EUROPA OIL & GAS (INISHKEA) LIMITED
INISHKEA PROSPECT SITE SURVEY

RESPONSE TO REQUESTS FOR FURTHER INFORMATION AND CLARIFICATIONS TO INFORM ENVIRONMENTAL IMPACT ASSESSMENT SCREENING

MGE0719RP0017
Europa Oil & Gas (Inishkea) Limited
Inishkea Prospect Site Survey – Response to RFI and Clarifications to Inform EIA Screening
F01
27 August 2019

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	Response to RFIs and Clarifications to Inform EIA Screening	James Forde	Paula Kearney	Paula Kearney	27/08/2019

Approval for issue

Paula Kearney		27 August 2019

Prepared by:

RPS

Dr James Forde
Senior Project Scientist

Lyrr 2, IDA Business & Technology Park,
Mervue, Galway, Ireland
H91 H9CK

T +353 (0) 91 400 200
E James.Forde@rpsgroup.com

Prepared for:

Europa Oil & Gas (Inishkea) Limited

Simon Lucas
Drilling Manager

6 Porter Street,
London, UK,
W1U 6DD

T +44 (0) 7979 035 345
E Simon.Lucas@europaoil.com

Contents

Tables

Figures

Appendices

1 INTRODUCTION

On 15 May 2019 Europa Oil & Gas (Inishkea) Limited ('Europa'), a wholly owned subsidiary of Europa Oil & Gas (Holdings) PLC, submitted an application under Licensing Option 16/20 to the Petroleum Affairs Division (PAD) of the Department of Communications, Climate Action and Environment (DCCAE) seeking Ministerial approval to undertake geophysical and environmental baseline site survey activities over Licensing Blocks 18/19 and 18/20, offshore Ireland. The name of the proposed survey is the 'Inishkea Survey'. At its closest point, the proposed survey is over 63 km from landfall at Inishkea South Island which is located approximately 4 km west of the Mullet Peninsula, County Mayo, Ireland. It is proposed that the survey will be undertaken in 2019. If the survey has not commenced or concluded in 2019, operations will be undertaken sometime between early-February and late-November 2020. Excluding weather and technical downtime, survey operations are expected to take a total of 14 survey working days.

The application submitted by Europa to the PAD DCCAE in May 2019 comprised the following:

- Europa Inishkea Site Survey Application
  Document reference: *Survey Technical Specifications Report - MGE0719RP0006*
- Europa Inishkea Site Survey Letter
  Dated: 10 May 2019
- Europa Inishkea AA Screening and Natura Impact Statement (NIS)
  Document reference: *Screening for Appropriate Assessment (AA) and Natura Impact Statement Report (NIS) - MGE0719RP0005*
- Europa Inishkea Pre-survey Fishery Assessment
  Document reference: *Pre-survey Fishery Assessment - MGE0719RP0007*
- Europa Inishkea EIA Screening
  Document reference: *Environmental Impact Assessment (EIA) Screening and Environmental Risk Assessment (ERA) Report - MGE0719RP0004*

The Environment Advisory Unit (EAU), a unit of the DCCAE, is responsible for carrying out the environmental impact assessment screening and environmental impact assessments of applications made to the Minister for permission to undertake activities in accordance with Environmental Impact Assessment (EIA) Directive 2011/92/EU (as amended by 2014 EIA Directive [2014/52/EU]) and the Habitats Directive 92/43/EEC (as amended).

On 24 July 2019 the EAU wrote to Europa requesting further information and clarifications on the Inishkea Survey application to enable a screening of the proposed activities in accordance with the requirements set out in the EIA Petroleum Exploration Regulations 2013 (as amended) and the 2014 Directive (in particular the criteria specified in Annex III that are required to be taken into account when compiling the information on the characteristics of the project and its likely significant effects). The EAU raised a total of 11No. requests for further information or clarifications (queries) relating to the following application reports: the *Environmental Impact Assessment Screening,* the *Pre-survey Fisheries Assessment* and the *Survey Technical Specifications Report*.

Europa has considered the 11No. queries raised by the EAU and presents below a detailed response to each query (see **Section 2.1** to **Section 2.11**). We trust that these responses provide the required additional information and clarity to enable an EIA screening determination to be made.

2 REQUESTS FOR FURTHER INFORMATION/ CLARIFICATIONS

2.1 EAU Query No. 1

EAU Query

…provide an indicative line plan for the survey operations;

Europa Response

A line plan for provisional vessel survey lines is presented in **Figure 2.1** (survey lines are shown in red and blue). Coordinates for the line start- and end-points of the provisional vessel survey lines are presented in **Table 2-1**. Coordinates of the survey area node points illustrated in **Figure 2.1** are listed in **Table 2-2** below.

A total of 40No. provisional vessel survey lines are proposed:

- 29No. parallel 5,500 m survey lines orientated in a south-west to north-east direction (shown in red). Adjacent lines are separated by 150 m; and
- 11No. parallel 4,500 m survey lines orientated in a south-east to north-west direction (shown in blue). Adjacent lines are separated by 500 m.

Geophysical data will be acquired along survey lines using the following:

- Single-beam echosounder – hull mounted Kongsberg EA400 (or similar)
- Multi beam echosounder – hull mounted Kongsberg EM710 (or similar)
- Side Scan Sonar – towed fish – Edgetech EM400 (or similar)
- Sub-bottom Profiler– hull-mounted pinger or chirp system – Edgetech 3300 (or similar)
- Sub-bottom Profiler – 10 cu in airgun
- Magnetometer – towed fish – Geometrics G882 caesium vapour (or similar)

Provisional benthic habitat transects are shown in **Figure 2.2** (transects shown in orange, blue and red) relative to the approximate location of the well top-hole and relief well. Coordinates for the transects start- and end-points of the provisional transects are presented in **Table 2-3**. The provisional benthic habitat transects proposed comprise:

- 13No. 100 m drop down camera transects (shown in orange). Of these, 8No. orientated in a south-east to north-west direction while 5No. are orientated in a south-west to north-east direction;
- 4No. 500 m AUV transects (shown in blue); 2No. orientated in a south-east to north-west direction and 2 orientated in a south-west to north-east direction; and
- 3No. optional extended AUV transects (shown in red); 1No. 5,500 m line orientated south-west to north-east and 2No. 4,500 m lines orientated south-east to northwest.

Geophysical data will be acquired along AUV transects using:

- Multi beam echosounder – AUV mounted Simrad EM2040 (or similar);
- Side Scan Sonar – AUV mounted Tritech SeaKing (or similar); and
- Sub-bottom Profiler –AUV mounted Edgetech 2205 Chirp (or similar)

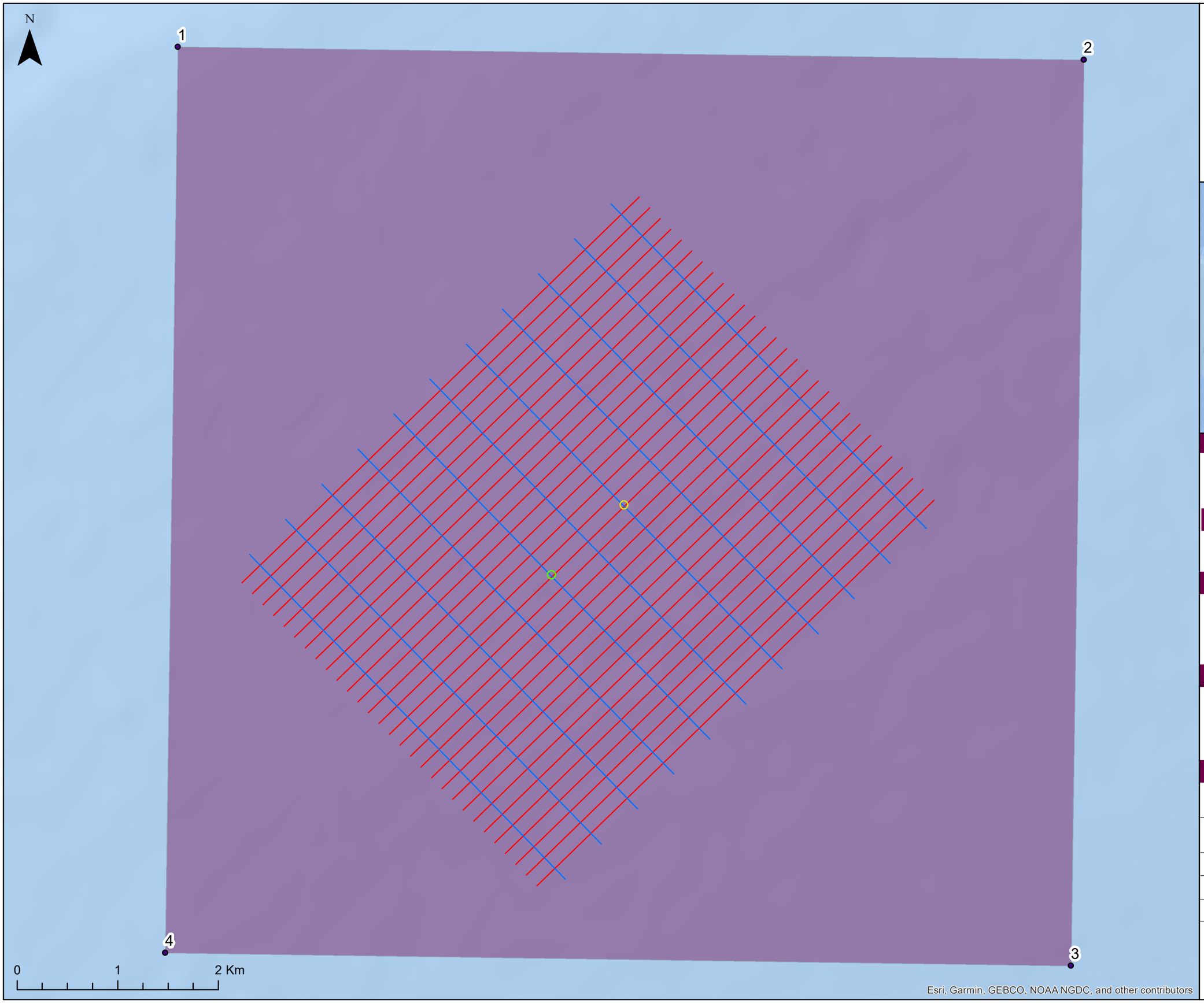
Seabed imagery will also be recorded along AUV transect lines using AUV mounted stills/ video cameras.

