	**Enoch Field**	GENESIS

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Bridge Petroleum 3 Limited

Enoch Field

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BRIDGE PETROLEUM

REPORT

Enoch Subsea Comparative Assessment Report

Prepared for: **Bridge Petroleum**

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Project Title: **Enoch Decommissioning Project**
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ABBREVIATIONS

"	Inch
<	Less than
>	Greater than
≥	Greater than or equal to
ALARP	As Low as Reasonably Practicable
C&P	Contracting and Procurement
CA	Comparative Assessment
CNS	Central North Sea
CoP	Cessation of Production
DESNZ	Department for Energy Security and Net Zero
DoB	Depth of Burial
DoC	Depth of Cover
DoL	Depth of Lowering
DP	Decommissioning Programme
EA	Environmental Appraisal
E/H/CI	Electrical, Hydraulic and Chemical Injection
ENVID	Environmental Impact Identification
FPS	Forties Pipeline System
HIRA	Hazard Identification
HSE	Health Safety and Environment
km	Kilometre
m	Metre
m^2	Square metre
N/A	Not Applicable
NCS	Norwegian Continental Shelf
NSD	Not Significantly Different

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OEUK	Offshore Energies UK
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo-Paris Convention
PL	Pipeline
PLU	Umbilical
PMF	Priority Marine Features
R/A/G	Red / Amber / Green
SSIV	Subsea Isolation Valve
SUTU	Subsea Umbilical Termination Unit
te	Metric tonne
ToP	Top of Pipe
TUTU	Topsides Umbilical Termination Unit
WHPS	Wellhead Protection Structure
UKCS	United Kingdom Continental Shelf

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EXECUTIVE SUMMARY

Bridge Petroleum 3 Limited are developing plans to decommission the Enoch field in the United Kingdom Continental Shelf (UKCS) Central North Sea (CNS). Enoch is tied back to Brae Alpha approximately 15 km distant. The field partially extends into the Norwegian Continental Shelf (NCS) although the facilities are located entirely within the UKCS. First production was achieved in 2007. Cessation of Production (CoP) is being planned for Q3 2026.

Enoch is a single well development, the tie-back is approximately 15.8 km in length. There are three lines laid between the Enoch well and the Brae Alpha platform:

- 8” Rigid Oil Production Flowline (PL2336);
- 3” Rigid Gas Lift Flowline (PL2337) (piggy-backed onto the 8” line);
- Combined Control, Power, Signal Hydraulic and Chemical Injection Umbilical (PLU2338)

To support the Decommissioning Programme (DP) submission for the Enoch facilities, the preferred method of decommissioning the pipelines and umbilical must be determined.

In accordance with the Department for Energy Security and Net Zero (DESNZ) decommissioning guidelines (Ref 1) and the Offshore Energy UK (OEUK) CA guidelines (Ref 2), a Comparative Assessment (CA) has been carried out to compare possible decommissioning options for the pipelines and umbilical to determine the preferred decommissioning approach for these lines.

In line with the OEUK CA guidelines (Ref 2) the CA followed a six step process; Scoping, Screening, Prepare, Establish, Evaluate and Report. Following these six steps ensured a consistent approach to the undertaking of the CA and therefore in identifying the optimal approach to decommissioning the relevant infrastructure.

The CA was based upon an assessment against five main criteria; Technical, Safety, Environment, Societal and Economic. Within each main criteria, between two and four sub-criteria were considered. The sub-criteria considered in this project are listed in Table 0-1.

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Table 0-1: CA Main and Sub Criteria.

Main Criteria	Sub-Criteria
Technical	Risk of major project failure
	Technical complexity & track record
Safety	Risk during project execution to project personnel
	Risk during project execution to those on land
	Risk during project execution to other users of the sea
	Residual (Long-Term) risk to other users of the sea
Environment	Impact of decommissioning operations offshore
	Seabed disturbance – short term
	Change of habitat – long term
	Waste processing
Societal	Impact on commercial fisheries
	Socio-economic impact on communities and amenities
Economic	Cost of decommissioning / removal activities
	Cost of long-term monitoring / remedial activities

To facilitate the CA process the decommissioning guidance allows for pipelines and umbilicals with similar features to be grouped together to assist with the CA process. Based on the type of lines (e.g. flexible or rigid), and status (e.g. trenched and buried to depths ≥ 0.6 m, or trenched and buried to depths < 0.6 m or surface laid) the Enoch flowlines and umbilical were split into two groups: Group A and Group B as shown in Table 0-2.

Table 0-2: Summary of Groupings Considered in the CA.

Group	Description
Group A	Rigid Flowlines (Trenched and buried with partial rock cover) (Depth of Cover (DoC) ≥ 0.6 m)
Group B	Umbilical (Trenched and buried with partial rock cover) (DoC < 0.6 m)

The UK decommissioning guidance suggests that a screening exercise is conducted in advance of the CA to screen out infeasible options before the CA is undertaken. All recognised subsea decommissioning options were assessed for both Groups, and those options were screened prior to the CA to ensure the most appropriate options were carried forwards.

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In support of the CA, a desktop Hazard Identification and Risk Assessment (HIRA) and a desktop Environmental Impact Identification (ENVID) were carried out to assess the safety, environmental and societal factors of each of the options in the CA.

The CA was conducted on the 14th August 2025 and was attended by technical, safety and environmental representatives from Bridge Petroleum and Genesis Energies. A summary presentation was provided detailing the characteristics of each subsea hardware grouping and a summary of decommissioning options.

During the CA, all participants had the opportunity to provide their input whilst the CA chair and scribe populated the CA worksheets with the agreed narrative. Each decommissioning option was then assessed against each of the sub-criteria rated using a Red / Amber / Green (R/A/G) scale in accordance with the OEUK CA guidelines; using Green to signify a most preferred scenario / lower impact, Amber to signify a moderately preferred scenario / moderate impact and Red to signify a least preferred scenario / higher impact. Only when all decommissioning options for the group were assessed were the number of Green / Amber / Red ratings reviewed to determine the preferred decommissioning option for that grouping.

The CA results highlighting the preferred option are provided in Table 0-3.

Table 0-3: CA Results.

Description	Status	Results of the CA
PL2336 8" Rigid Oil Production Flowline	**Group A** Trenched and buried with a (Depth of Cover) DoC ≥ 0.6 m	**Preferred option:** **2C** - Remediate *in-situ* with Exposed Sections Cut and Removed **Acceptable options:** **2A** - Remediate *in-situ* with Exposed Sections Rock Covered **2B** - Remediate *in-situ* with Exposed Sections Trenched and Buried
PL2337 3" Rigid Gas Lift Flowline (piggy-backed onto the 8" line)		
PLU2338 Combined Control, Power, Signal Hydraulic and Chemical Injection Umbilical	**Group B** Trenched and buried with a DoC of < 0.6m	**Preferred option:** **2C** - Remediate *in-situ* with Exposed Sections Cut and Removed[1]

[1]Note: The sections (~1.25 km) to be remediated in-situ are under existing rock cover. The remaining 14.125 km length of the umbilical will be fully removed.

The UK regulator advises that economic criteria should not be a main/only driver for selecting a decommissioning option. Therefore, a sensitivity test was carried out whereby the economic criteria were removed. Removing the economic criteria did not change the results.

Where the Contracting and Procurement (C&P) select a decommissioning option that was not the most preferred option, Bridge Petroleum will discuss this with the regulator before finalising execution plans recognising asset availability and market environment at the time of decommissioning.

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1.0 INTRODUCTION

1.1 Background

Genesis Energies ("Genesis" henceforth) have been awarded the contract to provide decommissioning support for the Enoch Field to draft a subsea Decommissioning Programme (DP) for submission to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) for approval.

Under the Department for Energy Security and Net Zero (DESNZ) guidance (Ref 1) a Comparative Assessment (CA) is required to identify the optimal approach for decommissioning the pipelines and umbilical associated with the Enoch field.

The CA for the pipelines & umbilical followed the approach set out in the 2015 Offshore Energies UK (OEUK) guidelines (Ref 2) This report, details the preparation for the CA, the CA process and the results and is submitted in support of the DP submission.

1.2 Overview of Field

The Enoch Field, first discovered in 1985, is located in United Kingdom Continental Shelf (UKCS) block 16/13a (Central North Sea), approximately 15 kilometres (km) East of the Brae Complex. The field partially extends into the Norwegian Continental Shelf (NCS); however the facilities are located entirely within the UKCS and decommissioning will be subject to UK requirements. First production was achieved in 2007. Cessation of Production (CoP) is now being planned for Q3 2026.

The field is approximately 300 km Northeast of Aberdeen and is in water depths of approximately 120 meters (m).

Enoch is a single well development (well 16/13a-7), tied back to the Brae Alpha platform. See Figure 1-1. The tie-back is approximately 15.8 km in length. There are three lines laid between the Enoch well and the Brae Alpha platform:

- 8" Rigid Oil Production Flowline (PL2336).
- 3" Rigid Gas Lift Flowline (PL2337) (piggy-backed onto the 8" line).
- Combined Control, Power, Signal Hydraulic and Chemical Injection Umbilical (PLU2338, E/H/CI Umbilical).

The infield production and gaslift lines are tied back to Brae Alpha via flexible risers inboard of the Enoch SSIV and oil production is exported from Brae via the Forties Pipeline System (FPS).

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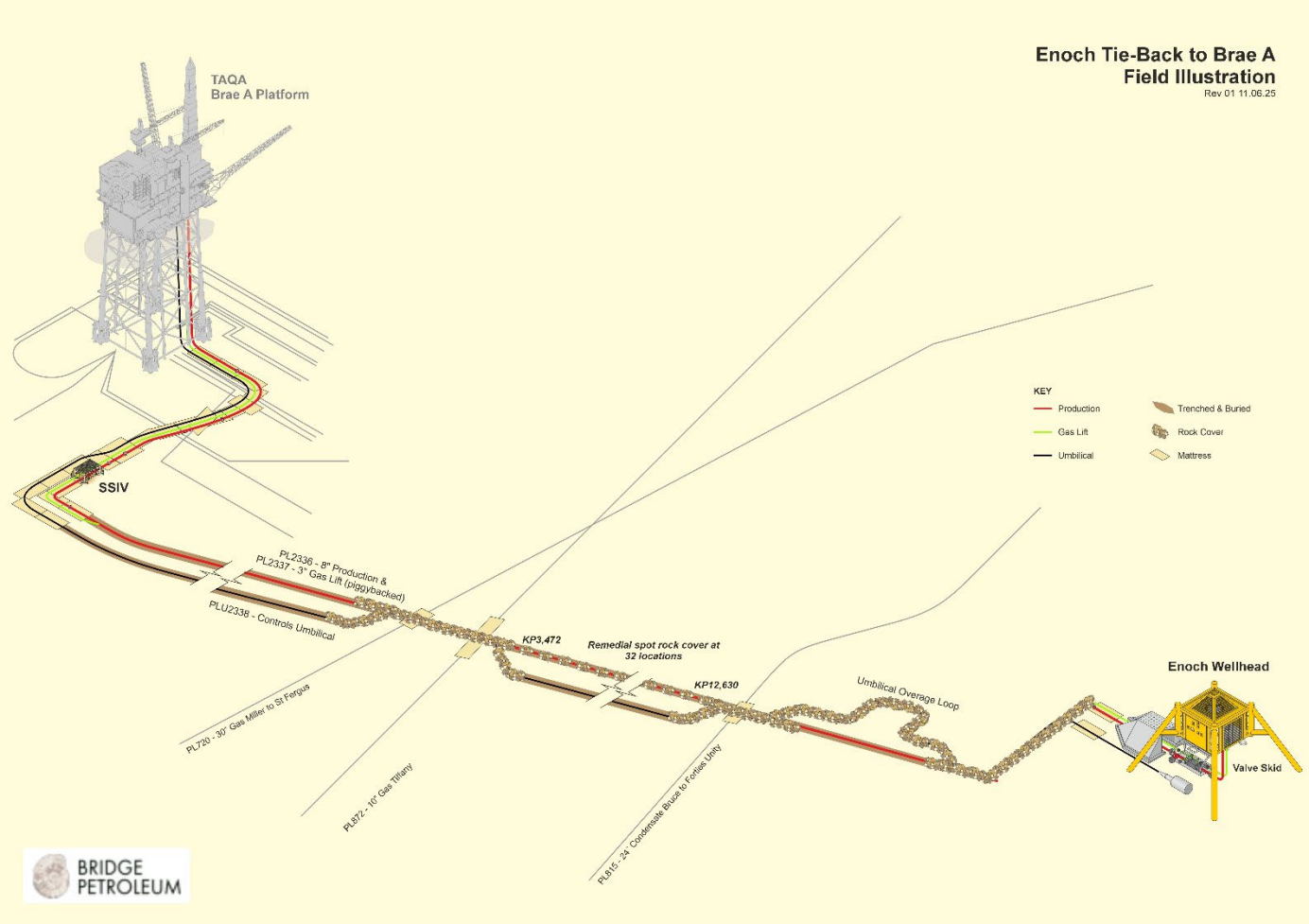


Figure 1-1: Enoch Subsea Layout

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1.3 Purpose

This document is intended to provide a record of the CA process carried out for the pipelines and umbilical associated with the Enoch field tied back to the Brae Alpha platform.

1.4 Environmental and Societal Overview

The Environmental Appraisal (EA) to be submitted in support of the DP submission will provide details of the environmental and societal receptors in the area. In summary the field is located outwith any protected areas. However, there are indications of mature and juvenile *Arctica islandica* within the Enoch area (an OSPAR species classified as a threatened and / or declining species and a Scottish Priority Marine Species (PMF)). Habitat similar to 'Sea pen and burrowing megafauna communities' is also associated with the area. This habitat is classified by OSPAR as a threatened and/or declining habitat. A number of marine mammals, fish, and seabirds also occur in the area.

Fishing effort in the area is considered to be low.

More details on the environmental and social receptors associated with the area are provided in the EA (Ref 3).

1.5 Pipeline Burial Depth Definitions

Different definitions will be used for different burial depths. The following diagram (Figure 1-2) illustrates the different burial depth definitions.

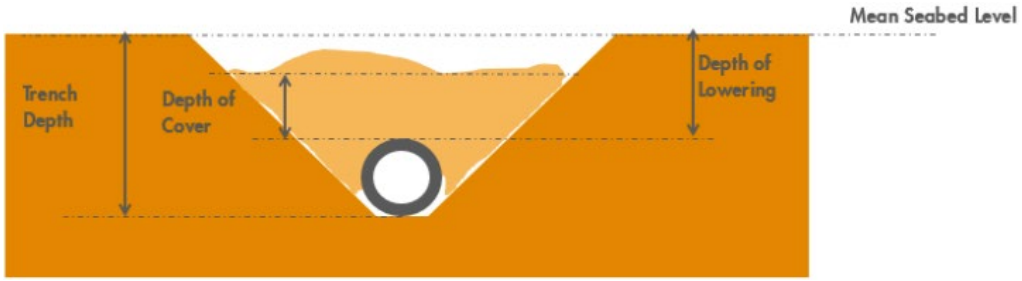


Figure 1-2: Pipeline Burial Depth Definitions

As per DESNZ Guidance (Ref 1), a pipeline is deemed adequately trenched and buried (and therefore a candidate for *in-situ* decommissioning) when the top of the pipeline is to a minimum depth of 0.6m (Depth of Lowering (DoL) and Depth of Coverage (DoC)).

