. Upon contact with the seabed, tensioned wires are released, which causes the sampling bucket to pivot through 90º pushing seabed sediment into the bucket. On completion of its travel the open end of the bucket comes against a rubber sealed steel plate which stops the sediment escaping during recovery. 0.1m² Hamon Grab refers to 0.1m² area of seabed sampled. The depth of scoop penetration is up to 20cm. On recovery the grab is landed onto a rectangular base from where access can be gained to the inside of the bucket via an inspection window. Whilst in the stand the grab sample can then be easily emptied into a sampling container located under the bucket.

Figure 6-1: Hamon Grab Sampler

7. Marine mammals

Marine mammals are typically surveyed from the shoreline via vantage point surveys. The surveyor uses a telescope and binoculars to scan the study area. This survey will be supplemented by an underwater acoustic survey i.e. a submerged microphone attached to specialised recorder device. Both surveys are non-invasive.

The survey for marine mammals may occur year-round taking account of species specific movements.

7.1 Underwater Video Camera Systems

Various underwater camera systems may be used for underwater video inspections of marine mammals to provide the best quality of gathered data. An underwater drop camera system or similar will be used for the provision of benthic survey video inspection.

The SeaSpyder Telemetry system is a typical underwater camera system and is designed for operation in water depths up to 1000m utilising standard coaxial sonar umbilicals. This system is one of the most commonly used camera systems for underwater video inspections. The system as standard offers simultaneous uninterrupted recording of low latency live video footage along with high resolution stills photography, along with interfacing to a wide range of sensors and dataloggers. The stills camera is fitted with a high quality 18 mega pixel digital SLR Camera offering full control of all photographic parameters including manual focus, shutter speed and aperture. The stills camera is housed within a robust 1000m rated aluminium enclosure along with an internal IP video camera. All data is transferred directly to the surface unit for live interpretation, this includes video, stills photos, serial sensor data and ethernet data such as an imaging sonar.

8. Survey Vessels

Dedicated survey vessels will be used which are appropriate to the water depth of the survey area; a vessel with a shallow draft will be utilised for the shallow water survey area. The exact equipment to be used will be confirmed following a tender process to procure the survey contractor.

A jack-up platform will likely be used to acquire geotechnical boreholes in the application area. Exact details of the vessel/platform to be used will not be confirmed until the ground investigation contractor can be confirmed. Positioning at the site may require the use of a tug vessel.

The exact vessels to be used, will be confirmed following a tender process to procure the survey contractor. All vessels will be fit for purpose, certified, and capable of safely undertaking all required survey work. The vessels will conform to the following minimum requirements as appropriate:

- Station-keeping and sea keeping capabilities required by the specified work at the proposed time of year; the appointed contractor may provide supplemental tug assistance if such assistance benefits the operation;
- Endurance (e.g. fuel, water, stores, etc.) to undertake the required survey works;
- Staffing to allow all planned work to be carried out as a continuous operation (on a 24 hour per day basis for the offshore activities and on a 12 hour per day basis for the inshore activities);
- Equipment and spares with necessary tools for all specified works;
- Appropriate accommodation and messing facilities on board;
- Adequate soil laboratory testing facility where required.

9. Timeline for Marine Surveys

The intention is to begin survey activities as soon as feasible following grant of license and contractor appointment, with a staged programme of investigations, capitalising on suitable weather windows over this time period. The exact mobilisation dates will not be known until foreshore licence has been obtained and the process of procuring a contractor is complete. It is estimated that the proposed works will take approximately 19 weeks to complete in the field. See Section 10 below for an indicative Outline Programme of Works.

MWP

10. Indicative Outline Programme of Works

Survey	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16	Week 17	Week 18	Week 19
Geophysical																			
Geotechnical: Boreholes and CPTs																			
Environmental: Sub-tidal Benthic and Sub-tidal Video																			
Intertidal Benthic																			
Marine Mammals																			

Note: Indicative programme only. Survey duration and timeline is subject to changes.