The identified provisional survey and transect lines may be subject to change. Final survey lines and transects will be confirmed to the PAD DCCAE prior to survey.

It should be noted that the final location of survey lines and transect lines will be affected by the accuracy (tolerance levels) of positioning equipment used during the survey, while survey operators may be required to change the final location of the survey lines and transect lines due to operational constraints (e.g. presence of seabed obstructions, inclement weather, local water currents etc.).

If the vessel appointed to undertake the survey is not equipped with an AUV, the AUV transect lines will be investigated using the vessel mounted geophysical equipment listed above. Features of note along transect lines identified using geophysical data will be visually inspected using drop down camera system deployed from the vessel.

Details of seabed sampling is provided in response to **Query 7** below (see **Section 2.7**).

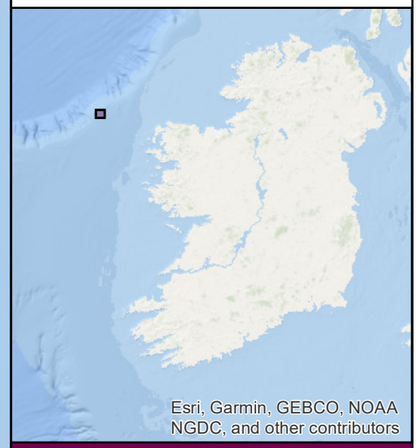


Inishkea Survey greater working area

Survey area nodal points

Approximate location of well top-hole

Approximate location of relief well



Client

Europa Oil & Gas

Figure

2.1

Title

Provisional vessel survey lines relative to the proposed greater working area

RPS | Consulting UK & Ireland
Lyrr 2, IDA Business &
Technology Park, Mervue
Galway, H91 H9CK, Ireland
T +353 (0)91 400 200
E ireland@rpsgroup.com
W rpsgroup.com/ireland

Issue Details

File Identifier: MGE0719Arc0002	
Rev: F01	
Drawn: JF	**Date:** 21/08/2019
Checked: GMcE	**Scale:** 1:35,234 (A3)
Approved: GMcE	**Projection:** ITM

NOTE:

1. This drawing is the property of RPS Group Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. Ordnance Survey Ireland Licence EN 0005019 ©Copyright Government of Ireland.

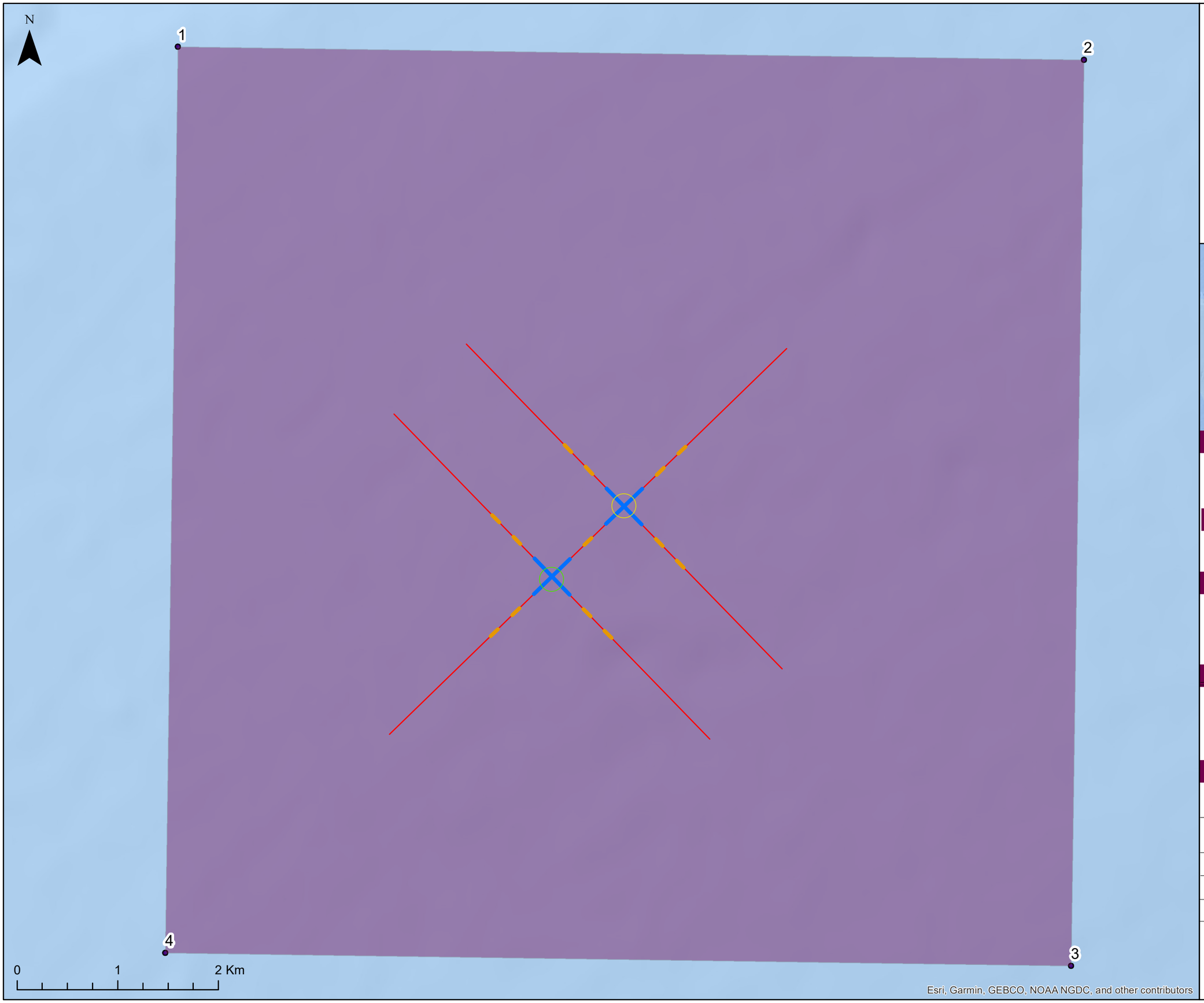
Table 2-1: Coordinates of provisional vessel line start- and end-points