However, in situations where lines are adequately trenched (DoL), but not buried to 0.6 m or greater (DoC) then more information will be required on potential snagging risks to support the decision making.

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2.0 OVERVIEW OF THE CA PROCESS

The CA process described in the OEUK CA Guidelines (Ref 2) is summarised in Figure 2-1. This process was followed for the Enoch CA and this report is structured to follow the process described.

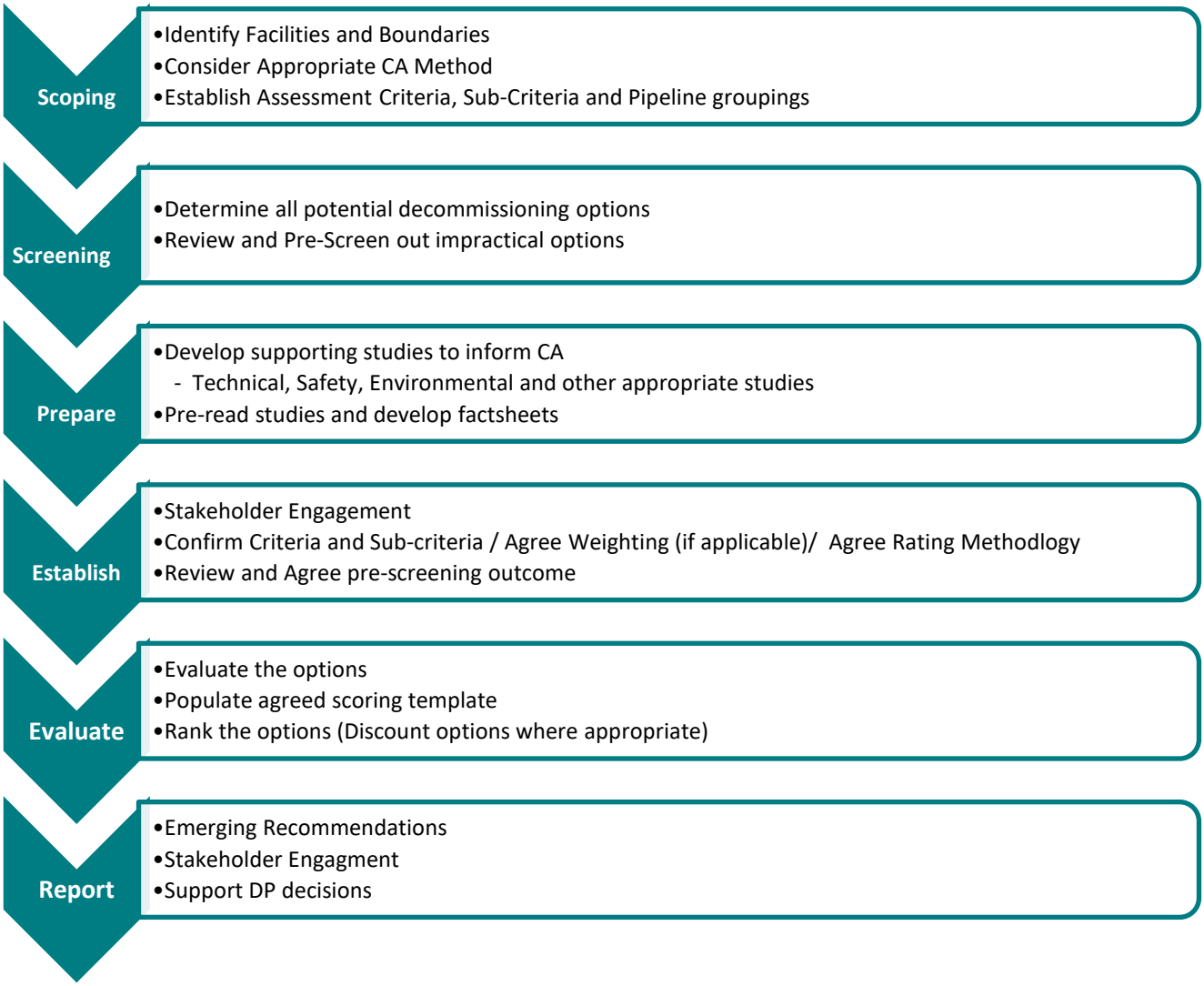


Figure 2-1: CA Process Flowchart.

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3.0 SCOPING

This section summarises:

- The elements included within the CA and the boundaries (Section 3.1);
- Those elements not considered in the CA (Section 3.2);
- The Evaluation Method applied in the CA (Section 3.3);
- The assessment criteria and sub-criteria considered in the CA (Section 3.4); and
- The groupings considered in the CA (Section 3.5)

3.1 Inclusions and Boundaries

This CA covers the subsea rigid pipeline, rigid piggy-backed pipeline and the combined control, power, signal hydraulic and chemical injection umbilical associated with the Enoch Well, tied back to the Brae Alpha platform.

Details of each of the lines considered in the CA are presented in Table 3-1.

Table 3-1: Boundaries of CA

Pipeline	Description	From	To
PL2336	8” Rigid Oil Production Flowline	End of rock cover at Enoch well	Pipeline end flange at SSIV structure
PL2337	3” Rigid Gas Lift Flowline (piggy-backed onto the 8” line)	End of rock cover at Enoch well	Pipeline end flange at SSIV structure
PLU2338	Combined Control, Power, Signal Hydraulic and Chemical Injection Umbilcal	End of rock cover approaching SSIV Break-Out (Umbilical terminates at Topsides Umbilical Termination Unit (TUTU), but this section not included in scope of CA)	End of rock cover at Enoch well (Umbilical continues to Subsea Umbilical Termination Unit (SUTU), but this section not included in scope of CA)

3.2 Exclusions

In line with DESNZ decommissioning guidelines (Ref 1) the following items will be recovered as part of the decommissioning project and therefore are not subject to a CA:

- All subsea installations, including Tree, Wellhead, Wellhead Protection Structure (WHPS), SSIV, Tree Valve Skid, pipe tunnel and stabilisation / protection mattresses;
- 8” flexible riser and jumper at Brae Alpha to Subsea Isolation Valve (SSIV);
- 8” production tie-in spool at SSIV;
- 8” production tie-in spools at Enoch Well;
- 3” flexible riser and jumper at Brae Alpha to SSIV;

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- 3" production tie-in spool at SSIV;
- 3" production tie-in spools at Enoch Well;
- Dynamic / Static Umbilical, section from Brae Alpha Platform to SSIV Break-Out;
- Flowline spools.

3.3 Evaluation Method

For the CA, Evaluation Method A, as defined in the OEUK Guidelines (Ref 2), was selected. This involves the use of the RED / AMBER / GREEN (R/A/G) evaluation method which is a common approach for pipeline CAs.

Under this Evaluation Method, colour coding, rather than numerical scoring, represents the relative preference of the options with respect to the criteria to be considered Table 3-2).

Table 3-2: Evaluation Method A – Comparative Impact.

Performance	Comparative Impact	
Most Preferred	(**Green**)	Lower Impact
	(**Amber**)	Moderate Impact
Least Preferred	(**Red**)	Higher Impact
No Preference	No significant impact across options[1]	
Regulatory Guidance (Ref 1) identifies that "*The preferred option should be selected by focusing on the matters where the impacts of the options are significantly different*". Therefore, where there is no significant difference between the options the sub-criterion across the options should be colour coded grey.		

3.4 Assessment Criteria and Sub-Criteria

Assessment criteria provide a framework for comparing options. The main criteria considered in the CA were as per OEUK CA guidelines (Ref 2). For ease of analysis and recognising the main criteria cover a wide spectrum of specific issues, the main criteria were divided into sub-criteria. Table 3-3 identifies the main criteria and sub-criteria considered in the CA. It should be noted that the sub-criteria considered are largely aligned to the examples of sub-criteria provided in the OEUK CA guidelines.

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Table 3-3: Main Criteria and Sub-Criteria Adopted in the CA Evaluation.

Main Criteria		Sub-Criteria
Technical		Risk of major project failure
		Technical complexity & track record
Safety	Risk during Project Execution Phase	To project personnel
		To those on land
		To other users of the sea
	From end points	Residual risk to other users of the sea
Environment		Impact of decommissioning operations offshore (includes emissions to air, discharges to sea, underwater noise and fuel use)
		Seabed disturbances – short term
		Change of habitat – long term
		Waste processing (i.e. processing of returned materials, use of landfill, consideration of emissions associated with such processes, and the impact of transport of material)
Societal		Impact on commercial fisheries
		Socio-economic impact on communities and amenities
Economic		Cost of decommissioning / removal activities
		Cost for long term monitoring / potential future remediation activities

3.5 Subsea Hardware Groupings

The DESNZ decommissioning guidelines (Ref 1) and OEUK CA guidelines (Ref 2) both acknowledge that, where there are several flowlines and umbilicals in the field that are being decommissioned at the same time it may be appropriate to group flowlines and umbilicals with similar features together and to carry out a combined CA.

As part of the Options Development and Screening Report (Ref 4) proposals were made and agreed on for the flowlines and umbilical groupings described as shown in Table 3-4.

Burial depth is an important factor in the grouping of subsea infrastructure. DESNZ Decommissioning Guidance (Ref 1) defines an acceptable burial depth as ≥0.6 m, thus exposed sections of pipeline are defined by one of the following criteria:

- No Depth of Cover (DoC) along the exposed section, or
- Where Depth of Burial (DoB), is ≤0.6 m to Top of Pipe (ToP) along the exposed section.

The two main groups identified for Enoch are summarised as follows:

- Group A: Rigid Flowlines (Trenched and buried with partial rock cover)
- Group B: Umbilical (Trenched and buried with partial rock cover)

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Table 3-4: Pipeline and Umbilical Grouping and Features

GROUP ID	COMPONENT TYPE / AS-LAID CONDITION	APPLICABLE PIPELINES	LENGTH (m)	WEIGHT (Te)	BURIAL STATUS[2, 4]	EXPOSED LENGTH (m)[3]
A	Rigid Flowlines (Trenched and buried with partial rock cover)	PL2336, 8" Oil Production Flowline	15,244[1]	1,290	Trenched and buried with partial rock cover along entire length Average depth of burial is 0.99m	30m Brae end and 6m well end (under shared single mattress)
		PL2337, 3" Gas Lift Flowline (piggy-backed onto the 8" line)	15,240[1]	191	Trenched and buried with partial rock cover along entire length Average depth of burial is 0.99m	30m Brae end and 6m well end (under shared single mattress)
B	Umbilical (Trenched and buried with partial rock cover	PLU2338, Electric, Hydraulic, Chemical Injection umbilical	15,375	501	Trenched and buried with partial rock cover along entire length Average depth of burial is 0.3m	Due to DoC, the majority of the line (circa 14.125 km) is considered exposed

[1] The lengths listed for the piggyback pipelines within this Table in Group A cover only the lengths being CA'd, excluding spools, risers etc.

[2] The average DoB of the piggyback pipelines is 0.99m over the entire length. Between KP0.252 – KP2.882, the average DoB is 0.55m, which is rock covered.

[3] The lines are rock covered at the well approach, where the rock cover extends to cover the trench transitions. The umbilical is also rock covered at the overage loop, where the rock cover extends to cover the trench transitions. The only untrenched sections of flowline and umbilical are at the Brae Alpha platform SSIV approach, where the short, circa 30m, flowline sections running between the trench transition and the SSIV spools are on the seabed and are mattress protected. The umbilical section running between the trench transition and the SSIV break-out can be cut at the trench transition. The flowline section running between the trench transition and the SSIV tie-in spools can also be cut at the trench transition [Ref 4].

[4] Refer to Appendix D for depth of burial survey data.

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4.0 SCREENING

The DESNZ decommissioning guidelines (Ref 1) and the OEUK CA guidelines (Ref 2) recommend that a screening exercise is completed on all potential decommissioning options to create a shortened list to be carried into the CA.

A pre-screening was carried out of all known decommissioning options for each grouping. The pre-screening resulted in a number of options being identified for further assessment in the CA. Table 4-1 identifies the options considered for each grouping and shows which options were carried through to the CA. Details on why different options were screened out are also summarised in Table 4-1. Full details of the screening process are captured in the Decommissioning Option Screening Report (Ref 4).

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Table 4-1: Summary of Screened Options

GROUP ID	COMPONENT TYPE / AS-LAID CONDITION	1. TOTAL REMOVAL				2. REMEDIATE IN-SITU WITH EXPOSED SECTIONS			3. LEAVE *IN-SITU*
		A). BY REVERSE REELING	B). BY LIFT AND CUT	C). BY REVERSE S-LAY	D). BY CUT AND LIFT	A). ROCK COVERED	B). TRENCHED AND BURIED	C). CUT AND REMOVED	
A	Rigid piggy-backed lines which are trenched and buried with varying lengths / sections of rock cover. Average Depth of Burial (DoB) is 0.55 m.	✓	✗ (Screened Out)	✗ (Screened Out)	✗ (Screened Out)	✓	✓	✓	✗ (Screened Out)
B	Umbilical which is trenched and buried with some rock cover. Average DoC is 0.3 m. Assessment considers that outwith the rock covered crossings and sections the umbilical is exposed due to being only covered to 0.3 m (DoC).	✓	✓	✗ (N/A)	✗ (Screened Out)	✓	✓	✓	✗ (Screened Out)

✓ Carry forward option to CA.
X Screened Out based on qualitative assessment, or not applicable; do not carry forward option to CA.

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5.0 PREPARE

5.1 Technical

To ensure robust evidence was available to inform the CA evaluation of the different decommissioning options, drawings, inspection reports, survey reports and operational history were all reviewed. In addition, technical studies were completed to accurately determine the quantity, specification, physical layout, status and predicted behaviour of the facilities to be decommissioned.

For reference during the CA workshop, summary technical data sheets for each of the Groups were prepared (Appendix A).

5.2 Safety Risk Assessment / Environmental Impact Identification

A desktop Hazard Identification and Risk Assessment (HIRA) and a desktop Environmental Impacts Identification (ENVID) were undertaken to inform the CA.

