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Client Representatives Geotechnical Survey Doordewind Wind Farm Zone

Annex 8

Scope of Work

Colophon

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1 Introduction

1.1 Scope of this document

This document details the Scope of Work (SoW) for the Client Representatives during the Geotechnical Survey in the Doordewind (DDW) Wind Farm Zone.

1.2 Contract Parties

Quality Expert Support (QES)	AFRY Netherlands B.V. who has been awarded by Client to perform the technical due diligence related to all soil related studies and surveys for the DDW WFZ
Client	Netherlands Enterprise Agency (RVO), acting as representatives of the Contracting Authority
Contracting Authority	The State of the Netherlands, represented by the Minister of Economic Affairs
Client Representative (CR)	Person working for Contractor on the project of Client to monitor the progress and HSEQ for Client
Contractor	Contracting party which supplies the Client Representatives as part of the Services
Survey Contractor	Contractor awarded by Client who performs the geotechnical site investigation
Geotechnical Survey Contractor for the seabed campaign	Ocean Infinity
Geotechnical Survey Contractor for the downhole campaign	Fugro

1.3 Background

The Ministry of Economic Affairs and Climate Policy is responsible for the legislative framework for the development of offshore wind farms in the Netherlands. Within this framework (concession) permit tenders for the construction and operation of offshore wind farms is organized under the current regulation. As part of the tender documentation, the participants receive an information package in which detailed information on the offshore site is included. Detailed information on the soil conditions at the site is part of this information package.

Information on the soil conditions at the site is to be developed through a sequence of offshore operations for geological, geophysical, geotechnical and morphodynamical studies. Information will be presented as factual data, integrated and interpreted data (a Ground Model) and will be comprehensively reported.

The Integrated Ground Model is to be of sufficient quality to allow participants to make (preliminary) plans, designs and cost estimates for foundations and cables.

1.4 Site Description

Please refer to 'Annex 9: Starting Points and Assumptions' for more details on general site characteristics.

1.5 Two Geotechnical Surveys

The Contacting Authority has split the Geotechnical Survey scope for the DDWWFZ in two LOTs:

1. LOT1: the SoW contains a **seabed** CPT and vibrocore campaign at the Doordewind Investigation Area, including basic laboratory testing and reporting;
2. LOT2: the SoW contains a borehole (**downhole**) campaign comprising borehole sampling, downhole in-situ testing at the Doordewind Investigation Area and all basic and cyclic laboratory testing and reporting.

The Geotechnical Surveys are executed by two different Survey Contractors. A summary of the Scope of Work for the two Geotechnical Survey LOTs can be found in Chapter 3 of this document. More detailed information can be found in the documents issued for the geotechnical tender, which can be found at: Geotechnical Surveys at Doordewind Wind Farm Zone - Details - TenderNed (https://www.tenderned.nl/aankondigingen/overzicht/345070).

To avoid confusion: There are two different LOTs for the geotechnical survey, but for the Client Representative Contract there are no different lots; there will be only one contract that covers the provision of CRs on both the geotechnical survey LOTs. Whenever a reference is made to LOTs in this document, it refers to the geotechnical survey scope.

1.6 Investigation Area

It is the intention of the Client to obtain a comprehensive set of geotechnical data, reports, and drawings for the Doordewind Investigation Area. An overview of the Investigation Area is presented in Figure 1. More information about the Doordewind Investigation Area and the Doordewind Wind Farm Zone can be found in Annex 9 – Starting points and Assumptions.