Line	Start of Line		End of Line		Start of LIne		End of Line	
ID	ED 50 Latitude	ED 50 Longitude	ED 50 Latitude	ED 50 Longitude	WGS 84 Latitude	WGS 84 Longitude	WGS 84 Latitude	WGS 84 Longitude
V01	54° 25' 13.069" N	11° 12' 54.541" W	54° 23' 33.396" N	11° 09' 52.717" W	54° 25' 09.739"N	011° 13' 00.691"W	54° 23' 30.066"N	011° 09' 58.859"W
V02	54° 25' 01.279" N	11° 13' 13.523" W	54° 23' 21.614" N	11° 10' 11.700" W	54° 24' 57.948"N	011° 13' 19.672"W	54° 23' 18.283"N	011° 10' 17.843"W
V03	54° 25' 24.858" N	11° 12' 35.557" W	54° 23' 45.177" N	11° 09' 33.730" W	54° 25' 21.528"N	011° 12' 41.707"W	54° 23' 41.847"N	011° 09' 39.873"W
V04	54° 24' 49.488" N	11° 13' 32.502" W	54° 23' 09.831" N	11° 10' 30.681" W	54° 24' 46.157"N	011° 13' 38.651"W	54° 23' 06.499"N	011° 10' 36.824"W
V05	54° 25' 36.646" N	11° 12' 16.569" W	54° 23' 56.958" N	11° 09' 14.740" W	54° 25' 33.318"N	011° 12' 22.719"W	54° 23' 53.629"N	011° 09' 20.883"W
V06	54° 24' 37.697" N	11° 13' 51.477" W	54° 22' 58.047" N	11° 10' 49.659" W	54° 24' 34.365"N	011° 13' 57.627"W	54° 22' 54.715"N	011° 10' 55.801"W
V07	54° 25' 48.434" N	11° 11' 57.578" W	54° 24' 08.737" N	11° 08' 55.747" W	54° 25' 45.106"N	011° 12' 03.729"W	54° 24' 05.409"N	011° 09' 01.890"W
V08	54° 24' 25.904" N	11° 14' 10.450" W	54° 22' 46.263" N	11° 11' 08.634" W	54° 24' 22.572"N	011° 14' 16.599"W	54° 22' 42.930"N	011° 11' 14.775"W
V09	54° 26' 00.220" N	11° 11' 38.585" W	54° 24' 20.516" N	11° 08' 36.751" W	54° 25' 56.893"N	011° 11' 44.735"W	54° 24' 17.188"N	011° 08' 42.895"W
V10	54° 24' 02.317" N	11° 14' 48.386" W	54° 22' 22.692" N	11° 11' 46.574" W	54° 23' 58.983"N	011° 14' 54.535"W	54° 22' 19.357"N	011° 11' 52.716"W
V11	54° 23' 53.100" N	11° 14' 51.804" W	54° 26' 02.791" N	11° 11' 23.021" W	54° 23' 49.766"N	011° 14' 57.952"W	54° 25' 59.464"N	011° 11' 29.171"W
V12	54° 23' 49.781" N	11° 14' 45.740" W	54° 25' 59.469" N	11° 11' 16.957" W	54° 23' 46.447"N	011° 14' 51.888"W	54° 25' 56.142"N	011° 11' 23.107"W
V13	54° 23' 46.461" N	11° 14' 39.676" W	54° 25' 56.146" N	11° 11' 10.892" W	54° 23' 43.127"N	011° 14' 45.824"W	54° 25' 52.819"N	011° 11' 17.042"W
V14	54° 23' 43.142" N	11° 14' 33.612" W	54° 25' 52.824" N	11° 11' 04.828" W	54° 23' 39.807"N	011° 14' 39.760"W	54° 25' 49.497"N	011° 11' 10.978"W
V15	54° 23' 33.182" N	11° 14' 15.424" W	54° 25' 42.855" N	11° 10' 46.637" W	54° 23' 29.848"N	011° 14' 21.571"W	54° 25' 39.528"N	011° 10' 52.786"W
V16	54° 23' 39.822" N	11° 14' 27.549" W	54° 25' 49.501" N	11° 10' 58.764" W	54° 23' 36.487"N	011° 14' 33.697"W	54° 25' 46.174"N	011° 11' 04.913"W
V17	54° 23' 36.502" N	11° 14' 21.486" W	54° 25' 46.178" N	11° 10' 52.700" W	54° 23' 33.168"N	011° 14' 27.634"W	54° 25' 42.851"N	011° 10' 58.849"W
V18	54° 23' 29.862" N	11° 14' 09.361" W	54° 25' 39.532" N	11° 10' 40.573" W	54° 23' 26.528"N	011° 14' 15.508"W	54° 25' 36.205"N	011° 10' 46.722"W
V19	54° 23' 26.542" N	11° 14' 03.299" W	54° 25' 36.209" N	11° 10' 34.511" W	54° 23' 23.207"N	011° 14' 09.445"W	54° 25' 32.882"N	011° 10' 40.659"W
V20	54° 23' 23.221" N	11° 13' 57.237" W	54° 25' 32.886" N	11° 10' 28.448" W	54° 23' 19.887"N	011° 14' 03.384"W	54° 25' 29.559"N	011° 10' 34.596"W
V21	54° 23' 19.901" N	11° 13' 51.176" W	54° 25' 29.563" N	11° 10' 22.386" W	54° 23' 16.567"N	011° 13' 57.322"W	54° 25' 26.236"N	011° 10' 28.533"W
V22	54° 23' 16.581" N	11° 13' 45.114" W	54° 25' 26.240" N	11° 10' 16.323" W	54° 23' 13.246"N	011° 13' 51.260"W	54° 25' 22.912"N	011° 10' 22.471"W
V23	54° 23' 13.260" N	11° 13' 39.053" W	54° 25' 22.916" N	11° 10' 10.262" W	54° 23' 09.926"N	011° 13' 45.199"W	54° 25' 19.589"N	011° 10' 16.409"W
V24	54° 23' 09.940" N	11° 13' 32.993" W	54° 25' 19.593" N	11° 10' 04.200" W	54° 23' 06.605"N	011° 13' 39.138"W	54° 25' 16.266"N	011° 10' 10.347"W
V25	54° 23' 06.619" N	11° 13' 26.932" W	54° 25' 16.269" N	11° 09' 58.139" W	54° 23' 03.285"N	011° 13' 33.077"W	54° 25' 12.942"N	011° 10' 04.286"W
V26	54° 23' 03.298" N	11° 13' 20.872" W	54° 25' 12.946" N	11° 09' 52.078" W	54° 22' 59.964"N	011° 13' 27.017"W	54° 25' 09.618"N	011° 09' 58.224"W
V27	54° 22' 59.977" N	11° 13' 14.812" W	54° 25' 09.622" N	11° 09' 46.017" W	54° 22' 56.643"N	011° 13' 20.957"W	54° 25' 06.295"N	011° 09' 52.164"W
V28	54° 22' 56.656" N	11° 13' 08.752" W	54° 25' 06.298" N	11° 09' 39.957" W	54° 22' 53.322"N	011° 13' 14.897"W	54° 25' 02.971"N	011° 09' 46.103"W
V29	54° 22' 53.335" N	11° 13' 02.693" W	54° 25' 02.974" N	11° 09' 33.896" W	54° 22' 50.001"N	011° 13' 08.837"W	54° 24' 59.647"N	011° 09' 40.042"W
V30	54° 22' 50.014" N	11° 12' 56.634" W	54° 24' 59.650" N	11° 09' 27.837" W	54° 22' 46.680"N	011° 13' 02.778"W	54° 24' 56.323"N	011° 09' 33.982"W
V31	54° 22' 46.693" N	11° 12' 50.575" W	54° 24' 56.326" N	11° 09' 21.777" W	54° 22' 43.359"N	011° 12' 56.718"W	54° 24' 52.998"N	011° 09' 27.922"W

Line	Start of Line		End of Line		Start of LIne		End of Line	
ID	ED 50 Latitude	ED 50 Longitude	ED 50 Latitude	ED 50 Longitude	WGS 84 Latitude	WGS 84 Longitude	WGS 84 Latitude	WGS 84 Longitude
V32	54° 22' 43.372" N	11° 12' 44.516" W	54° 24' 53.002" N	11° 09' 15.718" W	54° 22' 40.037"N	011° 12' 50.659"W	54° 24' 49.674"N	011° 09' 21.863"W
V33	54° 22' 40.050" N	11° 12' 38.458" W	54° 24' 49.678" N	11° 09' 09.658" W	54° 22' 36.716"N	011° 12' 44.601"W	54° 24' 46.350"N	011° 09' 15.803"W
V34	54° 22' 36.729" N	11° 12' 32.400" W	54° 24' 46.353" N	11° 09' 03.600" W	54° 22' 33.395"N	011° 12' 38.543"W	54° 24' 43.026"N	011° 09' 09.744"W
V35	54° 22' 33.407" N	11° 12' 26.342" W	54° 24' 43.029" N	11° 08' 57.541" W	54° 22' 30.073"N	011° 12' 32.485"W	54° 24' 39.701"N	011° 09' 03.685"W
V36	54° 22' 30.086" N	11° 12' 20.285" W	54° 24' 39.704" N	11° 08' 51.483" W	54° 22' 26.751"N	011° 12' 26.427"W	54° 24' 36.377"N	011° 08' 57.627"W
V37	54° 22' 26.764" N	11° 12' 14.227" W	54° 24' 36.380" N	11° 08' 45.425" W	54° 22' 23.429"N	011° 12' 20.369"W	54° 24' 33.052"N	011° 08' 51.569"W
V38	54° 22' 23.442" N	11° 12' 08.170" W	54° 24' 33.055" N	11° 08' 39.367" W	54° 22' 20.108"N	011° 12' 14.312"W	54° 24' 29.727"N	011° 08' 45.511"W
V39	54° 22' 20.120" N	11° 12' 02.114" W	54° 24' 29.730" N	11° 08' 33.310" W	54° 22' 16.786"N	011° 12' 08.255"W	54° 24' 26.403"N	011° 08' 39.453"W
V40	54° 24' 14.111" N	11° 14' 29.419" W	54° 22' 34.478" N	11° 11' 27.605" W	54° 24' 10.778"N	011° 14' 35.568"W	54° 22' 31.144"N	011° 11' 33.747"W

Table 2-2: Coordinates of survey area node points.

Node Point	ED 50 Latitude	ED 50 Longitude	WGS 84 Latitude	WGS 84 Longitude
1	54° 26' 44.1219" N	11° 15' 40.9824" W	54° 26' 40.7924" N	11° 15' 47.1389" W
2	54° 26' 53.1829" N	11° 07' 21.7237" W	54° 26' 49.8607" N	11° 07' 27.8717" W
3	54° 22' 02.2051" N	11° 07' 06.7042" W	54° 21' 58.8742" N	11° 07' 12.8399" W
4	54° 21' 53.1710" N	11° 15' 24.9835" W	54° 21' 49.8327" N	11° 15' 31.1277" W



Inishkea Survey greater working area

Survey area nodal points

Drop down camera transect

500 m AUV transect

Optional AUV transects

Approximate location of well top-hole

Approximate location of relief well

Client

Europa Oil & Gas

Figure

2.2

Title

Provisional benthic transect lines relative to the proposed greater working area

RPS | Consulting UK & Ireland
Lyrr 2, IDA Business &
Technology Park, Mervue
Galway, H91 H9CK, Ireland
T +353 (0)91 400 200
E ireland@rpsgroup.com
W rpsgroup.com/ireland

Issue Details

File Identifier:
MGE0719Arc0002

Rev:
F01

Drawn: JF	**Date:** 21/08/2019
Checked: GMcE	**Scale:** 1:35,234 (A3)
Approved: GMcE	**Projection:** ITM

NOTE:

1. This drawing is the property of RPS Group Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. Ordnance Survey Ireland Licence EN 0005019 ©Copyright Government of Ireland.