The objectives of the desktop exercises were to:

- Identify initiating events that have the potential to give rise to safety, health, societal and environmental consequences;
- Evaluate the safeguards, controls and mitigating measures;
- Risk assess the hazards identified across the options; and
- If appropriate, make recommendations for adequate safeguards, controls, mitigating and emergency response measures to minimise the occurrence, reduce the consequences and escalation potential such that the risk or environmental impact is reduced to as low as reasonably practicable (ALARP).

The activities associated with each decommissioning option under consideration for each grouping were assessed separately which enabled the specific safety, societal and environmental related risks of each option to be identified.

The HIRA and ENVID processes involved structured approaches, in line with general industry accepted good practice.

The results of the desktop HIRA informed the ratings applied to the relevant safety sub-criteria during the CA.

The results of the desktop ENVID informed the ratings applied to the relevant environmental and societal sub-criteria during the CA.

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6.0 ESTABLISH

6.1 Stakeholder Engagement

Consulting with stakeholders is an important part of the decommissioning impact assessment and CA process as it allows any concerns or issues which stakeholders may have to be communicated and addressed.

Given the relatively straightforward nature of the project and minimal infrastructure, informal stakeholder engagement (i.e. SFF and JNCC) was carried out in advance of the CA being completed. In addition, where applicable, previous decommissioning project feedback from Stakeholders/Regulators was also considered during the workshop and reflected in the evaluation.

6.2 Confirm Criteria, Sub-Criteria & Weightings

The agreed main criteria and sub-criteria are described in Section 3.4.

As described in Section 3.3, a qualitative R/A/G approach to rating performance of each decommissioning option and across each of the sub-criteria was adopted, therefore numerical scoring was not applied such that all sub-criteria evaluated were given equal weighting. This means that the more sub-criteria allocated to a main criterion, the greater the influence that main criterion had on the outcome when compared to another main criterion with less sub-criteria. The results were also assessed whereby an 'average' rating was considered across all the sub criteria within a main criterion, the results of which are also presented.

6.3 Review and Agree Pre-Screening Outcome

The results of the option pre-screening study (see Table 4-1 and Ref 4) were shared with the wider project team for review ahead of the CA Evaluation Workshop. A summary of the pre-screening was also presented at the workshop to ensure alignment across attendees.

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7.0 EVALUATE

The CA Evaluation Workshop was held in person on the 14th August 2025. Details of participants are provided in Table 7-1. As can be seen, required engineering disciplines and operator specialists were represented e.g. decommissioning, subsea engineering, safety, environment and operations.

Table 7-1: CA Workshop Participants.

NAME	ROLE	COMPANY
Rod Farquhar	Head of Operations / QHSSE Manager	Bridge Petroleum
Zach Ruslan	Asset Manager / Principal Production Technologist	
Nisha Murray	Geoscientist (Part time at workshop)	
Stuart Odell	Senior Consultant Decommissioning Engineer (**Project Manager**)	Genesis
Kevin Simpson	Senior Consultant Decommissioning Engineer (**Chair**)	
John Kennedy	Senior Consultant Decommissioning Engineer	
Iain Young	Decommissioning Engineer (**Scribe**)	
Pariza Mahbub	Senior EA Specialist	
Martha O'Sullivan	Senior Consultant Environmental Specialist	
Kayleigh Hughes	Consultant Environmental Engineer	
Allan Brown	Senior Consultant Technical Safety and Risk Engineer	

7.1 Evaluation Workshop Tools

7.1.1 Qualitative Assessment – Rating Guide Table

A Ratings Guide Table (see Appendix B) for the different Technical, and Cost sub-criteria considered in the CA was prepared to assist workshop participants in the application of R/A/G rating against each sub-criterion. The contents were not used as outright ranking instructions, rather as guides to generate discussion and provide direction on potential differentiators.

Results of the HIRA and ENVID (Ref 5) were used to support the assessment of the safety, environmental and societal sub-criteria.

7.1.2 Evaluation/Rating Workbook

Project specific evaluation / rating workbooks were prepared reflecting the criteria and sub-criteria to be assessed against the specific decommissioning options for each of the two groups being evaluated.

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The workbooks were populated by a scribe during the workshop with relevant narrative justifying the reasoning behind the rating of each sub-criterion against each decommissioning option.

The workbooks, provided in Appendix C, are the documented evidence and the justification agreed by the workshop participants for the recommended and acceptable decommissioning options recorded in this CA Report.

The decommissioning data sheets presented in Appendix A were used to guide the discussion during the workshop.

7.1.3 Mechanics of Rating the Options

The evaluation / rating workbook was live on screen and was populated by a scribe during the workshop.

Each Group (A & B) was assessed seperately by:

1) Taking each sub-criterion in turn and assessing and rating across each decommissioning option. This ensured a true comparison of the options for each sub-criterion, which would not have been the case if each decommissioning option was assessed in isolation and for all criteria first.
2) Narrative was added to the worksheets to record the decision-making process.
3) Steps (1) and (2) were repeated for each sub-criterion in turn until all sub-criteria were assessed for all decommissioning options.
4) Tallying of the results was not completed until each criterion had been assessed and rated individually. This avoided the possibility of summation results influencing ratings across subsequent criteria.
5) Once all criteria were completed a summary page was collated and viewed to determine the overall ranking for each decommissioning option:
    a) The decommissioning option with the highest number of sub-criteria rated as RED, was considered the least preferred option.
    b) The decommissioning option with the least number of sub criteria rated as RED and the most number of sub-criteria rated GREEN, was recorded as the most preferred option.
    c) Other options were ranked in order, based on relative numbers of RED and AMBER that the sub-criteria have attracted.

It is acknowledged that this approach to rating and ranking of the decommissioning options is somewhat subjective, however, this approach has previously been accepted and understood by both the UK Regulator and typical stakeholders for subsea decommissioning CAs. In addition, the workshop attendees comprised decommissioning, subsea, safety and environmental engineers such that the correct range of discipline expertise was present.

For inclusion in the DP, a preferred option is required. However, in some cases (and in the case of Group A for Enoch) multiple options can have the same score and rank equally. In this case, the option that best meets the overarching principle of maximising recovery where possible will be selected as the preferred option, whilst the remaining equally ranked options are retained to be carried forward for possible execution subject to project maturation.

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8.0 REPORT

This section provides a summary of the ranking reached for each decommissioning option under consideration within both Groups. Options ranked 1st being the most preferred option and options ranked 2nd, 3rd, 4th and 5th (where applicable), being less desirable performing options compared to the preferred option, or, where multiple options are acceptable and ranked equally, a single preferred option is selected and equally ranked options retained to be carried forward to the execution phase.

During the Evaluation Workshop, the allocated ratings were recorded on a pre-prepared Microsoft Excel evaluation workbook and narrative was added to justify each rating. A full set of the evaluation workbook / worksheets is provided in Appendix C and a summary of the results for each group is provided here.

The overall ratings and rankings for each grouping were initially determined from a summation of the ratings of the individual sub-criteria. Since a R/A/G evaluation was adopted all 14 sub-criteria have equal weighting. Therefore, the more sub-criteria allocated to a main criterion, the greater the influence that main criterion will have on the outcome when compared to main criterion with less sub-criteria.

In this CA evaluation, Safety and Environmental have four sub-criteria each, whereas Technical, Societal and Economic each have only two sub-criteria (see Table 3-3). As described in Section 6.2, though a numerical weighting has not been added, when considering each sub-criteria there is an unintended weighting added to the main criteria that have a greater number of sub-criteria. Therefore, the ratings allocated to Safety and Environmental will have had a greater influence on the outcome overall than the other main criteria. For comparison, an overall ranking was assigned to each main criterion thereby removing the 'influence' of differing numbers of sub-criteria within the different main criteria, which is recognised as an appropriate methodology. The results of this assessment are also presented in Appendix C for each grouping and are discussed below.

Three sensitivity checks were undertaken by i) removing the Economic Criteria (Decommissioning Cost) from the assessment to reflect the regulatory guidance that cost shall not be the main driver unless all other matters show no significant difference, ii) for Group B, a sensitivity check to determine the impact of trench-ability of the sea bed and iii) also for Group B, to check the sensitivity of loss of fishery caused by rock placement (these sensitivity checks are presented in Appendix C).

8.1 Group A Results

The Group A pipelines are rigid flowlines that are trenched and buried with DoC greater than 0.6m with partial rock cover.

In summary, when each sub-criteria is considered separately, the CA determined that for Group A pipelines, Remediate *in-situ* with Exposed Sections Rock Covered (Option 2A), with Exposed Sections Trenched and Buried (Option 2B) and Exposed Sections Cut and Removed (Option 2C) were all rated the same and therefore ranked as 1st equal. However, adopting the principle of maximising recovery, then Option 2C becomes preferred. Options 2A & Option 2B are still acceptable decommissioning options and can be carried forward to Contracting and Procurement (C&P) phase for consideration if required.

Option 1A; Total Removal by Reverse Reeling had a higher number of moderate ratings for Technical Complexity, Safety & Environmental than the Remediate *in-situ* options. In addition,

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the costs involved with Total Removal by Reverse Reeling leads to Option 1A achieving a high rating in the economic criteria.

If all main criteria were given an equal weighting (i.e. a single ranking given to each main criteria, rather than being influenced by greater or lesser numbers of sub-criteria) the results of the CA did not change.

Similarly, the Economic sensitivity test (i.e. removing economic criteria from the assessment) also had no impact on the results of the CA.

Table 8-1: Group A Pipelines CA Results Summary

Decommissioning Option	Total Removal	Remediate *in-situ*		
	1a) Reverse Reeling	**2a) Exposed Section Rock Covered**	**2b) Exposed Sections Trenched and Buried**	**2c) Exposed Sections Cut and Removed**
Rating	High Impact = 1	High Impact = 0	High Impact = 0	High Impact = 0
	Moderate impact = 5	Moderate impact = 0	Moderate impact = 0	Moderate impact = 0
	Lower impact = 0	Lower impact = 6	Lower impact = 6	Lower impact = 6
	Not Significantly Different = 7	Not Significantly Different = 7	Not Significantly Different = 7	Not Significantly Different = 7
Ranking	4th	1st	1st	**1st**
	Discounted	Carried through for C&P		**Preferred**

Results when sub-criteria within each main criterion are considered separately - all Remediate *in-situ* options are acceptable, but Exposed Sections Cut and Removed is preferred due to:

- The removal and recovery of material (exposed ends) from the seabed
- Potential technical challenges with trenching existing pipelines, especially towards rock cover
- Limited need for additional rock in an area known to be inhabited by Ocean Quahogs and Seapens.

Results when main criteria considered wholly - i.e. when each main criterion is given the same weighting (i.e. do not consider sub-criteria separately) - no change, remains same as above.

Results when economic criteria is removed - no change, remains same as above.

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8.2 Group B Results

Group B consists of an umbilical (15.375 km in length) which is trenched and buried with DoC less than 0.6m.

Note that since average DoC for the umbilical is 0.3m, the majority of the umbilical (~14.125 km) is considered to be exposed, with only the rock covered sections associated with pipeline crossings adequately covered.

In summary, when each sub-criteria is considered separately, the CA determined that for Group B, Remediate *in-situ* with Exposed Sections Cut and Removed (Option 2C) and Total Removal by Reverse Reeling (Option 1A) or other suitable method were rated the same and therefore ranked as 1st equal.

However, recognising that:

- Sections of Group B and Group A share the same rock cover berms, the Total Removal of Group B could impact the integrity of the rock cover for Group A. and;
- Option 2C still results in ~92% of the umbilical being recovered (leaving only ~1.25 km under the existing rock cover) with no impact to Group A.

The CA determined that the preferred approach for the Group B umbilical is Option 2C, Remediate *in-situ* with Exposed Sections Cut and Removed and that the method of recovery/removal of the exposed sections (~14.125 km) can be determined by the C&P process if required.

Total Removal by Lift and Cut (Option 1B) and Remediation *in-situ* with Exposed Sections Trenched and Buried (Option 2B) (i.e. ~14.125 km length of umbilical) both scored an equal amount of Lower and Moderate impacts and are therefore were ranked in 3rd equal position. However, recognising the implications of Total Removal on the shared Rock Cover with Group A, coupled with the known technical complexity of trenching an existing umbilical, resulted in both these options being discounted.

Remediation *in-situ* with Rock Cover on exposed sections (i.e. the full length of umbilical) is not preferred due to the large volume of rock required and the resultant impacts to the environment and long-term risk to other users of the sea.

If all main criteria were given an equal weighting (i.e. a single ranking given to each main criteria, rather than being influenced by greater or lesser numbers of sub-criteria) the preferred option remains Remediate *in-situ* with Exposed Sections Cut and Removed (Option 2C) which was ranked 1st equal with Total Removal by Reverse Reeling (Option 1A) and with Total Removal by Lift and Cut (Option 1B), whilst Remediate *in-situ* with Exposed Sections Rock Covered (Option 2A) ranked in 4th equal position with Remediate *in-situ* with Exposed Sections Trenched and Buried (Option 2B).

8.2.1 Group B Sensitivity Tests

During the CA workshop uncertainties were uncovered that required a number of sensitivity checks to be carried out.

Due to uncertainties about the supply chain's perception of technical complexity of trenching existing pipelines / umbilicals, a sensitivity check to determine the impact of trenching and burial of an existing umbilical being more achievable than originally envisaged. Changing the technical complexity from moderate to low for Remediation *in-situ* with Exposed Sections Trenched and Buried; Option 2B (i.e. ~14.125 km of the umbilical), which leads to the ranking

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for Option 2B being the same as Remediate in-situ with Exposed Sections Cut and Removed (Option 2C) and Total Removal by Reverse Reeling (Option 1A), placing all these options in 1st equal place. However, recognising the implications of total removal on the shared rock berm with Group A and maintaining the principle of maximising recovery, then Remediate *in-situ* with Exposed Sections Cut and Removed (Option 2C) would remain preferable.

In the event that rock placement for Option 2A; Remediate *in-situ* with Exposed Sections Rock Covered has a greater impact on commercial fisheries than originally envisaged, the relevant sub-criteria was changed from Low to Moderate. Since Remediate *in-situ* with Exposed Sections Rock Covered was already ranked in 5th position, changing a low to moderate only serves to reduce the option's attractiveness and further reinforce its ranking in 5th place, as the least preferred option.

The Economic criteria across all options was considered to be "Not Significantly Different" (NSD). Therefore, removing the criteria has no impact on the scoring and ranking of the options in the CA.