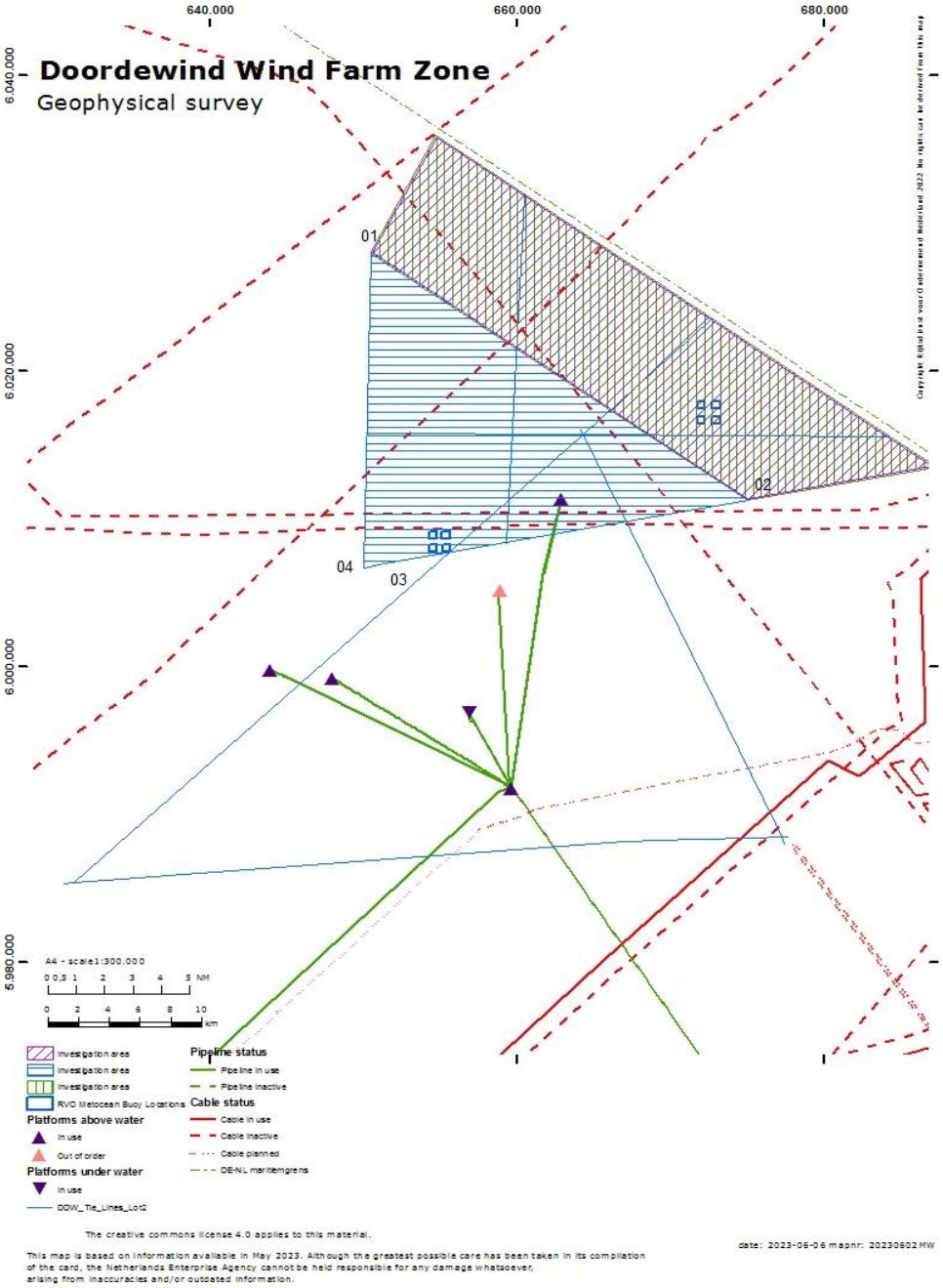

Figure 1 : Map of the Doordewind Wind Farm Zone, including cables and pipelines.

The size of the Investigation Area for the Geotechnical Survey is approximately 568 km^2 (IA DDW WFZ).

1.7 Aims of the Geotechnical Survey

The overall objective of the geotechnical soil investigation is to collect factual geotechnical data that enables the creation of a Geotechnical Interpretive Report and a Ground Model in order to improve the geological and geotechnical understanding of the Investigation Areas in DDWWFZ, suitable to progress the

design and installation requirements for an offshore wind farm, including, but not limited to foundations and cables.

The objective of the investigation and laboratory testing programme is to:

- Determine the vertical and lateral variability in soil conditions;
- Provide relevant factual geotechnical;
- Supplement the findings of the geological desk study and the geophysical survey;
- Contribute to an Integrated Ground Model and Geotechnical Interpretative Report

The Integrated Ground Model is developed by the Groundmodel Contractor.

1.8 Available Information

1.8.1 *WFZ specific information*

Client has carried out desk studies on the entire DDWWFZ. The following desk studies are available on https://offshorewind.rvo.nl;

- Geological desk study;
- Archaeological desk study;
- UXO desk study.