Table 2-3: Coordinates of provisional benthic transect line start- and end-points

Transect		Start of Line		End of Line		Start of LIne		End of Line	
ID	Transect Type	ED 50 Latitude	ED 50 Longitude	ED 50 Latitude	ED 50 Longitude	WGS 84 Latitude	WGS 84 Longitude	WGS 84 Latitude	WGS 84 Longitude
V01	Drop down camera	54° 23' 49.064" N	11° 12' 18.634" W	54° 23' 46.707" N	11° 12' 20.532" W	54° 23' 45.732"N	011° 12' 24.780"W	54° 23' 43.374"N	011° 12' 28.575"W
V02	Drop down camera	54° 23' 39.634" N	11° 12' 33.814" W	54° 23' 41.991" N	11° 12' 31.916" W	54° 23' 36.301"N	011° 12' 39.959"W	54° 23' 38.659"N	011° 12' 36.165"W
V03	Drop down camera	54° 24' 10.281" N	11° 11' 44.474" W	54° 24' 12.638" N	11° 11' 42.575" W	54° 24' 06.950"N	011° 11' 50.619"W	54° 24' 09.308"N	011° 11' 46.823"W
V04	Drop down camera	54° 24' 43.277" N	11° 10' 51.321" W	54° 24' 40.920" N	11° 10' 53.220" W	54° 24' 39.947"N	011° 10' 57.467"W	54° 24' 37.590"N	011° 11' 01.265"W
V05	Drop down camera	54° 24' 36.206" N	11° 11' 02.714" W	54° 24' 33.849" N	11° 11' 04.613" W	54° 24' 32.876"N	011° 11' 08.860"W	54° 24' 30.519"N	011° 11' 12.658"W
V06	Drop down camera	54° 23' 40.848" N	11° 11' 27.216" W	54° 23' 43.062" N	11° 11' 29.235" W	54° 23' 37.516"N	011° 11' 33.360"W	54° 23' 39.731"N	011° 11' 37.400"W
V07	Drop down camera	54° 23' 47.492" N	11° 11' 39.334" W	54° 23' 49.707" N	11° 11' 41.354" W	54° 23' 44.161"N	011° 11' 45.479"W	54° 23' 46.375"N	011° 11' 49.519"W
V08	Drop down camera	54° 24' 04.414" N	11° 10' 49.258" W	54° 24' 06.629" N	11° 10' 51.278" W	54° 24' 01.084"N	011° 10' 55.403"W	54° 24' 03.299"N	011° 10' 59.443"W
V09	Drop down camera	54° 24' 11.059" N	11° 11' 01.377" W	54° 24' 13.275" N	11° 11' 03.397" W	54° 24' 07.729"N	011° 11' 07.522"W	54° 24' 09.944"N	011° 11' 11.562"W
V10	Drop down camera	54° 24' 18.496" N	11° 12' 35.903" W	54° 24' 16.281" N	11° 12' 33.883" W	54° 24' 15.164"N	011° 12' 42.050"W	54° 24' 12.950"N	011° 12' 38.009"W
V11	Drop down camera	54° 24' 11.853" N	11° 12' 23.779" W	54° 24' 09.638" N	11° 12' 21.759" W	54° 24' 08.521"N	011° 12' 29.926"W	54° 24' 06.307"N	011° 12' 25.885"W
V12	Drop down camera	54° 24' 42.068" N	11° 11' 57.947" W	54° 24' 39.853" N	11° 11' 55.927" W	54° 24' 38.738"N	011° 12' 04.095"W	54° 24' 36.523"N	011° 12' 00.053"W
V13	Drop down camera	54° 24' 35.424" N	11° 11' 45.823" W	54° 24' 33.209" N	11° 11' 43.803" W	54° 24' 32.094"N	011° 11' 51.970"W	54° 24' 29.879"N	011° 11' 47.929"W
V14	AUV 500 m transect	54° 24' 29.135" N	11° 11' 14.106" W	54° 24' 17.349" N	11° 11' 23.598" W	54° 24' 25.805"N	011° 11' 20.252"W	54° 24' 14.019"N	011° 11' 39.236"W
V15	AUV 500 m transect	54° 24' 17.705" N	11° 11' 13.497" W	54° 24' 28.780" N	11° 11' 23.599" W	54° 24' 14.374"N	011° 11' 19.643"W	54° 24' 25.449"N	011° 11' 39.847"W
V16	AUV 500 m transect	54° 24' 05.567" N	11° 11' 52.066" W	54° 23' 53.779" N	11° 12' 01.555" W	54° 24' 02.235"N	011° 11' 58.211"W	54° 23' 50.447"N	011° 12' 17.190"W
V17	AUV 500 m transect	54° 23' 54.136" N	11° 11' 51.454" W	54° 24' 05.209" N	11° 12' 01.555" W	54° 23' 50.805"N	011° 11' 57.600"W	54° 24' 01.878"N	011° 12' 17.803"W
V18	AUV extended transect - optional	54° 23' 06.619" N	11° 13' 26.932" W	54° 25' 16.269" N	11° 11' 42.535" W	54° 23' 03.285"N	011° 13' 33.077"W	54° 25' 12.942"N	011° 10' 04.286"W
V19	AUV extended transect - optional	54° 25' 13.069" N	11° 12' 54.541" W	54° 23' 33.396" N	11° 11' 23.629" W	54° 25' 09.739"N	011° 13' 00.691"W	54° 23' 30.066"N	011° 09' 58.859"W
V20	AUV extended transect - optional	54° 24' 49.488" N	11° 13' 32.502" W	54° 23' 09.831" N	11° 12' 01.591" W	54° 24' 46.157"N	011° 13' 38.651"W	54° 23' 06.499"N	011° 10' 36.824"W

2.2 EAU Query No. 2

EAU Query

…provide additional information on the equipment to be used including peak source levels and references for these. While some equipment is still TBC, a representative equipment specification should be provided to allow reasonable assumptions to be made through the assessments;

Europa Response

To inform the assessment of survey noise impacts, an underwater noise modelling exercise was undertaken to predict the likely noise output levels generated by the proposed equipment. The modelled noise output levels (i.e. Source Level (SPL) (SEL dB re 1µPa2s@ 1m) and Source Level (Peak) (dB re 1µPa@ 1m)) were calculated based on the operating frequencies and peak output levels of the proposed equipment. Table 3.4 of the EIA Screening and ERA Report lists the operating frequencies of the equipment. The peak source outputs of the equipment used in the modelling exercise were obtained from a number of data sources including RPS' historical database of underwater survey equipment. The modelled noise output levels where used to determine the likely spatial area (or potential impact zones) around the survey within which noise emissions may exceed thresholds of potential injury and behavioural effects in fauna.

The noise modelling exercise presented in the EIA Screening and ERA Report has been revised based on current best available information on the peak source outputs for the proposed equipment (see **Table 2.4** below),while revised potential impact zones are presented in **Table 2 5**.

It should be noted that while the revised potential impact zones differ from those detailed in the EIA Screening and ERA Report, the differences are not significant and all potential impacts will be confined to an area close to the source.

Table 2-4: Peak source level outputs of equipment

Vessel Mounted/ Towed Equipment	Model	Peak source outputs dB re 1 µPa	Data Source
SBES	Hull mounted Kongsberg EA400 or similar (35 kHz – 200 kHz or similar)	240*	Calculated from Kongsberg EA400 Operator Manual 857-160981
MBES	Hull-Mounted Swathe Multibeam Kongsberg EM710 or similar (70 kHz – 100 kHz or similar)	232*	EM Technical note on sound levels from Kongsberg Multibeams, 2005 https://kmdoc.kongsberg.com/ks/web/nokbg0397.nsf/AllWeb/DE3B0D5A997BE98EC1257B58004502AB/$file/EM_technical_note_web_SoundLevelsFromKongsbergMultibeams.pdf?OpenElement
SSS	Towed Fish – Edgetech EM400 or similar (Dual frequency – 100 kHz/500 kHz or similar)	211*	Calculated from Edgetech 4125 Series Dual Frequency Side Scan Sonar System User's Manual Document No. 990-4125MAN-1000 Rev. D
SBP	Hull-mounted pinger or chirp system – Edgetech 3300 or similar (1-16 kHz or similar)	212*	Edgetech User's Hardware Manual May 2007 Rev 2.1
SBP	10 cu in Airgun	180	Hermannsen L, Tougaard J, Beedholm K, Nabe-Nielsen J, Madsen PT (2015) characteristics and Propagation of Airgun Pulses in Shallow Water with Implications for Effects on Small Marine Mammals. PLoS ONE 10(7): e0133436. doi:10.1371/journal.pone.0133436
USBL (topside)	Hull mounted HiPAP 502 USBL or similar	203*	Kongsberg HiPAP Product Description 400578/D 2016
Magnetometer	Towed fish – Geometrics G882 caesium vapour or similar	n/a	n/a
AUV Mounted Equipment	**Model**		
MBES	AUV mounted Simrad EM2040 or similar (300 kHz or similar)	218*	Kongsberg EM2040 Instruction Manual 346210/C

Vessel Mounted/ Towed Equipment	Model	Peak source outputs dB re 1 µPa	Data Source
SBP	AUV-Mounted Edgetech 2205 Chirp or similar (1-16 kHz or similar)	202*	Edgetech product manual
SSS	AUV-Mounted Tritech Seaking (Dual frequency - 200 kHz/550 kHz or similar)	208*	Tritech Seaking Operators Manual Issue 3
Stills/ video camera	TBC	n/a	n/a
Seabed Sampling Equipment	**Model**		
Core/ grab sampler	TBC	n/a	n/a
Seabed Imaging Equipment	**Model**		
Drop-down Camera	TBC	n/a	n/a
Positioning Equipment	**Model**		
USBL (seabed)	HiPAP 502 USBL or similar	190*	Kongsberg HiPAP Product Description 400578/D 2016

Notes: * Lurton (2016)[1] sets out how the duty cycle and limited spatial coverage limit the impact of directional echosounders and concludes that impacts in terms of injury are negligible for both SPL and SEL.