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Table 8-2: Group B Pipelines CA Results Summary

Decommissioning Option	Total Removal		Remediate *in-situ*		
	1a) Reverse Reeling	**1b) Lift and Cut**	**2a) Exposed Sections Rock Covered**	**2b) Exposed Sections Trenched and Buried**	**2c) Exposed Sections Cut and Removed**
Rating	High Impact = 0	High Impact = 0	High Impact = 0	High Impact = 0	High Impact = 0
	Moderate impact = 1	Moderate impact = 2	Moderate impact = 3	Moderate impact = 2	Moderate impact = 1
	Lower impact = 6	Lower impact = 5	Lower impact = 4	Lower impact = 5	Lower impact = 6
	Not Significantly Different = 6	Not Significantly Different = 6	Not Significantly Different = 6	Not Significantly Different = 6	Not Significantly Different = 6
Ranking	**1st**	3rd	5th	3rd	**1st**
	Discounted	Discounted	Discounted	Discounted	**Preferred**

Results when sub-criteria within each main criterion are considered separately – Remediate in-situ with Exposed Sections Cut and Removed is the preferred option. The other options are discounted recognising the implications on the shared rock berm with Group A from Total Removal by Reverse Reeling and Total Removal by Lift and Cut options, the technical uncertainties associated with the remedial trenching of umbilicals required for the Remediate *in-situ* with Exposed Sections Trenched and Buried option and the large amount of rock required (and its associated impacts) for Remediate *in-situ* with Exposed Sections Rock Covered option.

Results when main criteria considered wholly - i.e. when each main criterion is given the same weighting (i.e. do not consider sub criteria separately) – preferred option remained Remediate in-situ with Exposed Sections Cut and Removed (Option 2C) which was ranked 1st equal with Total Removal by Reverse Reeling (Option 1A) and, with Total Removal by Lift and Cut (Option 1B), whilst and Remediate in-situ with Exposed Sections Rock Covered (Option 2A) ranked in 4th equal position and with Remediate in-situ with Exposed Sections Trenched and Buried (Option 2B).

Results when economic criteria is removed - no change, remains same as above.

Results when sensitivity test on trenching and burying is applied - leads to the ranking for Option 2B being the same as Remediate in-situ with Exposed Sections Cut and Removed (Option 2C) and Total Removal by Reverse Reeling (Option 1A), placing all these options in 1st equal place. However, recognising the implications of total removal on the shared rock berm with Group A and maintaining the principle of maximising recovery, then Remediate in-situ with Exposed Sections Cut and Removed (Option 2C) remains preferred.

Results when sensitivity test for rock placement impacting commercial fisheries - no change, remains same as above, only strengthening the position of Exposed Sections Rock Covered in 5th place.

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9.0 CONCLUSIONS

A CA has been undertaken for the Enoch field pipelines and umbilical tied back to Brae Alpha.

The pipelines that are trenched and buried with DoC of greater than 0.6m were considered in Group A and the umbilical that is trenched and buried with DoC of <0.6m was considered in Group B.

The Groups were assessed using a simple R/A/G CA method by an experienced technical and operations team consisting of both Genesis and Bridge Petroleum representatives. The CA identified preferred options, acceptable options and least preferred options for each group. The results of the CA are presented in Table 9-1.

Table 9-1: Preferred and Acceptable Decommissioning Options Identified.

Description	Status	Results of the CA
PL2336 8" Rigid Oil Production Flowline	**Group A** Trenched and buried with a (Depth of Cover) DoC ≥ 0.6 m	**Preferred option:** **2C** - Remediate *in-situ* with Exposed Sections Cut and Removed **Acceptable options:** **2A** - Remediate *in-situ* with Exposed Sections Rock Covered **2B** - Remediate *in-situ* with Exposed Sections Trenched and Buried
PL2337 3" Rigid Gas Lift Flowline (piggy-backed onto the 8" line)		
PLU2338 Combined Control, Power, Signal Hydraulic and Chemical Injection Umbilical	**Group B** Trenched and buried with a DoC of < 0.6m	**Preferred option:** **2C** - Remediate *in-situ* with Exposed Sections Cut and Removed[1]

[1]Note: The sections (~1.25 km) to be remediated in-situ are under existing rock cover. The remaining 14.125 km length of the umbilical will be fully removed.

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10.0 REFERENCES

Reference No.	Reference
Ref 1.	The Department for Energy Security and Net Zero (DESNZ) Guidance Notes.
Ref 2.	OEUK Guidelines for Comparative Assessment of Decommissioning Programs
Ref 3.	218919C-001-Y-RT-24002 - Enoch Decommissioning Project Environmental Appraisal.
Ref 4.	218919C-001-U-RT-20001 - Enoch Decommissioning Project Options Development and Screening Report.
Ref 5.	218919C-001-Y-RT-24000 – Enoch Decommissioning Project HIRA & ENVID Report.
Ref 6.	**Appendix D Drawings** DeepOcean. *Enoch Manifold Site Survey*. PRJ000836-SUR-CHA-ENOCH-001 Revision 02. DeepOcean. *PL2336 – Production Pipeline – Brae A to Enoch Plan View and Longitudinal Profile.* PRJ000836-SUR-CHA-PL2336-XXX, Sheets 001—007. Revision 02. DeepOcean. *PLU2338 – Control Umbilical – Brae A to Enoch Plan View and Longitudinal Profile.* PRJ000836-SUR-CHA-PLU2338-XXX, Sheets 001—007. Revision 02.

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APPENDIX A – TECHNICAL DATA SHEETS

Guide Table	Basis of Score	Decommissioning Option							
		1. Total Removal				2. Remediate in-situ			3. Leave in-situ
		a. By Reverse Reeling	b. By Lift-and Cut	c. By Reverse S-Lay	d. By Cut-and-Lift	a. Exposed Sections Rock-Covered	b. Exposed Sections Trenched and Buried	c. Exposed Sections Cut and Recovered	(Monitor)
1	Total vessel days	21.0	SCREENED OUT	SCREENED OUT	SCREENED OUT	15.0	10.0	16.0	SCREENED OUT
	Mob and demob days	9.0				7.0	3.0	8.0	
2	Number vessel transit days	2.0				1.3	1.3	2.0	
3	Quantity of materials returned to shore (Te)	1481				0	0	6	
N/A	Quantity of materials for land fill (Te)	291				0	0	1	
5	Quantity of materials left on or in seabed (Te)	0				1481	1481	1474	
5	Quantity of rock cover applied (Te)	0				462	0	10	
N/A	Cost estimate (kGBP)	4807 (390%)				1233 (100%)	1357 (110%)	1357 (110%)	

Guide Table	Basis of Score	Decommissioning Option							
		1. Total Removal				2. Remediate in-situ			3. Leave in-situ
		a. By Reverse Reeling	b. By Lift-and Cut	c. By Reverse S-Lay	d. By Cut-and-Lift	a. Exposed Sections Rock-Covered	b. Exposed Sections Trenched and Buried	c. Exposed Sections Cut and Recovered	(Monitor)
1	Total vessel days	13.0	14.0	N/A	SCREENED OUT	30.0	14.0	15.0	SCREENED OUT
	Mob and demob days	7.0	5.0			13.0	3.0	7.0	
2	Number vessel transit days	1.3	1.3			2.3	1.3	1.3	
3	Quantity of materials returned to shore (Te)	454	454			0	0	417	
N/A	Quantity of materials for land fill (Te)	123	123			0	0	113	
5	Quantity of materials left on or in seabed (Te)	0	0			454	454	37	
5	Quantity of rock cover applied (Te)	0	0			62307	0	0	
N/A	Cost estimate (kGBP)	3250 (155%)	3080 (146%)			2448 (116%)	2103 (100%)	3750 (178%)	

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APPENDIX B – CA RATINGS GUIDE TABLE

Main Criteria	RATING		LOW	MODERATE	HIGH
Technical Feasibility	Risk of Major Project Failure		Normal operational procedures proposed. Scope is straightforward and understood. Offshore Execution Phase Schedule unlikely to slip beyond planned schedule plus contingencies applied.	Some specialist operational procedures required. Some minor scope uncertainties to be resolved before execution. Potential for some schedule slippage activity resulting project delay but not leading to revisit to execution methods.	Unique operational procedures proposed. Major scope uncertainties will remain at execution. Potential for unplanned and unforeseen activity resulting in significant project delay or potential revisit to execution methods.
	Technical Complexity & Track Record		Uses established technology[1] and/or working methods designed for this field of operation. Large experienced contractor pool available.	Uses proven technology[1] and/or working method but in a diverse field of operation. Some experienced contractors available.	Uses novel technology[1] untested in this field of operation or untried methods to be introduced. Likely to be new to contractors.
Safety	Risk During Project Execution	To Project Personnel	HIRA results used as a guide.		
		To Those on Land			
		To Other Users of the Sea			
	Residual Risk to Other Users of the Sea				
Environmental	Impact of Decommissioning Operations Offshore		ENVID results used as a guide.		
	Seabed Disturbance - Short Term				
	Change of Habitat - Long Term				
	Waste Processing				
Societal	Impact on Commercial Fisheries		ENVID results used as a guide		
	Socio-economic impact on communities and amenities				
Economic Risk	Cost for Decommissioning/ Removal activities		Lowest cost option or within 30% of lowest cost.	Between 130% and 200% of lowest cost option.	Greater than 200% of lowest cost option.
	Cost for long term monitoring / Remediation activities		Minimal potential ongoing cost liability. Post project assessment survey only.	Potential for 2 to 3 periodic monitoring surveys to review behaviour of site post project completion. Potential for some remediation activities (e.g. re-profile unstable rock berms).	Requirement for more than 3 periodic monitoring surveys, and over a much more prolonged period to review behaviour of site post project completion. It is more likely that some post project remediation activities will be required.

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APPENDIX C – CA EVALUATION WORKBOOKS

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J-UK-00351-218919 - Enoch Decommissioning Support - Comparative Assessment (CA) Workshop - Group A: Rigid piggybacked lines (trenched and buried w/ avg. DoC = 0.99 m)

1. Technical Feasibility: The short- and long-term technical risk that the option does not achieve the intended end-state on time. For example, the risk of equipment failure or unavailability, or the potential for schedule overrun.

	Sub-Criteria / Decommissioning Option		Option 1A: Total Removal by Reverse Reeling	Option 2A: Remediate in situ with Exposed Sections Rock Covered	Option 2B: Remediate in situ with Exposed Sections Trenched & Buried	Option 2C: Remediate in situ with Exposed Sections Cut & Removed
Technical Feasibility	Risk of Major Project Failure	Workshop Narrative	21 total vessel days. No SIMOPs. 30.48 kilometers (15.24 km each) for PL2336 and PL2337. Normal operational procedures proposed. Scope is straightforward and understood. Offshore Execution Phase Schedule unlikely to slip beyond planned schedule plus contingencies applied. Separate (therefore no SIMOPs) excavation camapaign required before reverse reeling campaign. Piggybacked pipelines not expected to increase the complexity of the operation. Assume that the clamps / straps removed on deck of vessel.	15 total vessel days. No SIMOPs. ≈ 36 meters of untrenched length for each line Normal operational procedures proposed. Scope is straightforward and understood. Offshore Execution Phase Schedule unlikely to slip beyond planned schedule plus contingencies applied.	10 total vessel days. No SIMOPs. ≈ 36 meters of untrenched length for each line Normal operational procedures proposed. Scope is straightforward and understood. Offshore Execution Phase Schedule unlikely to slip beyond planned schedule plus contingencies applied. No crossings at the Brae Alpha 60 m section. Differences in seabed condition at the Brae A. end and the well end are not expected.	16 total vessel days. No SIMOPs. ≈ 36 meters of untrenched length for each line Normal operational procedures proposed. Scope is straightforward and understood. Offshore Execution Phase Schedule unlikely to slip beyond planned schedule plus contingencies applied. All options ranked Lower Impact therefore all options re-ranked Not sognifncantly dofferent
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different
	Technical Complexity & Track Record	Workshop Narrative	Experienced contractor pool. Established technology and operation. Layout of field is relatively simple. > 8" pipeline & piggybacked line removal by reverse reeling has limited track record.	Proven method. Existing working methods. Experienced contractors to undertake work.	Proven method. Existing working methods. Experienced contractors to undertake work. Additional complexity due to the requirement to trench and burry toward / away from rock. Operation is not complex but trenching results may vary due to short lengths of line. However, jet trenching may yield better results over short distances relative to other methods but may take slightly longer. (Option ranked assuming Jet Trenching is feasible.)	Proven method. Existing working methods. Experienced contractors to undertake work. No access concerns.
		Ranking	Moderate Impact	Lower Impact	Lower Impact	Lower Impact
	RAG Count		High Impact = 0; Moderate Impact = 1; Lower Impact = 0; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1
	Narrative		Risk of major project failure is NSD therefore average ranking is based on Technical Complexity and Track Record.			
	RAG Rank (BASED ON AVERAGE)		Moderate Impact	Lower Impact	Lower Impact	Lower Impact

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	J-UK-00351-218919 - Enoch Decommissioning Support - Comparative Assessment (CA) Workshop - Group A: Rigid piggybacked lines (trenched and buried w/ avg. DoC = 0.99 m)					
	2. Safety: The extent to which the option may pose health and safety risks in the short- and long-term, both during decommissioning activities offshore and during disposal activities onshore. This includes both decommissioning operators, and other users of land and sea					
	Sub-Criteria / **Decommissioning Option**		**Option 1A: Total Removal by Reverse Reeling**	**Option 2A: Remediate in situ with Exposed Sections Rock Covered**	**Option 2B: Remediate in situ with Exposed Sections Trenched & Buried**	**Option 2C: Remediate in situ with Exposed Sections Cut & Removed**
Safety	**Risk During Project Execution... to project personnel**	**Workshop Narrative**	No vessel SIMOPs. 1,481 tonnes of material recovered via reverse reeling. Some materials handling on deck. Significant materials handling on deck compared to Option 2C. Option ranked Moderate Impact taking into consideration reverse reeling of 8 inch line with 3 inch piggybacked line. Complexity associated with separation of piggybacked line which is a manual operation (i.e., personnel in the potential line of fire of release of energy sources.)	462 tonnes of rock required. No vessel SIMOPs.	No vessel SIMOPs.	Ten (10) tonnes of rock required. No vessel SIMOPs. Very minor materials handling on deck compared to Option 1A.
		Ranking	Moderate Impact	Lower Impact	Lower Impact	Lower Impact
	Risk During Project Execution... to those on land	**Workshop Narrative**	1,481 tonnes of material return to shore. Significant onshore cutting and handling activities compared to Option 2c. Time at risk is Ssignificantly greater for Option 1A in comparison to Option 2C.	*No materials recovered.*	*No materials recovered.*	Six (6) tonnes of material returned to shore.
		Ranking	Moderate Impact	Lower Impact	Lower Impact	Lower Impact
	Risk During Project Execution... to other users of the sea	**Workshop Narrative**	21 total vessel days. No vessel SIMOPs. Low impact. All options same order of magnitude so no differentiator rated as LI).	15 total vessel days. No vessel SIMOPs. Low impact.	10 total vessel days. No vessel SIMOPs. Low impact.	16 total vessel days. No vessel SIMOPs. Low impact.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different
	Residual (Long-Term) Risk to Other Users of the Sea	**Workshop Narrative**	Full removal - no increased risk to fishing. Safe seabed as demonstrated post completion survey. All options same order of magnitude so no differentiator (rated as LI)..	Rock would be laid in an overtrawlable profile in line with SFF requirements. Safe seabed as demonstrated post completion survey.	Exposed sections to be trenched and buried such that SFF requirements are met. Safe seabed as demonstrated post completion survey.	Spot rock cover to remediate following exposed sections cut and removal. Safe seabed as demonstrated post completion survey.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different