For DDWWFZ, the above desk studies can be provided to the CR(s) prior to the start of the field works.

1.8.2 *Other information*

Further, for information, the results of the geophysical and Geotechnical Surveys carried out for other Wind Farm Zones are available at https://offshorewind.rvo.nl/. It should be noted that this scope of work (this document) may deviate from those of previous investigations and may introduce additional requirements.

2 Scope of Work

This section describes the Scope of Work for the CR. Details of the Survey works are presented in section 3.

2.1 Monitoring of Survey Activities

The CR monitors the field works performed by the Survey Contractor during the execution of the works. The CR monitors the progress of the data acquisition.

2.2 Health, Safety, Environment, and Quality monitoring

The CR shall monitor the observation of Health, Safety, Environment and Quality (HSEQ) of the works performed by the Survey Contractor. The CR assesses if the Survey Contractor works according their own HSEQ procedures and as per the Client HSEQ requirements.

2.3 Number of Client Representatives

LOT1

Client expects the Survey Contractor will execute the Geotechnical Survey with one (1) vessel. However, there is a very small possibility that the Survey Contractor will mobilize an additional vessel. The CR will be located in the Survey Contractor's Remote Operating Facility, which is different from conventional CR work! The duration of rotations can be determined by Contractor but will be subject to approval by the Client. However, for continuity purposes it is expected a CR will work for a minimum of at least 4 weeks before being relieved. In order to have good handovers between CRs, the day and night CR shall not be changed at the same time; A minimum overlap of one week shall be considered.

LOT2

Client expects the Survey Contractor will execute the Geotechnical Survey with one (1) vessel. However, there is a very small possibility that the Survey Contractor will mobilize an additional vessel, so this possibility has to be accounted for when planning for CR availability. For each vessel two (2) CRs shall be available; they will be located on the vessel and the CRs will work in rotating a 12 hour shift. The duration of rotations between crew changes is to be confirmed by the Geotechnical Survey Contractor. The CR rotation schedule shall be aligned with the Survey Contractor's rotation plan. Client expects a possibility to change CR each 4 weeks.

Client requests Tenderers to submit ten (10) CRs during the tender phase, who are able to perform the work. CRs will be selected from the offered CR pool during the scheduled work. For clarity, not all ten CRs are expected to perform the works simultaneously, but according to the schedule of the GT Survey Contractors.

2.4 Know-how requirements for offered Client Representatives

Requirements relating to Personnel offered in the role as CR for the Geotechnical Survey. The personnel involved in the executing of the Services, must have:

- Experience with the execution of geotechnical soil investigations carried out for offshore wind projects, including:
    a. (Deep) CPTs between 10 meters to 60 meters;
        - Standard PCPTs;
        - Temperature CPTs;
        - Seismic cone CPTs;
        - Seismic seabed CPTs

b. Performing performance dissipation tests during seabed PCPT tests and in *situ* thermal conductivity tests using a cone
c. Executing vibrocores.
d. Drilling boreholes with a combination of sampling, downhole piezocone penetration tests (PCPT) and downhole seismic cone penetration tests (SCPT) to at least target depth of between 60m and 80m.
    - This includes P-S logging, Density logging, spectral gamma ray logging and downhole magnetic resonance logging.
    - Oversampling of a PCPT or SCPT stroke.
e. Preparation of borehole log and borehole laboratory testing schedule after borehole completion.
f. Other projects for which similar investigations are carried out, and have proven in depth knowledge on technical and contractual issues relevant for these works;

2.5 Schedule of the Work

Duration of the Work will depend on the workability, the amount and efficiency of the vessels used by the Survey Contractor.

For the purpose of tendering, a number of 200 vessel days is expected, divided over the two Geotechnical Survey LOTs, with one vessel performing the works per LOT. The current expectation is that approximately 30% of the vessel days will require **onshore** presence of two CRs in the Remote Operation Facility and approximately 70% of the vessel days will require **offshore** presence of two CRs.

The figures above do not include the optional scope (PAWOZ). The current expectation is that this project would require approximately 60 days **offshore** presence of two CRs.