[1] Lurton, X., (2016) Modelling the sound field radiated by multibeam echosounders for acoustical impact assessment, Applied Acoustics, 101 p201-221

Table 2-5: Revised zone of potential impact

Species	Criteria		Impact Zone Surface	Impact Zone AUV	Impact Zone Seabed
	dB re 1 µPa(peak)(flat)	SEL_{cum} dB re 1 μPa^2-s	m	m	m
Low Frequency Cetaceans (PTS)[1]	219	183	24	-	-
Mid Frequency Cetaceans (PTS)[1]	230	185	2	-	-
High Frequency Cetaceans (PTS)[1]	202	155	201	16	3
Phocid Pinnipeds (PTS)[1]	218	185	6	-	-
Otariid Pinnipeds (PTS)[1]	232	203	-	-	-
Marine Mammal Disturbance[1]	160 dB RMS re 1 µPa		200	6	-
Mortality/PMI Fish Eggs and Larvae[2]	207	210	2	-	-
Mortality/PMI in adult Fish (swim bladder)[2]	207	207	2	-	-
Mortality/PMI Sea Turtles[2]	207	210	2	-	-

- indicates the threshold for the species was not exceeded
1 NOAA 2018 thresholds
2 Popper et al. (2014) Mortality and potential mortal injury thresholdsthresholds for seismic souces, based on worst case (lower threshold) the threshold for Mid-Frequency Sonar is significantly higher at >210 dB rms

2.3 EAU Query No. 3

EAU Query

…provide details on the anticipated survey vessel that the appointed Fugro survey team will use to undertake the survey;

Europa Response

While not yet confirmed it is likely that the M.V. Fugro Venturer will be used for the survey activities. A specifications sheet for the M.V. Fugro Venturer is included in **Appendix A** of this report.

Once the survey vessel is appointed/ confirmed, details of the vessel will be made available to the PAD DCCAE.

2.4 EAU Query No. 4

EAU Query

…provide consistency between reports in regard to the equipment proposed and its output sound levels;

Europa Response

The response to EAU Query No. 2 in **Section 2.2** above presents updated information on equipment and output sound levels.

2.5 EAU Query No. 5

EAU Query

…The applicant has not addressed how the zone of impact surrounding the autonomous underwater vehicle (AUV) will be monitored during the operation of the AUV. The report states that the maximum radius of impact is in close proximity to the vessel, although it is 6m from the AUV, but no mitigation is currently proposed for potential effects within this area when the AUV is deployed and operational. Please provide additional information to address this;

Europa Response

Given the water depths at which the AUV will be operating (approximately 400 m – 500 m) it is not technically feasible to propose specific measures to monitor the area immediately surrounding the AUV during operations.

The risk of potential impact to marine mammals from AUV operations will be managed through the implementation of current best industry practice during the proposed survey including DAHG Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters (DAHG, 2014) and recommendations from PAD/ NPWS, regarding the separation distance between concurrent acoustic surveys. In summary; in accordance with DAHG (2014) guidance all sound-producing survey activity proposed for the Inishkea Survey including AUV operations shall not commence until all protective measures including pre-start visual monitoring measures and ramp-up procedures have been successfully completed. Of particular relevance to the management of potential impacts to marine mammals from AUV operations is the use of ramp-procedures of all equipment mounted on the AUV. The ramp-up procedures will be implemented to encourage mammals to leave the area of the sound sources before the sources reach full power, thereby effectively minimising the potential for individual marine mammals to be found in close proximity to the AUV during start-up operations and within the zones of impact. The visual monitoring described in DAHG (2014) guidance will be supplemented by passive acoustic monitoring (PAM). While PAM is not a primary mitigation measure, it will be used to detect actively vocalising marine mammals. Where marine mammals are detected using PAM during the pre-start monitoring period, equipment ramp-up procedures, and ensuing sound-producing survey activity shall not be undertaken.

2.6 EAU Query No. 6

EAU Query

…provide up to date information in regard to the survey operations proposed by schemes considered in combination with the Inishkea survey;

Europa Response

The list of schemes proposed for 2019 considered in combination with the Inishkea Survey operations is presented in Section 3.10 Table 3.8 and Section 4 Table 4.1 of the *EIA Screening and ERA Report*. The list of schemes considered was, in part, based on publicly available information of oil and gas surveys published on the DCCAE website at the time of submission of the Inishkea Survey application to the PAD (14 May 2018). Additional details of oil and gas surveys that informed the assessment of in-combination effects were provided to Europa either directly by operators as part of the communications regarding the coordination of vessel operations and survey activities or through the Irish Offshore Operators Association which provides a forum for the discussion and exchange of information with respect to operations planned by the oil and gas operators active in the Irish offshore. The assessment of potential in-combination impacts also considered the Western European Shelf Pelagic Acoustic Survey (WEPAS) proposed by the Marine Institute. Details of the Marine Institute survey were obtained during fisheries consultations.

Since the submission of the Inishkea Survey application, details of CNOOC's proposed survey activity at the Slyne/ Erris Basin have been published on the DCCAE website while an application previously submitted by ENI Ireland BV has been withdrawn and the Marine Institute acoustic fisheries survey has been completed. In addition, NEXEN/ CNOOC have completed exploratory drilling operations at the Iolar prospect in the Porcupine Basin while Exola DAC have been granted approval for seabed debris clearance, environmental baseline and habitat assessment site survey operations at the Barryroe field. More recently, PSE Kinsale Energy submitted an application for approval for the decommissioning of certain facilities of the Kinsale Head gas fields.

Table 2-6 below provides an summary of up to date information of schemes proposed for 2019/ 2020.

It should be noted that the only source of impact from the proposed survey that has the potential to result in significant effects is underwater noise generated by geophysical survey and positioning equipment. The receptors of concern are Article 12 and Annex II marine mammal species.The assessment of in-combination effects considers activities proposed by other planned operations that may act in-combination with underwater noise generated by the Inishkea Survey to result in likely significant effects. The potential effects associated with the above oil and gas operations are the same as those effects described above for the Inishkea Survey. To minimise and/ or eliminate potential effects of the Inishkea Survey on marine mammals the Inishkea Surevy will implement mitigation measues detailed in DAHG (2014). In summary, sound-producing survey activity shall not commence until protective measures (including monitoring measures and ramp-up procedures) have been successfully completed. In addition, Europa will maintain a 100 km separation distance from concurrent acoustic surveys thereby eliminating potential in-combination noise effects.

Table 2-6: Other offshore activities and potential for in-combination effect with the proposed Inishkea Survey

Operator	Location	Activity Description	Potential In-combination effects?	Approximate distance from proposed Inishkea Survey
Vermillion	Corrib Gasfield Slyne Basin	The Vermillion 2019 survey programme will involve: • Subsea inspection and maintenance and infrastructure renewal survey programme of the subsea facilities using ROV and vessel mounted equipment. • Repair programme to the Corrib Central Manifold P3 wellhead, which will require the opening of the wellhead protection cover. No use of acoustic survey equipment is planned during the repair programme at P3	**Yes** Noise generated by geophysical equipment proposed for the Vermillion survey may act in-combination with the Inishkea Survey to result in likely significant effect to marine mammal Qualifying Features. Geophysical equipment proposed include MBES, SBP, SSS, sound velocity probes. Europa are in communication with Vermillion to ensure operations are coordinated.	The proposed Inishkea Survey area is approximately 4 km north-west of the western-most end of the Corrib gas pipeline.
CNOOC	Slyne/ Erris Basin and surrounding continental shelf	CNOOC plan to conduct a 2D HR (2-Dimensional High Resolution) seismic data acquisition and, geophysical and environmental site survey. The name of the proposed CNOOC survey is the Edge Survey. The Edge site survey is located to the east of the proposed Inishkea Survey GWA in the Slyne/ Erris Basin area.	**Yes** The Edge Survey will comprise: • acquisition of 300 km of 2D HR seismic data; and, • geophysical site survey data over approximately 40 km^2 using: - single-beam echosounder (SBES), multi-beam echosounder (MBES) and sub-bottom profiler (SBP) equipment mounted on a survey vessel plus towed equipment such	The proposed Inishkea Survey area is approximately 1.1 km from the proposed Edge Survey area.