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3. Environmental: The extent to which the option impacts on the marine and non-marine ecology from activities in the short- and long-term.The extent of greenhouse gas emissions and any other known pollutant impacts. This could include impacts to sensitive species, short- and long-term changes to hard structure habitat, exposure to contaminants, as well as the energy and emissions associated with recycling materials compared to the extraction of new resources

	Sub-Criteria / Decommissioning Option		Option 1A: Total Removal by Reverse Reeling	Option 2A: Remediate in situ with Exposed Sections Rock Covered	Option 2B: Remediate in situ with Exposed Sections Trenched & Buried	Option 2C: Remediate in situ with Exposed Sections Cut & Removed
Environmental	Impact of Decommissioning Operations Offshore	Workshop Narrative	Emissions: Total vessel days anticipated to be 21 days. Resource Use: Fuel use will vary between options (associated with vessel type and duration of offshore and onshore activities). Discharges: All vessels will be MARPOL compliant. It is expected that the lines contain/will contain seawater at the time of decommissioning. Discharges are therefore not expected to have a significant impact on receptors. Underwater Noise: Sources of underwater noise will include the presence of vessels and the noise associated with reeling of the lines. These underwater noise sources are not considered to have a significant impact on marine mammals or fish species in the area. All ranked as not significantly different based on them all being low. Underwater noise & resource use not a differentiator between all options. Vessel days are same order of magnitude relative to each other therefore also no differentiator. All options ranked LI therefore NSD.	Emissions: Total vessel days anticipated to be 15 days. For resource use, discharges to sea and underwater noise and justification for ranking - descriptor as for Option 1A.	Emissions: Total vessel days anticipated to be 10 days. For resource use, discharges to sea and underwater noise and justification for ranking - descriptor as for Option 1A.	Emissions: Total vessel days anticipated to be 16 days. For resource use, discharges to sea and underwater noise and justification for ranking - descriptor as for Option 1A.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different
	Short-Term Seabed Disturbance	Workshop Narrative	Vessels will use DP, therefore no anchoring. Site surveys have identified PMFs in the vicinity such as *Arctica Islandica* and habitat similar to OSPAR habitat 'Sea pens and burrowing megafauna'. Total removal assumed to require excavation of the piggybacked lines prior to recovery. Condition of seabed following mass flow excavation hard to predict. Due to excavation being required along *c*. 15.24 km of line, the area of impact and therefore short term seabed disturbance was considered to have a greater Magnitude of Effect relative to the decommission *in situ* options. Ranked moderate due to excavation.	Vessels will use DP, therefore no anchoring. A total of *c*. 462 te of rock would be required to remediate *c*. 72 m of exposures. Due to short length of line to be remediated, the Magnitude of Effect of laying rock was considered to be less in the ENVID when compared to area impacted by full recovery. Relative to existing rock (105,400 tonnes) low tonnage of rock used - additional rock is insignificant.	Vessels will use DP, therefore no anchoring. Requires trenching and burying of *c*. 72 m of exposures of lines. Magnitude of Effect of short term impact based on footprint is considered similar to Option 2A. Assumes jet trenching. Using ROV.	Vessels will use DP, therefore no anchoring. Requires cut and removal of *c*. 72 m of exposures of lines. Magnitude of Effect of short term impact based on footprint is considered similar to Option 2A. Small volumes (*c*. 10 te) of spot rock added to cut ends.
		Ranking	Moderate Impact	Lower Impact	Lower Impact	Lower Impact
	Long-Term Change of Habitat	Workshop Narrative	Not expected to be any long term impacts on seabed communities. Recovering of the line would involve 'scattering' of the existing rock across a wider area (i.e., larger footprint area.) therefore ranked Moderate.	Rock introduced. A total of *c*. 462 te of rock would be required for remediation of 66 m of length of exposures. Magnitude of Effect considered highest for this option.	With burial of the 72 m of lengths of exposures, no infrastructure left exposed on seabed such that no long term impacts. Assumed target depth is reached.	With removal of the 72 m of lengths of exposures, no infrastructure exposed on the seabed such that no long term impacts. Small volumes (*c*. 10 te) of spot rock added to cut ends.
		Ranking	Moderate Impact	Lower Impact	Lower Impact	Lower Impact
	Waste Processing	Workshop Narrative	Approximately 1,481 te of material returned onshore of which *c*. 291 te would go to landfill. Given the commitment toadhere to the waste hierarchy, volumes of material to landfill will be minimised. Based on volumes to be returned for relative options impacts considered low across all options and marked as not significant.	No materials returned onshore.	No materials returned onshore.	Approximately 6 te of material returned onshore of which *c*. 1 te would go to landfill. Given the commitment to maximise re-use/ recovery/ recycle, volumes of material to landfill will be minimised.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different

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4. Societal: The extent to which the option has short- and long-term socio-economic impacts resulting from decommissioning activities. This may include fishing interruption, commercial or naval vessel diversion, and onshore community impacts due to noise, pollution and traffic. It may also include socioeconomic benefits to the onshore community through employment opportunities.

	Sub-Criteria / Decommissioning Option		Option 1A: Total Removal by Reverse Reeling	Option 2A: Remediate in situ with Exposed Sections Rock Covered	Option 2B: Remediate in situ with Exposed Sections Trenched & Buried	Option 2C: Remediate in situ with Exposed Sections Cut & Removed
Societal	Impact of Commercial Fisheries	Workshop Narrative	The flowlines will be fully removed. Evidence of a safe seabed will be obtained. Therefore no significant impact on commercial fisheries anticipated for this option. All options ranked LI therefore reanked NSD.	Potential for new rock berms to alter fishing activity. Rock added to end line length (*c*. 72 m) exposures would be berms above seabed level and laid in an overtrawlable profile. Due to a short distance of exposed length, therefore no significant impact on commercial fisheries anticipated for this option.	The full length of all lines (*c*. 15.24 km) would be covered to a target depth of 0.6 m to top of pipe. Therefore no significant impact on commercial fisheries anticipated for this option.	Exposed sections of the flowlines and umbilicals will be fully removed. Evidence of a safe seabed will be obtained. Therefore no significant impact on commercial fisheries anticipated for this option.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different
	Socio-Economic Impact on Communities & Amenities	Workshop Narrative	Although materials are returned onshore the quantity (*c*. 1,481 te) is not expected to result in the creation of new jobs. Impacts on communities and amenities as a result of increased road traffic, odour and noise are not expected to be significant as materials will be returned to licensed and currently operating yards and recycling/ disposal facilities. All options ranked LI therefore reanked NSD.	No materials returned, such that no new onshore jobs anticipated. Similarly no impact on communities and amenities.	No materials returned, such that no new onshore jobs anticipated. Similarly no impact on communities and amenities.	Quantity of material returned to shore is *c*. 6 te. Impact descriptor as for Option 1A.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different

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	5. Economic Risk: The total cost of the option which may include removal and remediation activities; pre- and post-decommissioning surveys; and post-decommissioning monitoring.					
	Sub-Criteria / Decommissioning Option		Option 1A: Total Removal by Reverse Reeling	Option 2A: Remediate in situ with Exposed Sections Rock Covered	Option 2B: Remediate in situ with Exposed Sections Trenched & Buried	Option 2C: Remediate in situ with Exposed Sections Cut & Removed
Economic Risk	Cost of Decommissioning Activities	Workshop Narrative	4,807 kGBP. *Highest costing option* . 390% more costly than the lowest costing option. Option ranked Higher taking into account 4x higher than lowest cost option.	1,233 kGBP. *Lowest costing option.*	1,357 kGBP. 110% more costly than the highest costing option.	1,357 kGBP. 110% more costly than the highest costing option.
		Ranking	Higher Impact	Lower Impact	Lower Impact	Lower Impact

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UNWEIGHTED SCORES				
Sub-Criteria \ Decommissioning Options	Option 1A: Total Removal by Reverse Reeling	Option 2A: Remediate in situ with Exposed Sections Rock Covered	Option 2B: Remediate in situ with Exposed Sections Trenched & Buried	Option 2C: Remediate in situ with Exposed Sections Cut & Removed
Risk of Major Project Failure	NSD	NSD	NSD	NSD
Technical Complexity & Track Record	M	L	L	L
Risk During Project Execution... to project personnel	M	L	L	L
Risk During Project Execution... to those on land	M	L	L	L
Risk During Project Execution... to other users of the sea	NSD	NSD	NSD	NSD
Residual (Long-Term) Risk to Other Users of the Sea	NSD	NSD	NSD	NSD
Impact of Decommissioning Operations Offshore	NSD	NSD	NSD	NSD
Short-Term Seabed Disturbance	M	L	L	L
Long-Term Change of Habitat	M	L	L	L
Waste Processing	NSD	NSD	NSD	NSD
Impact of Commercial Fisheries	NSD	NSD	NSD	NSD
Socio-Economic Impact on Communities & Amenities	NSD	NSD	NSD	NSD
Cost of Decommissioning Activities	H	L	L	L
TOTAL UNWEIGHTED SCORE	High Impact = 1; Moderate Impact = 5; Lower Impact = 0; Not Significantly Different = 7	High Impact = 0; Moderate Impact = 0; Lower Impact = 6; Not Significantly Different = 7	High Impact = 0; Moderate Impact = 0; Lower Impact = 6; Not Significantly Different = 7	High Impact = 0; Moderate Impact = 0; Lower Impact = 6; Not Significantly Different = 7
RANK	4th	1st	1st	1st

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J-UK-00351-218919 - Enoch Decommissioning Support (w Option 2C) - Comparative Assessment (CA) Workshop - Group B: Umbilical (trenched and buried w/ partial rock cover & avg. DoC = 0.3 m)

1. Technical Feasibility: The short- and long-term technical risk that the option does not achieve the intended end-state on time. For example, the risk of equipment failure or unavailability, or the potential for schedule overrun.

	Decommissioning / Option		Option 1A: Total Removal by Reverse Reeling	Option 1B: Total Removal by Lift and Cut	Option 2A: Remediate in situ with Exposed Sections Rock Covered	Option 2B: Remediate in situ with Exposed Sections Trenched & Buried	Option 2C: Remediate in situ with Exposed Sections Cut & Removed
Technical Feasibility	Risk of Major Project Failure	Workshop Narrative	13 total vessel days. No SIMOPs. 14.125 kilometers of line to be removed. Routine operational procedures, scope is straightforward and understood. Offshore execution schedule is unlikely to slip beyond planned schedule with contingencies applied. Experience has been that pulling out of umbilical is tried and tested. All options LI therefore reranked NSD.	14 total vessel days. No SIMOPs. 14.125 kilometers of line to be removed. Some specialist operational procedures required, some minor scope uncertainties, potential for some schedule slippage, activity resulting in project delay, but not leading to revisit execution methods.	30 total vessel days. No SIMOPs. Routine operational procedures, scope is straightforward and understood. Offshore execution schedule is unlikely to slip beyond planned schedule with contingencies applied. Assumes whole length is exposed.	14 total vessel days. No SIMOPs. Some specialist operational procedures required, some minor scope uncertainties, potential for some schedule slippage, activity resulting in project delay, but not leading to revisit execution methods. Machine trencher assumed to be used. Base case assumes required depth can be reached due to being adjacent to Group A pipeline group which had reached target depth. Captures 14.125 km of the 15.375km of umbilical.	15 total vessel days. No SIMOPs. ~14.125 kilometers of line to be removed. Routine operational procedures, scope is straightforward and understood. Offshore execution schedule is unlikely to slip beyond planned schedule with contingencies applied. Rock covered sections left in situ, only exposed, or partially sediment covered sections to be removed. Spot rock put on umbilical end to minimise snag risk.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different
	Technical Complexity & Track Record	Workshop Narrative	Uses established technology and established methods. Large experienced contractor pool available. Layout of field is relatively simple.	Uses established technology and established methods. Large experienced contractor pool available.	Uses established technology and established methods. Large experienced contractor pool available.	Uses established technology and established methods. Large experienced contractor pool available. Additional complexity due to the requirement to trench and burry toward / away from rock. Captures 14.125 km of the 15.375 km of umbilical.	Uses established technology and established methods. Large experienced contractor pool available. Layout of field is relatively simple.
		Ranking	Lower Impact	Lower Impact	Lower Impact	Moderate Impact	Lower Impact
	RAG Count		High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 1; Lower Impact = 0; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1
	Narrative						
	RAG Rank		Lower Impact	Lower Impact	Lower Impact	Moderate Impact	Lower Impact

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2. Safety: The extent to which the option may pose health and safety risks in the short- and long-term, both during decommissioning activities offshore and during disposal activities onshore. This includes both decommissioning operators, and other users of land and sea