The timeline specifying the starting date of the offshore works by which the CR need to be made available, will be tried as good as possible to be accurately defined as follows*:*

- *Client will as soon as possible provide information on the indicative period in which the survey will take place.*
- *One month before the intended start of the offshore works, Client will provide a best estimation of the mobilization date and location.*
- *One week before the intended start of the offshore works, Client will provide an update with best estimation of the mobilization date and location.*

Notifications on the crew change dates will be provided by Client as follows (for the LOT2 survey:

- *One week before crew change, the crew change date can be specified with a precision of 3 days;*
- *48 hours before crew change, the exact crew change date shall be specified.*

For the LOT1 survey, notifications are not required for crew changes/ port calls, since the CR will be located in the Survey Contractor's Remote Operating Facility.

Approximately one or two months prior to the start of the offshore campaign, a kick-off meeting is held between Client and Survey Contractor. At least one of the CRs who will join the first rotation is requested to attend this meeting in person in order to learn and give input on the campaign strategy. In case one of the CRs cannot attend the meeting, the attending CR will brief the other CRs on the content. If the attending CR is not available at the start of the campaign, the substitute CR should be briefed on the content of this kick-off meeting.

LOT1 is currently scheduled to commence in the second half of February 2025. The expected duration of the offshore campaign is approximately 7 weeks.

LOT2 is currently scheduled to start mid-March 2025. The expected duration of the offshore campaign is approximately 4 months.

A starting date for the optional scope (PAWOZ) cannot be provided at this stage. As described in the Tender Document, **Contractor is expected to be able to provide up to a maximum of 4 CRs simultaneously**, where it is taken into account that LOT1 and LOT2 are partially executed simultaneously. Contractor may assume PAWOZ will not be executed simultaneously with both LOT1 and LOT2, but might be executed simultaneously with one of the two DDW LOTs.

The approximate starting dates and durations are estimates and subject to change.

2.6 Mobilization / demobilization

Contractor shall arrange all travel arrangements from and towards the mobilization port set by the Survey Contractor.

Travel arrangements include:

- Flight / train or other travel costs
- Hotel and food
- Mandatory vaccinations if applicable / test to be able to travel

Client expects the mobilization port of the LOT1 Survey Contractor to be in Eemshaven, Den Helder or IJmuiden, the Netherlands. Client Representatives will be able to visit the vessel during the mobilization phase to observe the vessel setup. However, there will be no facilities for Client Representatives to stay onboard overnight. When the vessel leaves the port, the CR will travel to the Survey Contractor's Remote Operation Facility (Gothenburg, Sweden) and will be based there for the duration of the works.

Client expects the mobilization port of the LOT2 Survey Contractor to be in Eemshaven or Den Helder, the Netherlands. For LOT2 the CR will stay on board the vessel during the offshore works (as has always be the case in the past).

2.7 Team set-up

The Soil site investigation for DDWWFZ is managed by RVO project managers together with a team of contracted experts (AFRY Netherlands B.V.), which are referred to as Quality Expert Support (QES). The package is set up under supervision of a package manager from RVO overseeing all the studies related to soil. The RVO package manager is supported by a lead expert who is involved as well in all studies. Both the package manager as the lead expert manage all interfaces between the studies. The Geotechnical Survey projects are managed by an RVO project manager who is supported by the Quality Experts with in-depth knowledge related to the study.

Organogram of the project set-up is presented in Figure 2.

The position of the CR in the organogram is highlighted red.