Operator	Location	Activity Description	Potential In-combination effects?	Approximate distance from proposed Inishkea Survey
			as second sub-bottom profiler (SBP), magnetometer and side scan sonar (SSS), or - remotely operated vehicle (ROV)/ autonomous underwater vehicle (AUV) with MBES, SBP, magnetometer and SSS plus towed equipment such as second SBP. • Europa are in communication with CNOOC to ensure operations are coordinated.	
Europa	Porcupine Basin	Planned site survey operations over the Kiely East and Edgeworth prospects over 350 km to the South of the Inishkea Survey GWA.	**Yes** The same survey vessel and geophysical equipment will be used for site surveys at Inishkea, Kiely East and Edgeworth. While Europa will not be undertaking concurrent survey operations at the Inishkea, Kiely East and Edgeworth, and despite the considerable distance between the survey areas, there is potential for in-combination effects to marine mammal species.	The Kiely East and Edgeworth prospects are located over approximately 350 km south of the proposed Inishkea Survey area.
Exola	North Celtic Sea	Exola plan to conduct a seabed debris clearance, environmental baseline and habitat assessment site survey over the area of the Barryroe field in the North Celtic Sea Basin	**Yes** The site survey will comprise a seabed and shallow geophysical survey and an environmental baseline and habitat assessment survey. There is potential that noise generated by geophysical equipment	The over Barryroe licence area is located over 400 km south-west of the proposed Inishkea Survey area.

Operator	Location	Activity Description	Potential In-combination effects?	Approximate distance from proposed Inishkea Survey
			may this equipment may act in-combination with the Inishkea Survey to result in likely significant effect to marine mammals.	
HAVFRUE	Slyne Basin and surrounding continental shelf	Construction of the HAVFRUE Telecommunications cable system by TE SubCom off the Mayo coast to the south of the proposed Inishkea Survey GWA. During 2019 TE SubCom plan to undertake cable laying operations.	**No** As there are no geophysical operations proposed, no likely significant effect to Natura 2000 sites arising from in combination effects are predicted. While no in combination effects are anticipated, Europa are in regular communication with TE SubCom to ensure operations are coordinated.	The proposed HAVFRUE cable will be located approximately 3.2 km south west of the Inishkea Survey area.
PSE Kinsale Energy and PSE Seven Heads Limited	North Celtic Sea	Decommissioning of Kinsale Head and Seven Head Facilities specifically the plugging and abandoning of development wells; the removal of two platform topsides structures; and the removal of a number of subsea facilities.	**Yes** The decommissioning activity will result in the generation of noise that may act in-combination with the to result in likely significant effect to marine mammals.	The Kinsale Head and Seven Head Facilities are located over 360 km south-east the proposed Inishkea Survey area.
PSE Kinsale Energy	North Celtic Sea	Decommissioning of certain facilities within the Kinsale Head Petroleum Lease area specifically removal of the Kinsale Alpha and Kinsale Bravo platform sub-structures (jackets) and all associated works.	**Yes** The decommissioning activity will result in the generation of noise that may act in-combination with the Inishkea Survey to result in likely significant effect to marine mammals.	The Kinsale Head Petroleum Lease area is located over 360 km south-east the proposed Inishkea Survey area.

2.7 EAU Query No. 7

EAU Query

…provide additional information on seabed sampling approach (including number of reference stations, anticipated number of seabed samples and amount of sediment to be removed that is being collected at each sample station (including reference stations) to acquire the analysis listed by the applicant;

Europa Response

Seabed samples will be retrieved at approximately 16No. stations as follows:

- 7No. seabed sampling stations located adjacent to the provisionally proposed well top hole to be sampled using a Van Veen grab/ Day grab;
- 1No. seabed sampling station located near the provisionally proposed well top-hole to be sampled using a gravity core;
- 7No. seabed sampling stations located adjacent to the provisionally proposed relief well to be sampled using a Van Veen grab/ Day grab; and
- 1No. seabed sampling station located near the provisionally proposed relief well to be sampled using a gravity core.

The location of the provisional grab sampling stations are shown in **Figure 2.3** relative to the approximate location of the well top-hole and relief well. Coordinates of the provisional grab sampling stations are presented in **Table 2-7**. In **Figure 2.3** grab sampling station at the well top-hole are labelled TH1 – TH7 and RW1 – RW7 at the relief well. Provisional gravity core sampling stations at the proposed well top-hole and relief well have yet to be identified. Approximate locations of the well top-hole and relief well are shown in **Figure 2.3**. Approximate core sampling stations, labelled TH8 and RW8 respectively, are also shown in **Figure 2.3**.

Prior to undertaking seabed sampling operations, the sampling stations will be visually inspected using AUV mounted cameras and/ or drop-down camera systems to ensure the areas to be sampled do not support protected sensitive habitats including Habitats Directive Annex I Habitats (e.g. Reef [1170] – geogenic and biogenic reef). Where the proposed sampling stations support sensitive habitats, alternative sampling stations with no protected sensitive habitats will be identified and sampled. The pre-sampling inspection of sampling stations will ensure that protected sensitive habitats are not impacted by deployed seabed samplers.

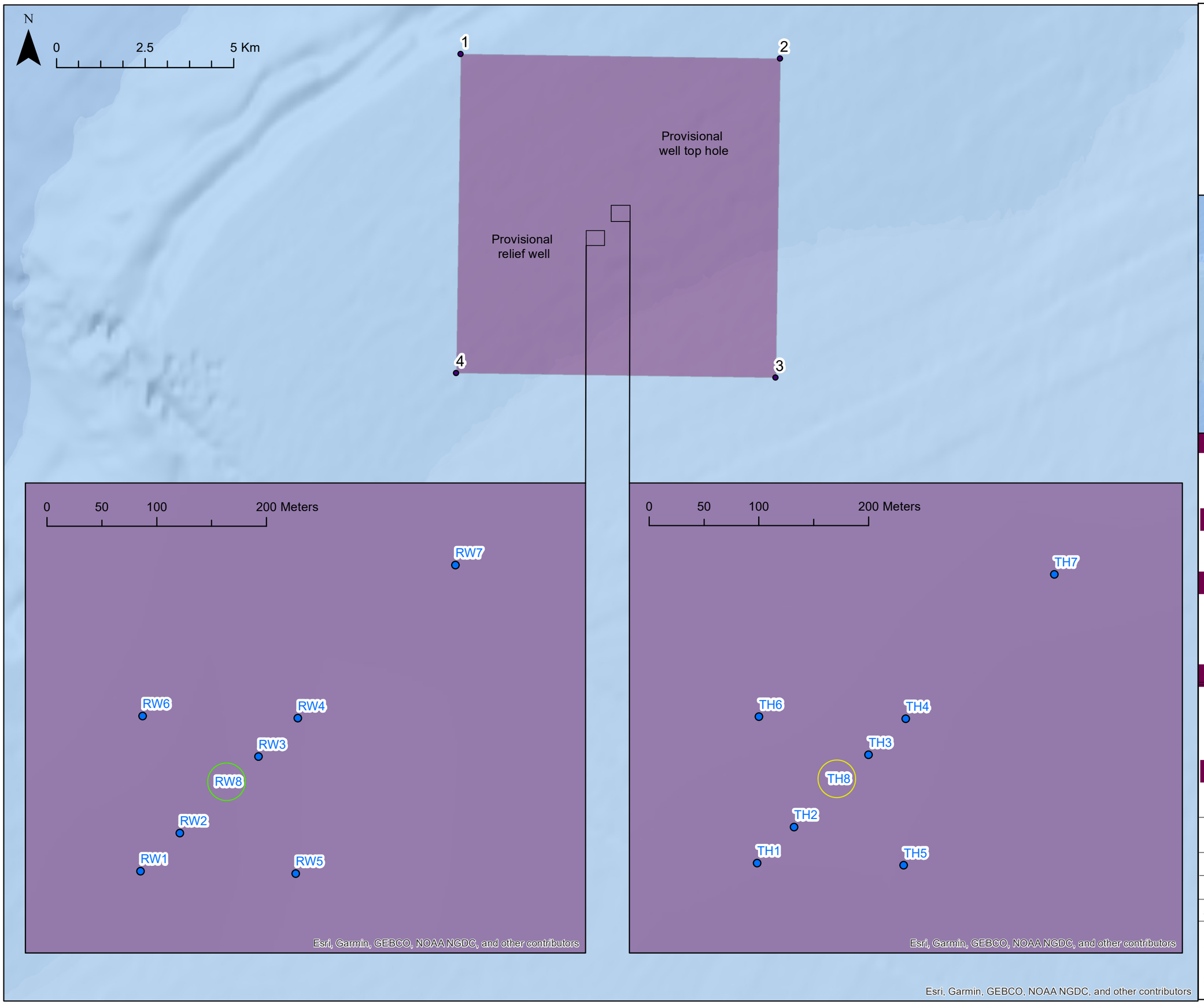
At each grab sampling station, sediments samples will be recovered using 0.25m^2 Van Veen or 0.25m^2 Day grab. The typical footprint of the grab samplers to be used is approximately 1 m^2. Three replicate grab sediment samples, each measuring a maximum of approximately 10 litres, will be recovered and retained to characterise the biological baseline environment. An additional single sediment grab will be recovered for physico-chemical analysis. From this grab triplicate sediment subsamples (each measuring approximately 0.5 litre) will be retained.

At the core sampling stations, cores will be obtained using 4 m long gravity corer. The footprint of the gravity corer is relatively small and limited to the part of the corer that will impact the seabed which is the core barrel that has a diameter of 110 mm. Sediment penetration depth of the gravity corer is approximately 2 – 4 m. Entire core samples recovered will be retained for physico-chemical analysis.