	Sub-Criteria / Decommissioning Option		Option 1A: Total Removal by Reverse Reeling	Option 1B: Total Removal by Lift and Cut	Option 2A: Remediate in situ with Exposed Sections Rock Covered	Option 2B: Remediate in situ with Exposed Sections Trenched & Buried	Option 2C: Remediate in situ with Exposed Sections Cut & Removed
Safety	Risk During Project Execution... to project personnel	Workshop Narrative	501tonnes of material returned to shore. No vessel SIMOPs. Some materials handling on deck.	Increased offshore cutting and handling activities compared to Option 1A Reverse Reeling. 501 tonnes of material returned to shore. No vessel SIMOPs. Some materials handling on deck. Ranked MI to reflect personnel exposed on deck due to manual and automated handling operations.	No vessel SIMOPs. 62,307 tonnes of rock required.	No vessel SIMOPs.	460 tonnes of material returned to shore. No vessel SIMOPs. Some materials handling on deck. Cutting of umbilical and spot rock placement can be undertaken remotely from people.
		Ranking	Lower Impact	Moderate Impact	Lower Impact	Lower Impact	Lower Impact
	Risk During Project Execution... to those on land	Workshop Narrative	Increased onshore cutting and handling activities. 501 tonnes of material returned to shore.	501 tonnes of material returned to shore. Multiple lifts of cut material assumed to be in baskets onshore for dismantling.	*No material recovered.*	*No material recovered.*	Increased onshore cutting and handling activities. 460 tonnes of material returned to shore.
		Ranking	Moderate Impact	Moderate Impact	Lower Impact	Lower Impact	Moderate Impact
	Risk During Project Execution... to other users of the sea	Workshop Narrative	13 vessel days. No vessel SIMOPs. All options ranked Low impact therefore reranked to NSD.	14 vessel days. No vessel SIMOPs. Low impact.	30 vessel days. No vessel SIMOPs. Low impact.	14 vessel days. No vessel SIMOPs. Low impact.	15 vessel days. No vessel SIMOPs.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different
	Residual (Long-Term) Risk to Other Users of the Sea	Workshop Narrative	Full removal - no increased risk to fishing. Safe seabed as demonstrated post completion survey All options ranked Low impact therefore reranked to NSD.	Full removal - no increased risk to fishing. Safe seabed as demonstrated post completion survey.	Rock would be laid in an overtrawlable profile in line with SFF requirements. Safe seabed as demonstrated post completion survey. Separation distance between adjacent Group A pipelines and Group B Umbilical is approximately 30 m (pipeline corridor distance). SFF expectation is a minimum of 50 meters between rock berms. Option therefore ranked Moderate.	Exposed sections to be trenched and buried such that SFF requirements are met. Safe seabed as demonstrated post completion survey.	Exposed sections to be fully removed. Cut ends will have spot rock placed over them to ensure no snag risk. Safe seabed as demonstrated post completion survey.
		Ranking	Lower Impact	Lower Impact	Moderate Impact	Lower Impact	Lower Impact
	RAG Count		High Impact = 0; Moderate Impact = 1; Lower Impact = 2; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 2; Lower Impact = 1; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 1; Lower Impact = 2; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 3; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 1; Lower Impact = 2; Not Significantly Different = 1
	Narrative			Two Moderate rankings therefore ranked 4th under this criterion.			
	RAG Rank		Moderate Impact	Moderate Impact	Moderate Impact	Lower Impact	Moderate Impact

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3. Environmental: The extent to which the option impacts on the marine and non-marine ecology from activities in the short- and long-term.The extent of greenhouse gas emissions and any other known pollutant impacts. This could include impacts to sensitive species, short- and long-term changes to hard structure habitat, exposure to contaminants, as well as the energy and emissions associated with recycling materials compared to the extraction of new resources

	Decommissioning Option		Option 1A: Total Removal by Reverse Reeling	Option 1B: Total Removal by Lift and Cut	Option 2A: Remediate in situ with Exposed Sections Rock Covered	Option 2B: Remediate in situ with Exposed Sections Trenched & Buried	Option 2C: Remediate in situ with Exposed Sections Cut & Removed
Environmental	Impact of Decommissioning Operations Offshore	Workshop Narrative	Emissions: Total vessel days anticipated to be 13 days. Resource Use: Fuel use will vary between options (associated with vessel type and duration of offshore and onshore activities). Discharges: All vessels will be MARPOL compliant. It is expected that the lines contain/will contain seawater at the time of decommissioning. Discharges are therefore not expected to have a significant impact on receptors. Underwater Noise: Sources of underwater noise will include the presence of vessels and the noise associated with reeling of the lines. These underwater noise sources are not considered to have a significant impact on marine mammals or fish species in the area. All ranked as not significantly different based on them all being low.	Emissions: Total vessel days anticipated to be 14 days. For resource use, discharges to sea and underwater noise and justification for ranking - descriptor as for Option 1A.	Emissions: Total vessel days anticipated to be 30 days. For resource use, discharges to sea and underwater noise and justification for ranking - descriptor as for Option 1A.	Emissions: Total vessel days anticipated to be 14 days. For resource use, discharges to sea and underwater noise and justification for ranking - descriptor as for Option 1A.	Emissions: Total vessel days anticipated to be 15 days. For resource use, discharges to sea and underwater noise and justification for ranking - descriptor as for Option 1A.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different
	Short-Term Seabed Disturbance	Workshop Narrative	Vessels will use DP, therefore no anchoring. Site surveys have identified PMFs in the vicinity such as *Arctica Islandica* and habitat similar to OSPAR habitat 'Sea pens and burrowing megafauna'. Total removal assumed to not require excavation of the umbilical as burial depth is 0.3 m. Condition of seabed following mass flow excavation hard to predict. Due to full length of umbilical line is considered as exposed and therefore not requiring excavation along *c* . 15.375 km of line, the area of impact and therefore short term seabed disturbance was considered to have a lower Magnitude of Effect relative to the decommission *in situ* options.	Descriptor as for Option 1A.	Vessels will use DP, therefore no anchoring. Requires trenching and burying of full length of exposed umbilical *c* . 13.95 km, as the full umbilical length is considered exposed and therefore would require remediation. Magnitude of Effect of short term impact based on footprint is considered greater than Option 1A.	Descriptor as for Option 2A.	Vessels will use DP, therefore no anchoring. Site surveys have identified PMFs in the vicinity such as Arctica Islandica and habitat similar to OSPAR habitat 'Sea pens and burrowing megafauna'. The removal of the exposed sections are assumed to not require excavation of the umbilical as burial depth is 0.3 m. Therefore, c. 14.125 km of line, to be recoved with only an immediate area of impact and associated short term seabed disturbance. This was considered to have a lower Magnitude of Effect relative to the other decommission in situ options, more akin to the two full removal options.
		Ranking	Lower Impact	Lower Impact	Moderate Impact	Moderate Impact	Lower Impact
	Long-Term Change of Habitat	Workshop Narrative	Not expected to be any long term impacts on seabed communities.	Not expected to be any long term impacts on seabed communities.	Rock introduced. A total of *c* . 62,307 te of rock would be required for remediation of full length of umbilical line *c* . 14.125km. Magnitude of Effect considered highest for this option.	With burial of the full length of umbilical line *c* . 14.125km, no infrastructure left on seabed such that no long term impacts. Assumed target depth is reached.	With ~14.125km of the line recovered, only sections already rock covered will be left in situ (with very minor spot rock on ends). As such it was not concluded the long term impacts on the seabed communities would be that different to the full removal options, which also leave the existing rock cover (albeit potentially scattered from the recovery)
		Ranking	Lower Impact	Lower Impact	Moderate Impact	Lower Impact	Lower Impact
	Waste Processing	Workshop Narrative	Approximately 501 te of material returned onshore of which c. 123 te would go to landfill. Given the commitment to adhere to the waste hierarchy, volumes of material to landfill will be minimised. Based on volumes to be returned for relative options impacts considered low across all options and marked as not significant. All options LI therefore reranked NSD.	Descriptor as for Option 1A.	No materials returned onshore.	No materials returned onshore.	Approximately 466 te of material returned onshore of which c. 113 te would go to landfill. Given the commitment to adhere to the waste hierarchy, volumes of material to landfill will be minimised.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different
	RAG Count		High Impact = 0; Moderate Impact = 0; Lower Impact = 2; Not Significantly Different = 2	High Impact = 0; Moderate Impact = 0; Lower Impact = 2; Not Significantly Different = 2	High Impact = 0; Moderate Impact = 2; Lower Impact = 0; Not Significantly Different = 2	High Impact = 0; Moderate Impact = 1; Lower Impact = 1; Not Significantly Different = 2	High Impact = 0; Moderate Impact = 0; Lower Impact = 2; Not Significantly Different = 2
	Narrative				Ranked 4th as two moderate rankings.		
	RAG Rank		Lower Impact	Lower Impact	Moderate Impact	Moderate Impact	Lower Impact

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4. Societal: The extent to which the option has short- and long-term socio-economic impacts resulting from decommissioning activities. This may include fishing interruption, commercial or naval vessel diversion, and onshore community impacts due to noise, pollution and traffic. It may also include socioeconomic benefits to the onshore community through employment opportunities.

	Decommissioning / Option		Option 1A: Total Removal by Reverse Reeling	Option 1B: Total Removal by Lift and Cut	Option 2A: Remediate in situ with Exposed Sections Rock Covered	Option 2B: Remediate in situ with Exposed Sections Trenched & Buried	Option 2C: Remediate in situ with Exposed Sections Cut & Removed
Societal	Impact of Commercial Fisheries	Workshop Narrative	The flowlines and umbilicals will be fully removed. Evidence of a safe seabed will be obtained. Therefore no significant impact on commercial fisheries anticipated for this option.	Descriptor as for Option 1A.	Potential for new rock berms to alter fishing activity. Rock added to full length of umbilical line (*c.* 15.375 km) will be within the trench and laid in an overtrawlable profile. Due to a short distance of exposed length, therefore no significant impact on commercial fisheries anticipated for this option. **Senstivity: moderate impact.**	The full length of umbilical line (*c.* 15.375 km) would be covered to a target depth of 0.6 m to top of pipe. Therefore no significant impact on commercial fisheries anticipated for this option.	Exposed sections to be fully removed. Cut ends will have spot rock placed over them to ensure no snag risk. Safe seabed as demonstrated post completion survey.
		Ranking	Lower Impact	Lower Impact	Lower Impact	Lower Impact	Lower Impact
	Socio-Economic Impact on Communities & Amenities	Workshop Narrative	Although materials are returned onshore the quantity (*c.* 501 te) is not expected to result in the creation of new jobs. Impacts on communities and amenities as a result of increased road traffic, odour and noise are not expected to be significant as materials will be returned to licensed and currently operating yards and recycling/ disposal facilities. All options ranked LI therefore reranked NSD.	Descriptor as for Option 1A.	No materials returned, such that no new onshore jobs anticipated. Similarly no impact on communities and amenities.	Descriptor as for Option 2A.	Although materials are returned onshore the quantity (c. 460te) is not expected to result in the creation of new jobs. Impacts on communities and amenities as a result of increased road traffic, odour and noise are not expected to be significant as materials will be returned to licensed and currently operating yards and recycling/ disposal facilities.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different
	RAG Count		High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 1; Not Significantly Different = 1
	Narrative				Sensitivity to be checked.		
	RAG Rank		Lower Impact	Lower Impact	Lower Impact	Lower Impact	Lower Impact

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	J-UK-00351-218919 - Enoch Decommissioning Support (w Option 2C) - Comparative Assessment (CA) Workshop - Group B: Umbilical (trenched and buried w/ partial rock cover & avg. DoC = 0.3 m)						
	5. Economic Risk: The total cost of the option which may include removal and remediation activities; pre- and post-decommissioning surveys; and post-decommissioning monitoring.						
	Sub-Criteria / **Decommissioning Option**		**Option 1A: Total Removal by Reverse Reeling**	**Option 1B: Total Removal by Lift and Cut**	**Option 2A: Remediate in situ with Exposed Sections Rock Covered**	**Option 2B: Remediate in situ with Exposed Sections Trenched & Buried**	**Option 2C: Remediate in situ with Exposed Sections Cut & Removed**
Economic Risk	**Cost of Decommissioning Activities**	**Workshop Narrative**	3,250 kGBP. *Second highest costing option.* 155% more costly than the lowest costing option. Assumes uses the same vessel as Group A pipelines. Considering the absolute costs between the options all are considered to be LI therefore all reranked to NSD. Estimates are assumed to be Class 5 (+-50%) therefore no differentiator identified.	3,080 kGBP. 146% more costly than the lowest costing option.	2,448 kGBP. 116% more costly than the lowest costing option.	2,103 kGBP. *Lowest costing option.*	3,750 kGBP. *Highest costing option.* 178% more costly than the lowest costing option.
		Ranking	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different
	RAG Count		High Impact = 0; Moderate Impact = 0; Lower Impact = 0; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 0; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 0; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 0; Not Significantly Different = 1	High Impact = 0; Moderate Impact = 0; Lower Impact = 0; Not Significantly Different = 1
	Narrative						
	RAG Rank		Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different	Not Significantly Different

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J-UK-00351-218919 - Enoch Decommissioning Support (w Option 2C) - Comparative Assessment (CA) Workshop - Group B: Umbilical (trenched and buried w/ partial rock cover & avg. DoC = 0.3 m)					
UNWEIGHTED SCORES					
Sub-Criteria / **Decommissioning Options**	**Option 1A: Total Removal by Reverse Reeling**	**Option 1B: Total Removal by Lift and Cut**	**Option 2A: Remediate in situ with Exposed Sections Rock Covered**	**Option 2B: Remediate in situ with Exposed Sections Trenched & Buried**	**Option 2C: Remediate in situ with Exposed Sections Cut & Removed**
Risk of Major Project Failure	NSD	NSD	NSD	NSD	NSD
Technical Complexity & Track Record	L	L	L	M	L
Risk During Project Execution... to project personnel	L	M	L	L	L
Risk During Project Execution... to those on land	M	M	L	L	M
Risk During Project Execution... to other users of the sea	NSD	NSD	NSD	NSD	NSD
Residual (Long-Term) Risk to Other Users of the Sea	L	L	M	L	L
Impact of Decommissioning Operations Offshore	NSD	NSD	NSD	NSD	NSD
Short-Term Seabed Disturbance	L	L	M	M	L
Long-Term Change of Habitat	L	L	M	L	L
Waste Processing	NSD	NSD	NSD	NSD	NSD
Impact of Commercial Fisheries	L	L	L	L	L
Socio-Economic Impact on Communities & Amenities	NSD	NSD	NSD	NSD	NSD
Cost of Decommissioning Activities	NSD	NSD	NSD	NSD	NSD
TOTAL UNWEIGHTED SCORE	High Impact = 0; Moderate Impact = 1; Lower Impact = 6; Not Significantly Different = 6	High Impact = 0; Moderate Impact = 2; Lower Impact = 5; Not Significantly Different = 6	High Impact = 0; Moderate Impact = 3; Lower Impact = 4; Not Significantly Different = 6	High Impact = 0; Moderate Impact = 2; Lower Impact = 5; Not Significantly Different = 6	High Impact = 0; Moderate Impact = 1; Lower Impact = 6; Not Significantly Different = 6
RANK	**1st**	**3rd**	**5th**	**3rd**	**1st**