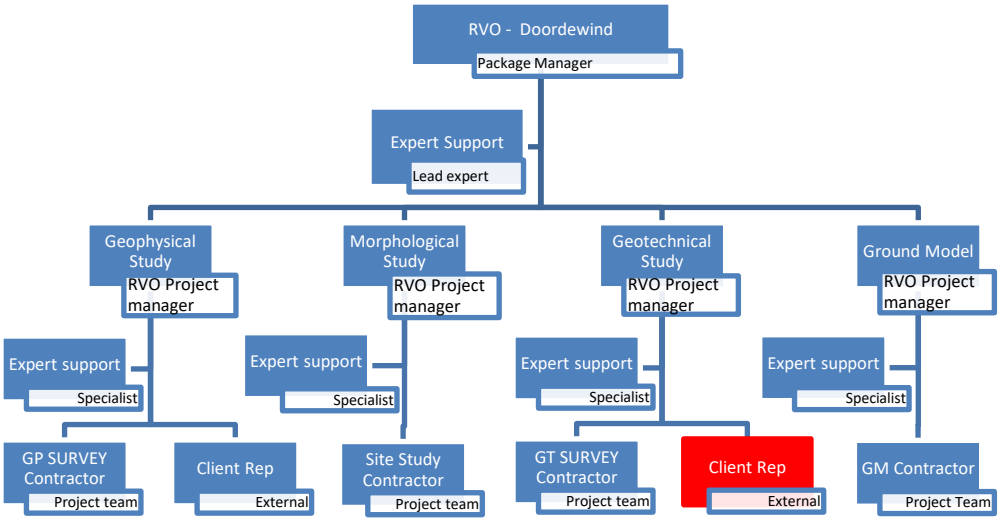

Figure 2 Organogram soil package

2.8 Communication

The communication lines are based on the team organization as presented in Section 2.7. Communication by the CR shall always include the RVO project manager and related quality expert(s). The quality expert support team advises together with the RVO project manager on any queries from the CR regarding the contract, HSEQ and or progress. The CR shall discuss queries with the Client's project team, consisting of the RVO project manager, deputy Project Manager and the Quality Expert Support. For the CR first point of communications is presented as below:

1) Contractor for Travel arrangements
2) RVO project manager for planning, contractual items and approval of travel arrangements
3) Lead Expert for technical questions and data acquisition

Figure 3 presents the communication lines within the Doordewind Geotechnical investigation with the position of the CR indicated in red.

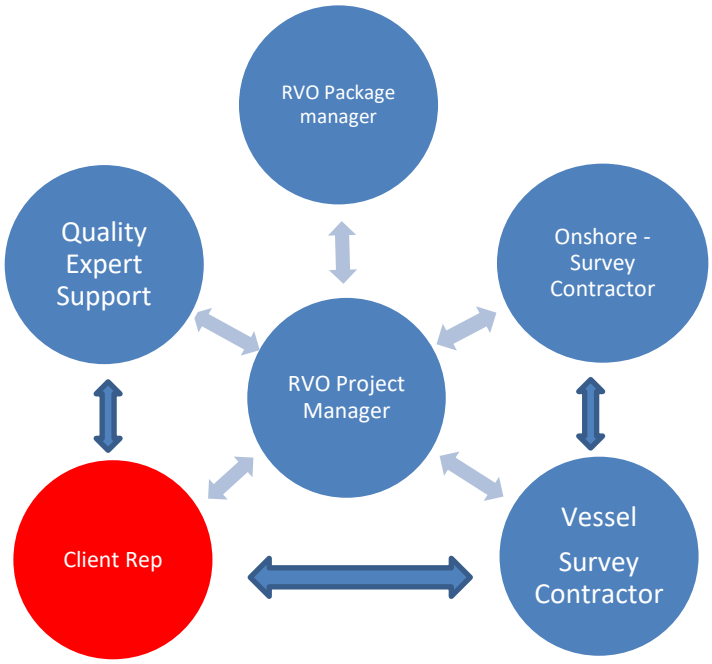

Figure 3 Communication lines

2.9 Reporting

The reporting requirements for the Geotechnical Survey work are as follows:

Daily & Weekly reporting

The Survey Contractor is to submit Daily Progress Reports (DPR) throughout the period of the fieldwork, providing full details of previous 24 hours' work and results. The CR shall review the DPR and sign it off.

The CR shall issue a daily update to the Client including:

- Summary of works completed (progress made during the) last 24 hours
- Planning for the upcoming 24 hours
- HSE items of last 24 hours
- Quality items of last 24 hours
- Any observations and/or notes

Furthermore, the CR shall participate in short progress meetings with Client and Survey Contractor, up to three (3) times a week (vessel progress calls).

3 Survey Requirements

The CR shall monitor the field works as performed by the Survey Contractor. This section describes a summary of the main requirements for the Geotechnical Survey. Detailed information can be found in the Scope of Work for the Geotechnical Survey contractors: Geotechnical survey at Doordewind Wind Farm Zone - Details - TenderNed.