Given the small footprints of the core and grab samplers and the small volumes of sediment that will be removed and/ or retained, and the temporary nature of sampling activities, likely significant effects can be excluded.

The identified seabed sampling stations may be subject to change. Final grab and core sampling stations will be confirmed to the PAD DCCAE prior to survey

It should be noted that the final location of seabed grab and core sampling stations will be affected by the accuracy (tolerance levels) of positioning equipment used during the survey, while survey operators may be required to change the final location of the seabed sampling station due to operational constraints (e.g. presence of seabed obstructions, inclement weather, local water currents etc.).



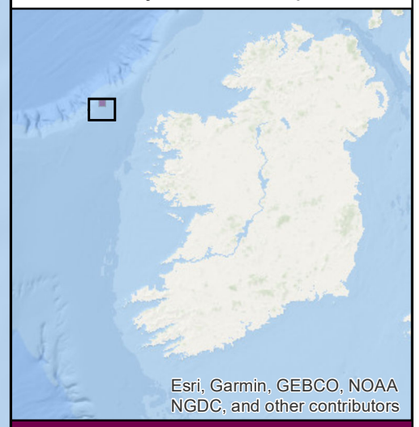
Inishkea Survey greater working area

Provisonal grab sampling stations

Approximate location of well top-hole

Approximate location of relief well

Survey area nodal points



Client

Europa Oil & Gas

Figure

2.3

Title

Provisonal seabed sampling sites relative to the proposed greater working area

RPS | Consulting UK & Ireland
Lyrr 2, IDA Business &
Technology Park, Mervue
Galway, H91 H9CK, Ireland
T +353 (0)91 400 200
E ireland@rpsgroup.com
W rpsgroup.com/ireland

Issue Details

File Identifier:
MGE0719Arc0002

Rev:
F01

Drawn: JF	**Date:** 21/08/2019
Checked: GMcE	**Scale:** 1:100,000 (A3)
Approved: GMcE	**Projection:** ITM

NOTE:

1. This drawing is the property of RPS Group Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. Ordnance Survey Ireland Licence EN 0005019 ©Copyright Government of Ireland.

Table 2-7: Coordinates of provisional sampling stations near the provisional well top-hole

ID	ED 50 Latitude	ED 50 Latitude	WGS 84 Longitude	WGS 84 Latitude
TH1	54° 25' 13.069" N	11° 12' 54.541" W	54° 25' 09.739"N	54° 23' 30.066"N
TH2	54° 25' 01.279" N	11° 13' 13.523" W	54° 24' 57.948"N	54° 23' 18.283"N
TH3	54° 25' 24.858" N	11° 12' 35.557" W	54° 25' 21.528"N	54° 23' 41.847"N
TH4	54° 24' 49.488" N	11° 13' 32.502" W	54° 24' 46.157"N	54° 23' 06.499"N
TH5	54° 25' 36.646" N	11° 12' 16.569" W	54° 25' 33.318"N	54° 23' 53.629"N
TH6	54° 24' 37.697" N	11° 13' 51.477" W	54° 24' 34.365"N	54° 22' 54.715"N
TH7	54° 25' 48.434" N	11° 11' 57.578" W	54° 25' 45.106"N	54° 24' 05.409"N
RW1	54° 24' 25.904" N	11° 14' 10.450" W	54° 24' 22.572"N	54° 22' 42.930"N
RW2	54° 26' 00.220" N	11° 11' 38.585" W	54° 25' 56.893"N	54° 24' 17.188"N
RW3	54° 24' 02.317" N	11° 14' 48.386" W	54° 23' 58.983"N	54° 22' 19.357"N
RW4	54° 23' 53.100" N	11° 14' 51.804" W	54° 23' 49.766"N	54° 25' 59.464"N
RW5	54° 23' 49.781" N	11° 14' 45.740" W	54° 23' 46.447"N	54° 25' 56.142"N
RW6	54° 23' 46.461" N	11° 14' 39.676" W	54° 23' 43.127"N	54° 25' 52.819"N
RW7	54° 23' 43.142" N	11° 14' 33.612" W	54° 23' 39.807"N	54° 25' 49.497"N

2.8 EAU Query No. 8

EAU Query

…reference is made to the fact that seabed carbonate mounds have been identified along the shelf edge to the north and south of the proposed survey area and that these mounds are generally linked to the development and growth of cold water corals. However, the potential impacts of seabed sampling on these habitats are screened out without providing details on the magnitude of effect and sensitivity of the receptor;

Europa Response

As outlined in response to **Query 7** (see **Section 2.7**), prior to undertaking seabed sampling operations, the sampling stations will be visually inspected using AUV mounted cameras and/ or drop-down camera systems to ensure the areas to be sampled do not support sensitive habitats including Habitats Directive Annex I Habitats (e.g. Reef [1170] – geogenic and biogenic reef). Where proposed sampling stations support sensitive habitats, no sampling will be undertaken. Alternative suitable sampling stations will be identified and sampled. The pre-sampling inspection of sampling stations will ensure that sensitive habitats are not impacted by deployed seabed samplers.

Seabed sampling within areas that support cold water reef coral has the potential to cause damage to reef through physical (mechanical) damage and removal of coral, and through smothering due to resuspension of sediments. A number of papers describe damage to biogenic reefs in the Irish offshore (e.g. Grehan et al., 2004, 2005; Söffker et al., 2011; Hall-Spencer et al., 2002), the primary sources being fishing (in particular bottom trawling), pollution and litter, and climate change (e.g. Grehan et al., 2004, 2005; Söffker et al., 2011; Hall-Spencer et al., 2002). While the potential damage to coral reef resulting from seabed sampling is insignificant in comparison to the damage associated with bottom fishing (both in terms of spatial extent and intensity) the impact mechanisms are the similar; fishing has the potential to cause damage:

- directly through physical (mechanical) damage and removal (e.g. Carey, 2016; Grehan et al., 2005; Hall-Spencer et al., 2002; Ragnarsson et al., 2017); and,
- indirectly through smothering due to increased sedimentation (e.g. Wilson et al., 2015; Ragnarsson et al., 2017).

Direct impacts from bottom trawling within the trawl tracks include dislodgment or crushing of reef forming organisms (Hall-Spencer et al., 2002) and removal of coral being as by-catch in commercial fisheries (Rogers et al., 2008). As cold-water coral has low recovery due to slow growth and high longevity (Althaus et al., 2009), fishing can result in significant adverse environmental impact and in extreme cases can destroy reef formations leaving tracts of seabed littered with crushed coral fragments and dead coral reef with no sign of regeneration (Buhl-Mortensen et al., 2013).

Like fishing activity using bottom contacting gear, there is potential that seabed sampling gear may crush reef forming organisms, however, as damage will be limited to the footprint of the samplers proposed, impacts will not be of similar scale of the damage associated with fishing which can be widespread. This disturbance from seabed sampling will be temporary and limited to the surface area (footprint) of the core and grab samplers. The footprint of the grab samplers to be used will be 1 m^2 while the footprint of the

gravity corer is limited to the part of the corer that will impact the seabed which is the core barrel that has a diameter of 110 mm.

Trawling can impact the seafloor *via* the resuspension of sediments (Puig et al., 2012, Martín et al., 2014). These impacts can be imparted over larger areas than those actually trawled due to advection of plumes of resuspended sediment to other area (Puig et al., 2012; Martín et al., 2014). Cold water corals, particularly black corals which exhibit preference for low sediment cover (Wagner, 2012), might be severely impacted by excessive levels of suspended material.

While there is potential that seabed sampling gear may result in resuspension of sediment any resulting sediment plumes will be highly localised and small; consequently, significant damage to coral reefs are unlikely to occur.

2.9 EAU Query No. 9

EAU Query

…indicate what methods will be used when a start-up is anticipated during hours of darkness.

Europa Response

No start-up will occur during hours of darkness.

As outlined in the following *Sound-producing survey activities will only be commenced in daylight hours where effective visual monitoring, as determined by the MMO, can be achieved*;

- Appendix A Mitigation Measures - *Survey Technical Specifications Report*; and
- Section 3.11.1 DAHG 2014 Guidance - *EIA Screening and ERA Report*.

2.10 EAU Query No. 10

EAU Query

…commit to deal with risks associated with climate change in subsequent stages of the project, i.e. as part of individual licensing procedures;

Europa Response

The Inishkea application is for a site survey only. Atmospheric emissions will be limited to exhaust gases from the vessel's engines. As the operational duration is short (14 days) the volume of atmospheric emissions for the site survey will be low, with no significant climate change effects.

After the site survey, future activity might include drilling an exploration well, subject to grant of the necessary consents. If exploration results in a geological success, again subject to the necessary consents an appraisal drilling phase may be undertaken and were this to also be successful it is possible that, again subject to the necessary consents, a gas field development might arise in the future. Europa commits to assess the operational emissions risks associated with climate change in subsequent stages of the project, as part of the consent application for each stage.

2.11 EAU Query No. 11

EAU Query

…the cumulative impact assessment assumes that other seismic surveys known to be proposed (for the HAVFRUE subsea cable system off the Mayo coast) will be separated by at least 100 km should the surveys occur simultaneously, preventing any cumulative effects. Confirmation is required regarding how this will be applied in practice.