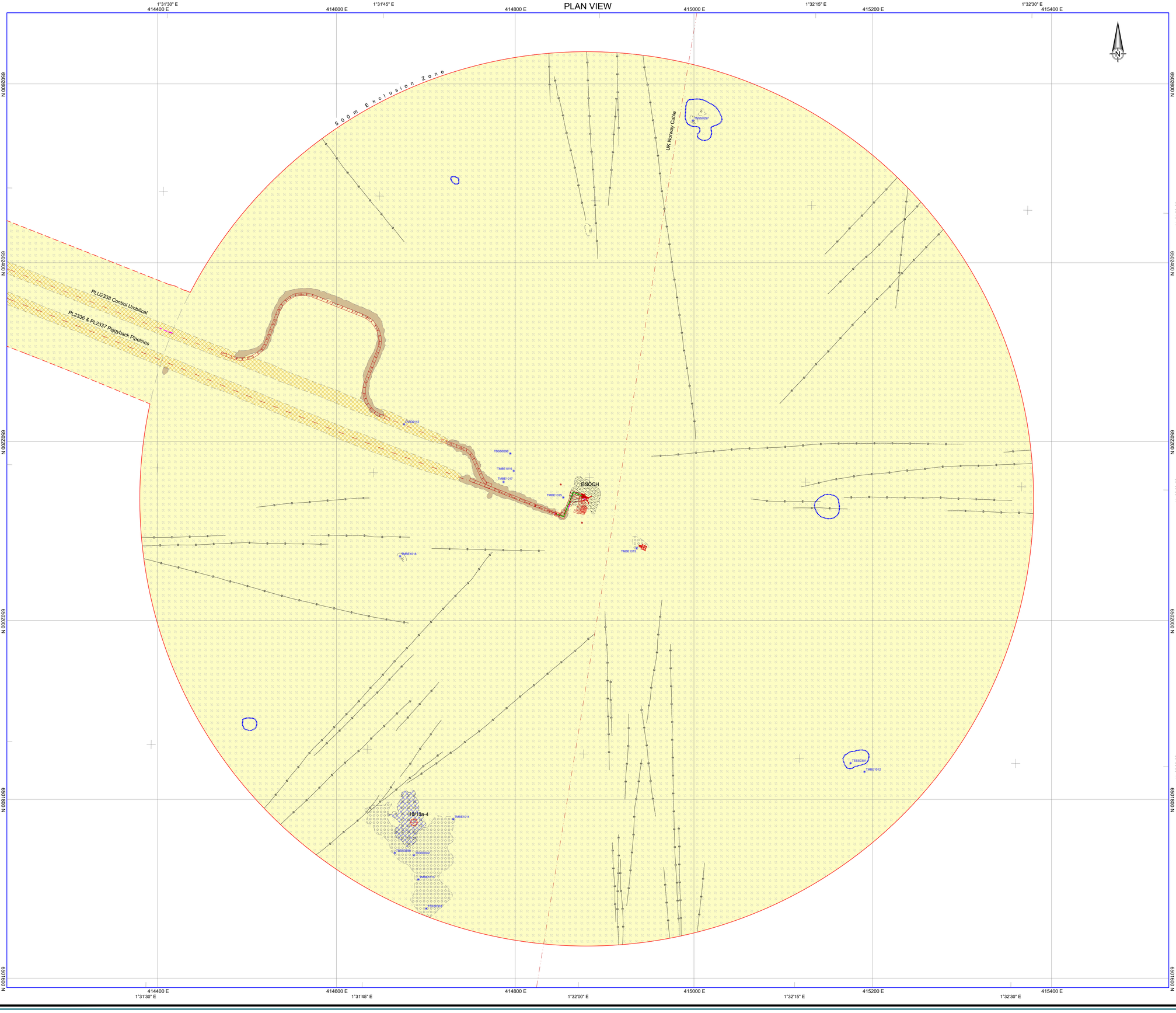
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APPENDIX D – DEPTH OF BURIAL PROFILES

Depth of burial profiles [Ref. 6] can be found in the pages overleaf.

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PLAN VIEW



Notes

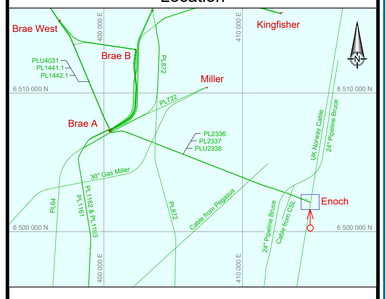
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Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack Secondary - Fugro StarPack Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

PLAN VIEW

- 9.00 — Kilometre post
- KP database
- Product Exposure ≥10m
- Product Freespan ≥10m
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
- TSS00001 — SSS Target with Target ID No.
- TMBE0002 — MBE Target with Target ID No.
- DVD0011 — Debris with Debris ID No.
- Sand — High reflectivity
- Gravel — Medium reflectivity
- Shell Matter with possible gravel intervention — Low reflectivity
- Spudcan footprint — Shell Aggregations
- Drill cuttings — Disturbed sediment
- Various protective covers and mattresses — Pockmark Cluster
- Dredged - Trench — Pockmarks - isolated

Location



0 50 100 150 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Company Review	VET	MKC	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	21 July '23

Karmsundgata 74
Postboks 2144
Postterminalen
N-5504 Haugesund, Norway
Tel. : + 47 52 70 04 00
www.deepoceangroup.com

DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-ENOCH-001_Rev01.dwg	Project: 2023 Decommissioning Survey Clyde Area and Enoch Enoch Manifold
Report No. : PRJ000836-SUR-REP-002	
Survey date : May & June 2023	
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Vertical Scale : N/A	
Chart size : A1	

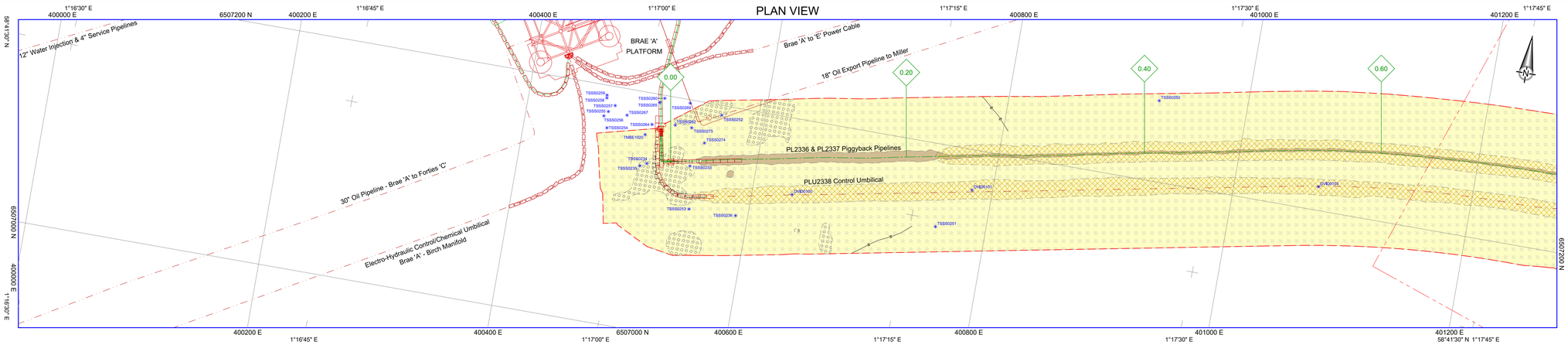
Enoch Manifold Site Survey

Contract No. : RL23003

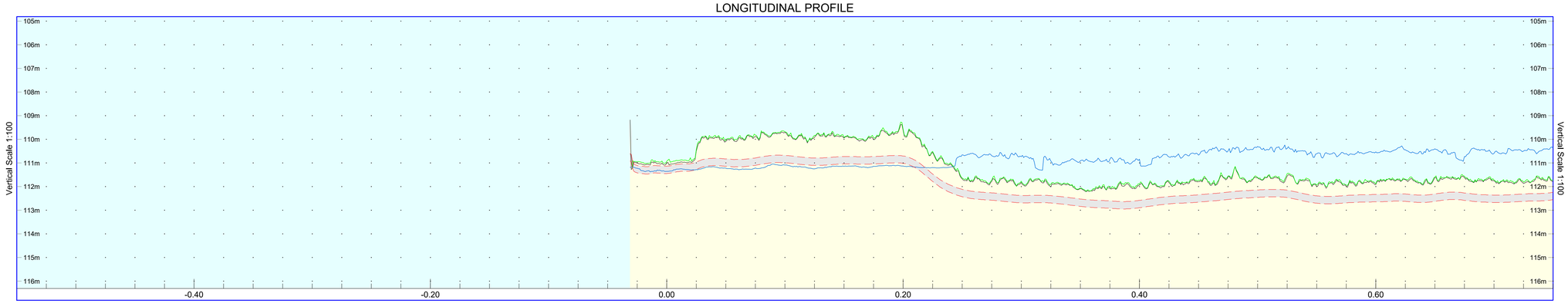
REPSOL SINOPEC Resources UK

PRJ000836 - SUR - CHA - ENOCH -	001	01
Drawing No.	Sheet No.	Rev.

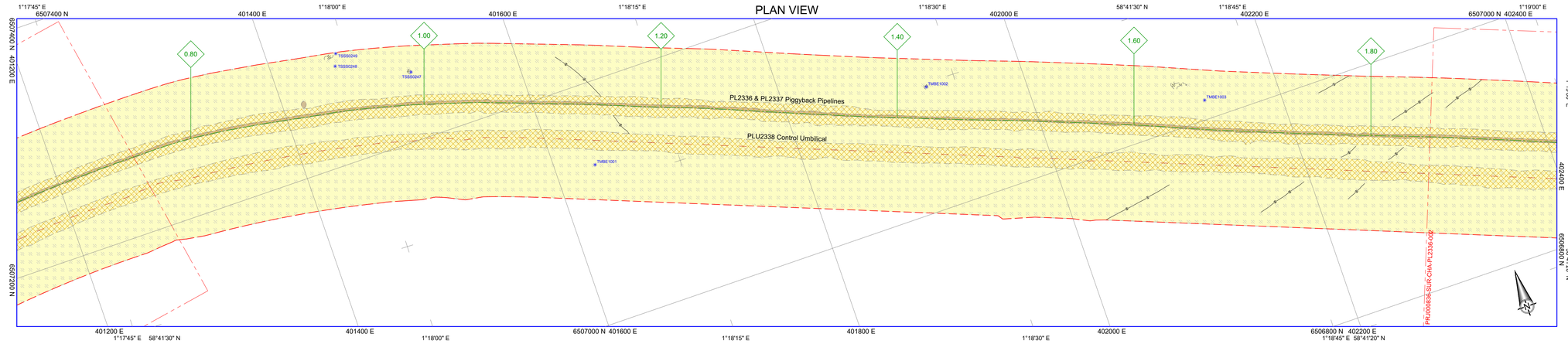
PLAN VIEW



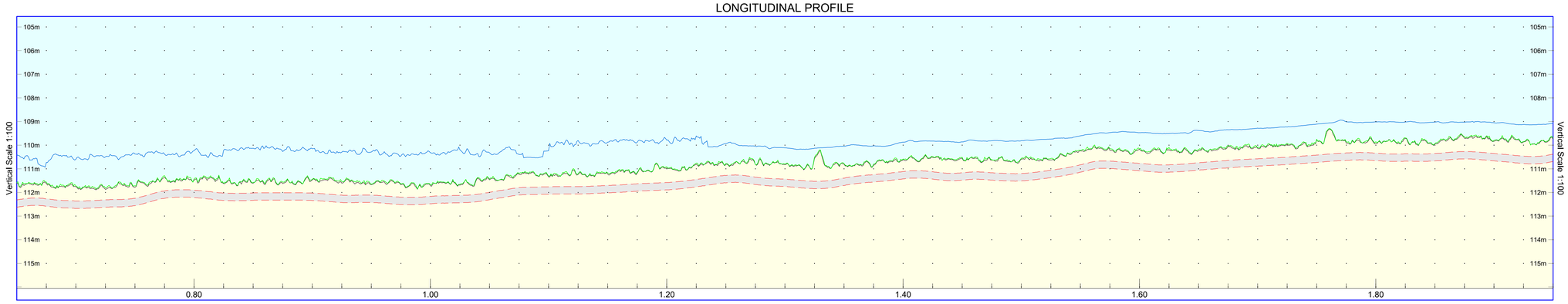
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

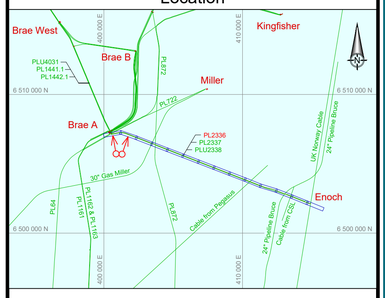
PLAN VIEW

- 9.00 — Kilometre post
- KP database
- Product Exposure ≥10m
- Product Freespan ≥10m
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
- TSS50001 — SSS Target with Target ID No.
- TMBE0002 — MBE Target with Target ID No.
- DVD0011 — Debris with Debris ID No.
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product
- Freespans ≥10m

Location



0 — 50 — 100 — 150 — 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-PL2336-001_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project

2023 Decommissioning Survey Clyde Area and Enoch PL2336

Title

Plan View and Longitudinal Profile KP -0.031 to KP 1.900

PL2336 - Production Pipeline - Brae A to Enoch

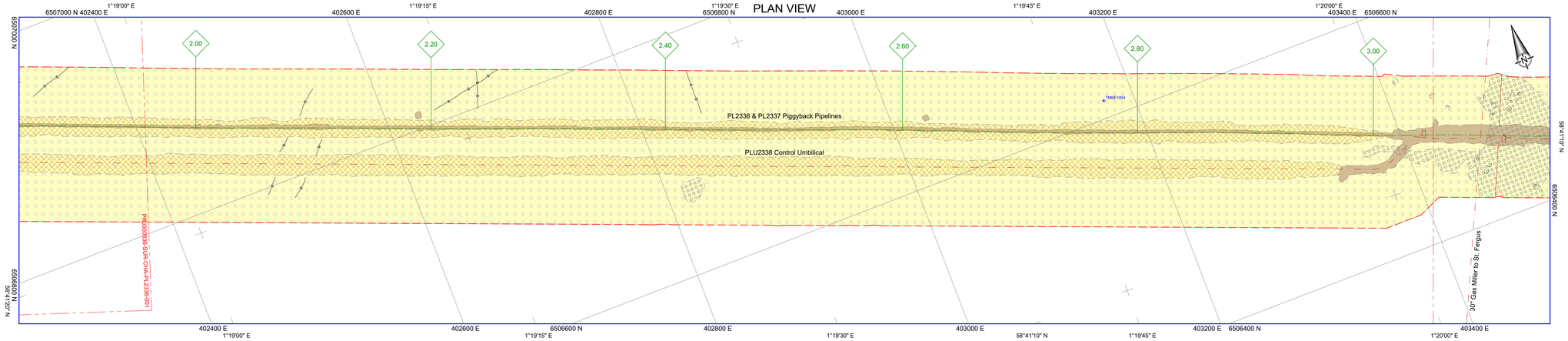
Contract No. : RL23003

REPSOL SINOPEC Resources UK

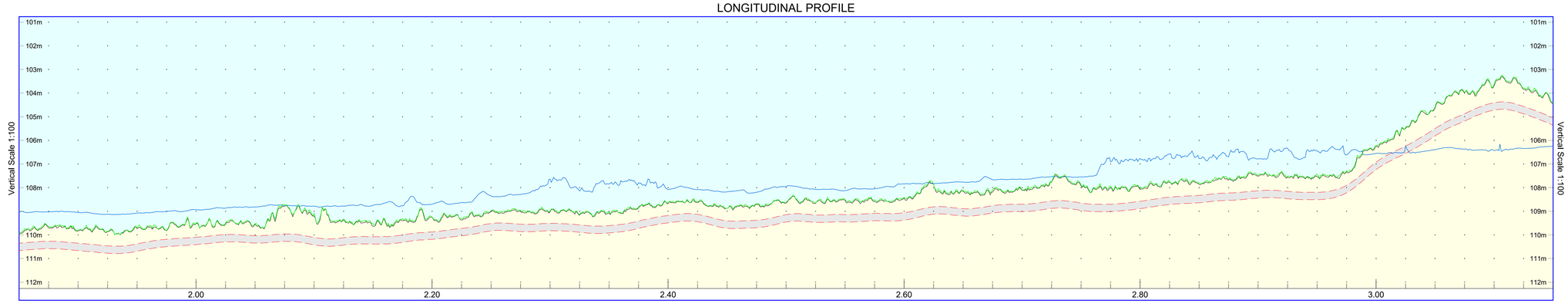
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Drawing No. | Sheet No. | Rev.