3.1 Requirements for the Geotechnical Survey works

The most relevant requirements for the shallow geotechnical investigation (LOT1 of geotechnical investigation) are as follows:

- Seabed CPT with a target depth of 60m, using either a standard piezocone penetrometer (PCPT) or a seismic cone (SCPT). Minimal CPT length of at least 25m corrected, vertical penetration.
- Seismic seabed CPTs (SCPT) to a target depth of 60m.
- *In situ* thermal conductivity tests using a cone (or similar method) at selected locations for the purpose of subsea electrical cable design.
- Dissipation tests during seabed PCPT tests at locations and depths to be agreed with OCR.
- Vibrocores at selected locations to obtain a minimum of 3m recovery below the base of the seabed (using 6m core barrel) for:
  - The primary purpose of subsea electrical cable design;
  - The secondary purpose of seabed morphodynamic assessment. The locations will be specified by the CLIENT; and
  - The additional purpose of archaeological assessment.
- Associated operational and factual reporting (results to be presented in "Seabed Sampling Report" and "Seabed In Situ Testing Report", each of which covers the whole site;
- Delivery of associated digital data

The most relevant requirements for the borehole geotechnical investigation (LOT2 of geotechnical investigation) are as follows:

- Drilling boreholes with a combination of sampling, downhole piezocone penetration tests (PCPT) and downhole seismic cone penetration tests (SCPT) to a target depth of between 60m (A) and 40m (B). The boreholes can be subdivided into four types, as follows:
  - Type 1 (A&B) - where the sampling/testing regime consists of quasi-continuous sampling from seabed to a predetermined depth followed by a combination of sampling and PCPT to a target depth of 40 or 60m. The main purpose of the Type 1 borehole is to obtain general soil data (i.e. samples and PCPT) for developing geological and engineering soil models.
  - Type 2 (A & B) – where the sampling/testing regime consists of quasi-continuous sampling from seabed to a predetermined depth followed by a combination of SCPTs and sampling to a target depth of 40 or 60m or the depth at which the seismic signal is no longer strong enough to provide reliable results. The main purpose of the Type 2 boreholes is to obtain *in situ* shear wave velocity measurements for deriving the small-strain shear modulus.
  - Type 3 (A & B) – where the sampling regime consists of continuous sampling from seabed to 40 or 60m depth. The main purpose of the

Type 3 boreholes is to obtain samples for the purposes of laboratory testing;
    - Type 4 (A & B) – where the sampling regime consists of continuous destructive drilling from seabed for the purposes of creating an open hole for P-S suspension logging or for (OPTIONAL) density/porosity logging;
- In some of the Type 1 boreholes, selected downhole PCPTs may be replaced with downhole SCPTs. Any such replacements will be notified by the OCR in advance of moving to the relevant borehole location;
- In some of the Type 1 or Type 2 boreholes P-S suspension logging is to be performed for cross-correlation/verification with nearby Lot 1 SCPT, Lot 2 Type 2 and Geophysical data. The P-S logging tests shall be performed at depth intervals of approximately 1m, as directed by the OCR.
- For any of the borehole types, oversampling of a PCPT or SCPT stroke may be requested by the OCR in order to verify the soil material type being tested;
- Preparation of borehole log and borehole laboratory testing schedule for approval within 24 hours of borehole completion.
- (optional) density or porosity logging to be performed in selected boreholes
- Associated reporting;
- Delivery of associated digital data.

3.2 Mobilization, port calls and demobilization

Mobilization of the vessels to the site, complete with all necessary geotechnical equipment and personnel. Survey Contractor shall include sufficient consumables and equipment spares in the mobilization plan to allow for any unforeseeable events. Survey Contractor shall indicate the proposed port of mobilization/ demobilization as well as the number of port calls foreseen during the survey.

The Client requires a port call approximately every four weeks (as a minimum) for Client Representative crew changes (applies to LOT2 of the Geotechnical Survey Works only). Since the CR for LOT1 will be based in one of the Remote Operations Centre locations of the Geotechnical Survey Contractor, the Client does not require port calls for CR crew changes for LOT1.

The Client requires a regular transport of soil samples to laboratory (applies to LOT1 and LOT2). In addition, Survey Contractor shall make use of any periods of weather standby to undertake such port calls to facilitate offload and transport of samples.

The port to be used for mobilization of survey vessel(s), equipment and personnel shall be approved by the Client.

Demobilization of the vessel will be authorized when all survey operations have been completed, the seabed frame has been recovered, and after approval of the OCR and CLIENT.