Europa Response

As outlined in Section 3.10 of the *EIA Screening and ERA Report* no seismic geophysical operations are proposed for the HAVFRUE telecommunications cable system in 2019/ 2020. This has been confirmed to Europa in consultations with the operators of the HAVFRUE project, TE SubCom. It is further indicated in the *EIA Screening and ERA Report* that while no in combination noise effects with the HAVFRUE are anticipated, Europa are in regular communication with TE SubCom to ensure operations are coordinated. Operations will be coordinated to ensure that the Inishkea Survey vessel and those appointed by TE SubCom are not operating in close proximity at the same time, thereby eliminating the potential for adverse interactions.

Europa are in regular communication with operators proposing to undertake operations offshore Ireland in 2019. These communications between operators and Europa are undertaken *via* phone and email. The Irish Offshore Operators Association (of which Europa is an active member) provides a forum for the discussion and exchange of information with respect to operations planned by oil and gas operators active in the Irish offshore. Information regarding planned activities will be passed by Europa directly to the vessels appointed to undertake the survey operations. With the exception of operations proposed by Vermillion at the Corrib Gasfield and CNOOC at the Slyne/ Erris Basin all currently proposed oil and gas survey operations planned for 2019/ 2020 are located over 350 km from the Inishkea Survey (see **Table 2-6** for details). In the case of proposed operations located less than 100 from the Inishkea Survey, Europa will discuss operation plans with the other operator and mutually agree operating periods to ensure noise producing operations are not undertaken concurrently thereby avoiding potential in-combination noise effects.

3 REFERENCES

Althaus, F., Williams, A., Schlacher, T., Kloser, R., Green, M., Barker, B., Bax, N., Brodie, P. & Schlacher-Hoenlinger, M. (2009). Impacts of bottom trawling on deep-coral ecosystems of seamounts are long lasting. Marine Ecology Progress Series, 397, 279–294.

Buhl-Mortensen, L., Aglen, A., Breen, M., Buhl-Mortensen, P., Ervik, A., Husa, V., Løkkeborg, S., Røttingen, I., Stockhausen, H.H. (2013). Impacts of fisheries and aquaculture on sediments and benthic fauna: suggestions for new management approaches. Norway: Institute of Marine Research. 2:69p.

Carey, F. (2016). Monitoring cold-water coral reefs, with special reference to anthropogenic impacts, on Giant Mounds, Porcupine Bank, west coast of Ireland [BSc: National University of Ireland, Galway 51 pp].

Grehan, A. J., Unnithan, V., Roy, K. O. & Opderbecke, J. (2005). Fishing impacts on Irish deepwater coral reefs: Making a case for coral conservation, in Proceedings Benthic habitats and the effects of fishing. American Fisheries Society Symposium 41, Tampa, 2005, Bethesda, Maryland, p. 819-832.

Grehan, A., Unnithan, V., Wheeler, A., Monteys, X., Beck, T., Wilson, M., Guinan, J., Foubert, A. & Klages, M., J. T., (2004). Evidence of major fisheries impact on cold-water corals in the deep waters off the Porcupine Bank, west coast of Ireland: are interim management measures required? ICES (International Council for the Exploration of the Sea) Annual Science Meeting, Vigo p. 1-9.

Hall-Spencer, J., Allain, V. & Fossa, J. H. (2002). Trawling damage to Northeast Atlantic ancient coral reefs: Proceedings of the Royal Society B-Biological Sciences, 269, 507-511.

Martín, J., Puig, P., Palanques, A. & Ribó, M. (2014). Trawling-induced daily sediment re-suspension in the flank of a Mediterranean submarine canyon. Deep Sea Research Part II, 104, 174–183.

Puig, P., Canals, M., Company, J. B., Martín, J., Amblas, D., Lastras, G., Palanques, A. & Calafat, A. M. (2016). Ploughing the deep sea floor. Nature, 489, 286-289

Ragnarsson, S., Burgos, J., Kutti, Tina., van den Beld, I., Egilsdottir, H., Arnaud-Haond, S., Grehan, A., (2017). The Impact of Anthropogenic Activity on Cold-Water Corals. In book: Marine Animal Forests, pp.1-35

Rogers, A. D., Clark, M. R., Hall-Spencer, J. M. & Gjerde, K. M. (2008). The Science behind the Guidelines: A Scientific Guide to the FAO Draft International Guidelines (December 2007) For the Management of Deep-Sea Fisheries in the High Seas and Examples of How the Guidelines May Be Practically Implemented. IUCN, Switzerland, 2008

Söffker, M., Sloman, K. A. & Hall-Spencer, J. M. (2011). In situ observations of fish associated with coral reefs off Ireland. Deep-Sea Research I, 58, 818–825.

Wagner, D., Luck, D. G. & Toonen, R. J. (2012). The biology and ecology of black corals (Cnidaria: Anthozoa: Hexacorallia: Antipatharia). Advances in Marine Biology, 67–132.

Wilson, A. M., Raine, R., Mohn, C. & White, M. (2015). Nepheloid layer distribution in the Whittard Canyon, NE Atlantic Margin. Marine Geology, 367, 130–142.

Appendix A

Vessel Specification

FUGRO
M.V. FUGRO VENTURER

New generation geophysical & hydrographic survey vessel designed for performance, safety and efficiency. Fugro Venturer, is the newest evolution of Fugro's Standard Survey Vessels (FSSV series) built specifically to meet multi-role geophysical survey standards.

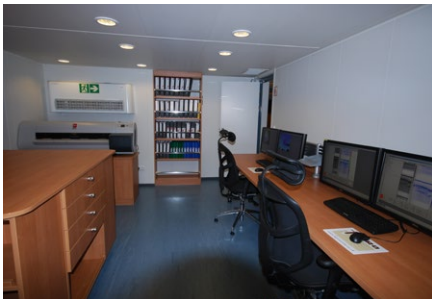
The suite of survey equipment includes analogue sensors comprising of hull mounted single and multibeam echo sounders, state of the art sub bottom profilers, a hull mounted Edgetech CHIRP profiler and 2 x 12 cubic inch mini air gun array and an Edgetech dual frequency 4200 FS digital sidescan sonar.

In complement to this, the vessel is also mobilised with a Hydroscience SeaMUX digital system, comprised of a 1200m HTI solid digital streamer and seismic source of 152 cubic inches, although larger sources and streamers may be mobilized subject to client requirements. Precise subsea positioning of survey equipment is achieved via a hull-mounted HiPAP 502 USBL system. Dual Rx / Dual Swath EM2040 and a Deep Water EM302 MBES system is fitted to an acoustically efficient gondola. A 20t traction winch is fitted below decks that offers sampling in up to 3500m water depth.

The design of the vessel permits simultaneous analogue/digital survey operations and the capability to also conduct AUV, ROV, Environmental and Shallow Geotechnical surveys.

The vessel houses a permanent AUV deployment Hangar and is capable of hosting a multitude of ROV platforms.

Fugro Venturer on launch day.



M.V. Fugro Venturer interior.

M.V FUGRO VENTURER

Technical Specifications

General

Name	M.V. Fugro Venturer
Classification	GL+100 A5 E1 BWM(D2) Special Purpose Ship, Research Vessel, GL+MC E1 AUT DP 1 EP-D
Owner	Fugro
Built	Q2 2016
Port / Flag	Panama
MMSI No.	311 000 463
Call Sign	C6CG3
IMO No.	9769051

Dimensions

LOA	71.5m
Beam	15.4m
Draught	5.6m
Tonnage	GT 2455

Accommodation

Cabins	34 single en-suite, 4 double ensuite
Hospital	1 single berth
Offices	2 clients office
Recreation	2 x lounge / video, 1 x gym, 1 x cinema

Machnery

Bow Thruster	1 x 600 kW (electric)
Cruising Speed	10 knots
Maximum Speed	12 knots

Electrical Power

Auxiliary Generators	N/A
Generators	2 x 1175 KVA, 2 x 972 KVA CAT Leroy Somer

Capacities

Fuel Capacity	464 m³ (35 operational days at sea)
Fuel Consumption	211 g/KWh at 100% load (pending sea trial measurements)
Water Capacity	185 m³
Water Making	10 m³/day
Provisions	90 days

Control and Navigation

Autopilot	Schottel Co-pilot Simrad AP80
DP System	Kongsberg KPOS and cJoy
2 x Radars	Sperry S-Band & Sperry X-Band
2 x Electronic Chart	TransasNS4000
2 x DGPS	Saab R5
1 x Gyro	Sperry Navigat X MK1

Deck Machinery

Deck Crane	2 x SWL 5.0 t /12 m crane
Hydraulic A Frame	1 x SWL 20t, 1 x SWL 7.5t, 1 x SWL 3t
Launch Boom	1 x SWL 2.5t and 1 x SWL 1t traversing
Deepwater Sampling lift/log winch (PCPT)	3,500m 20t lift and 1,400m

Communications

MF / HF (2x)	Sailor 6000 series
Inmarsat C (2x)	Sailor 6110 mini
VHF (4x)	Sailor 6222
UHF(4x)	Motorola DM2600
V-SAT	1 x KU band Seatel 6012
CCTV	Hernis

Safety

Rescue / MOB Boat	6.1m 6 pers rescue boat
Lift Rafts (200%)	4 x 25 person
Survival Suits (100%)	42 pcs
Lift Jackets (200%)	100 pcs
Work Vest	12 pcs
Fire Detection	Funa MD9800

Survey Equipment

Survey Equipment specified in MGE0719RP0013 and MGE0719RP0014