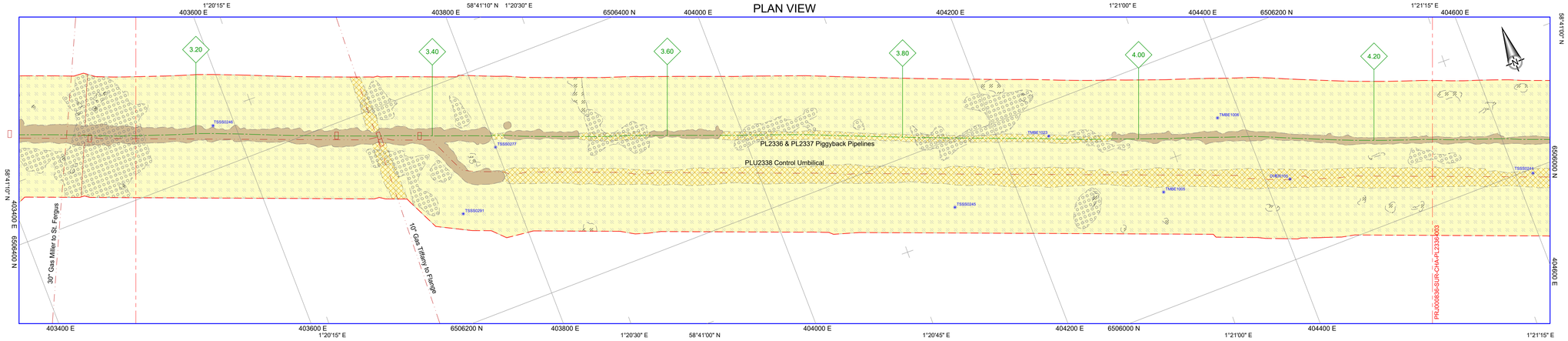
PLAN VIEW



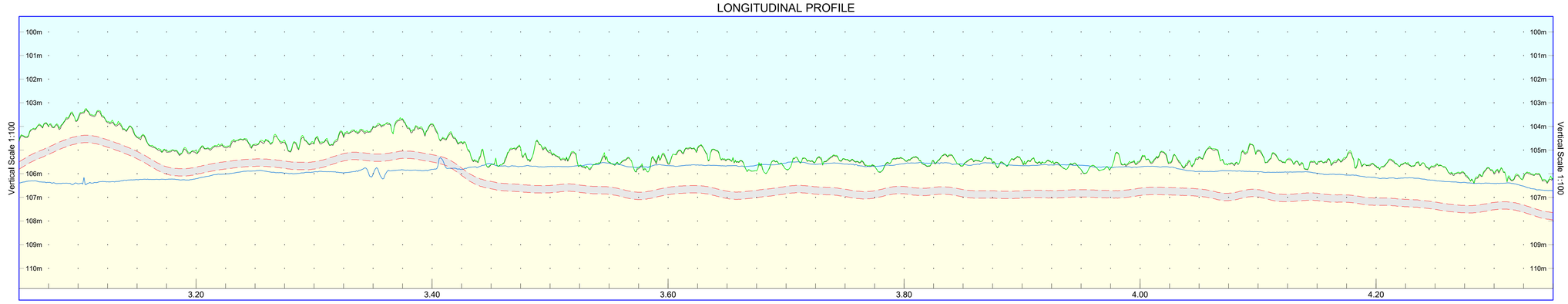
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

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Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
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Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

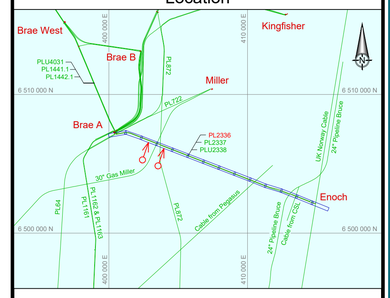
PLAN VIEW

- 9.00 — Kilometre post
- KP database
- Product Exposure ≥10m
- Product Freespan ≥10m
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
- TSS50001 — SSS Target with Target ID No.
- TMBE0002 — MBE Target with Target ID No.
- DVID0011 — Debris with Debris ID No.
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product
- Freespans ≥10m

Location



0 50 100 150 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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Drawing filename : PRJ000836-SUR-CHA-PL2336-002_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

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Project

2023
Decommissioning Survey
Clyde Area and Enoch
PL2336

Title

Plan View and
Longitudinal Profile
KP 1.900 to KP 4.300

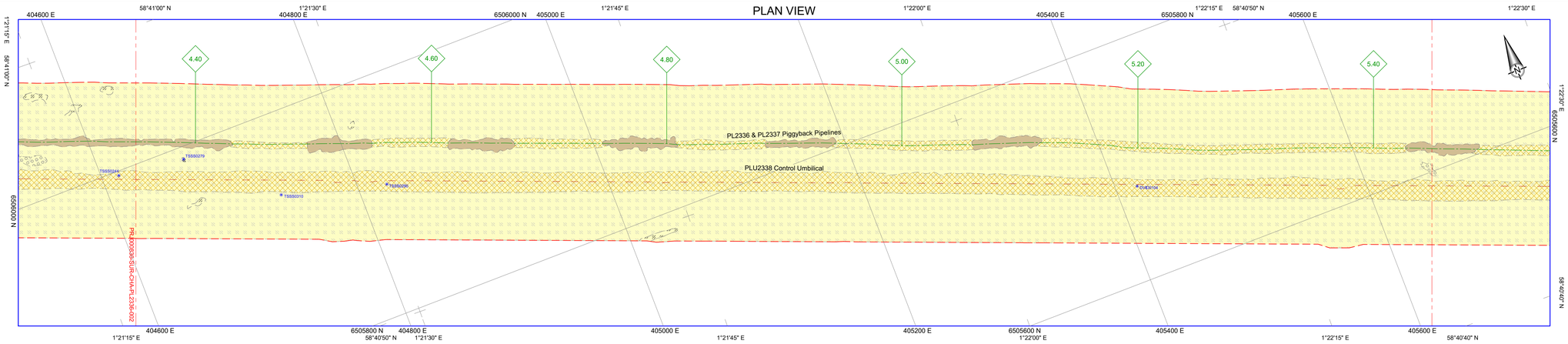
PL2336 - Production Pipeline - Brae A to Enoch

Contract No. : RL23003

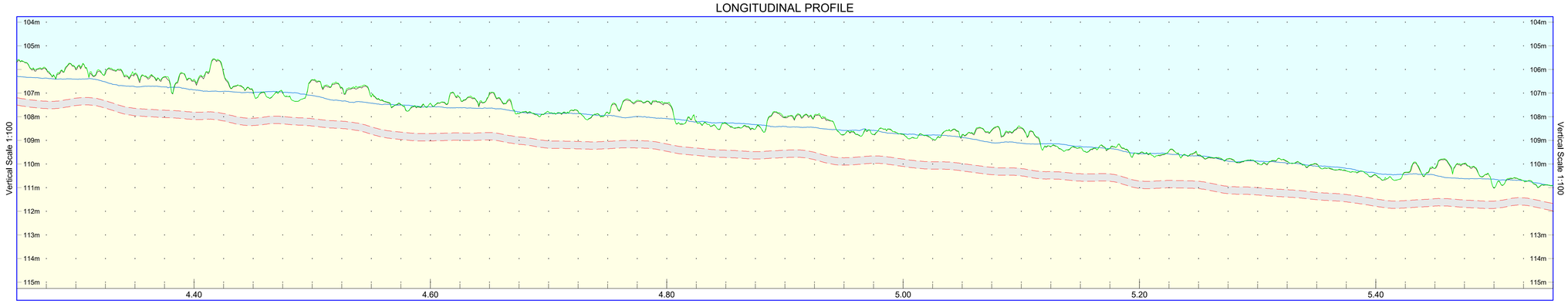
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
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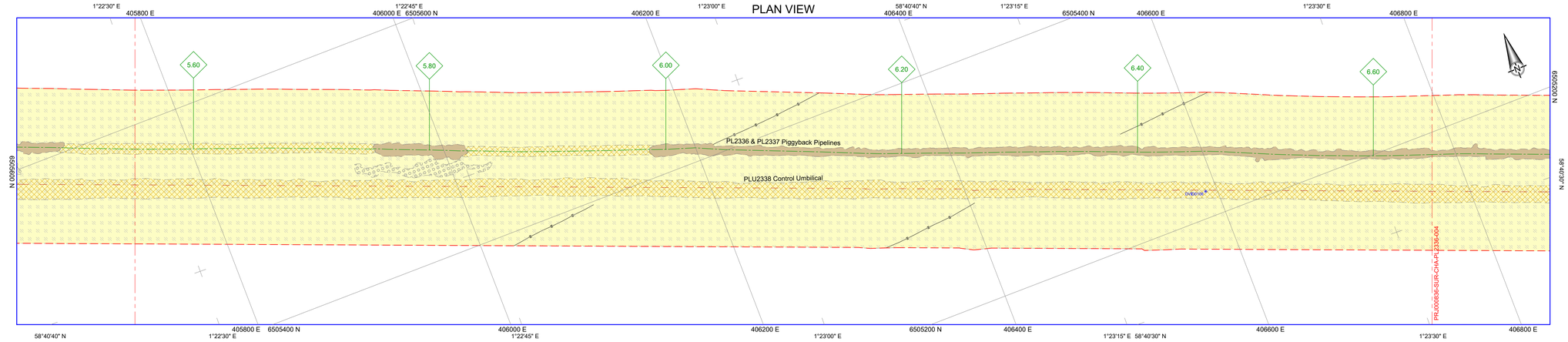
PLAN VIEW



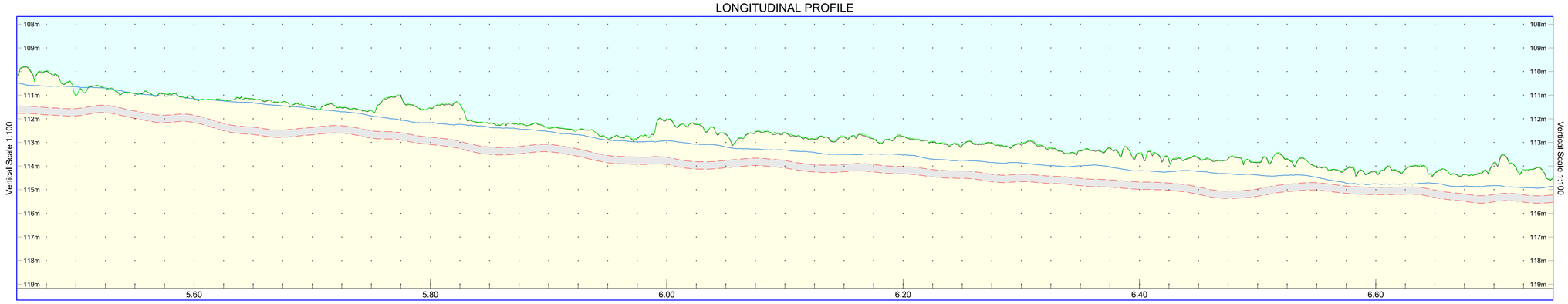
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
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Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

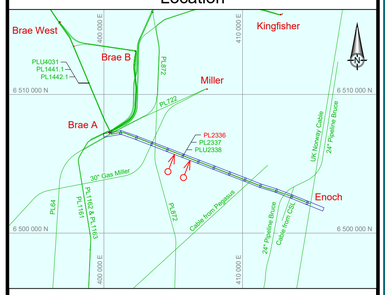
PLAN VIEW

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LONGITUDINAL PROFILE

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- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product
- Freespans ≥10m

Location



0 50 100 150 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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Drawing filename : PRJ000836-SUR-CHA-PL2336-003_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project

2023 Decommissioning Survey Clyde Area and Enoch PL2336

Title

Plan View and Longitudinal Profile KP 4.300 to KP 6.700

PL2336 - Production Pipeline - Brae A to Enoch

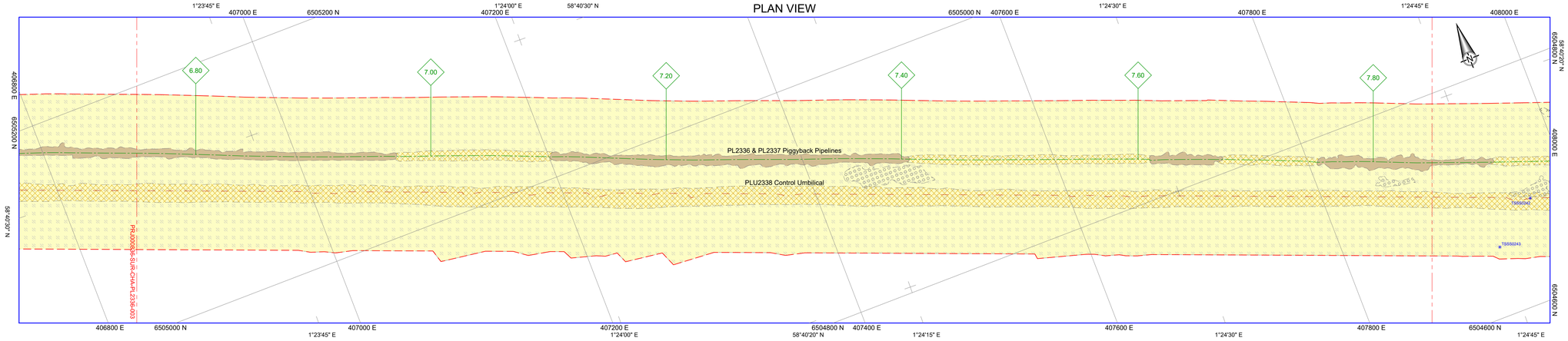
Contract No. : RL23003

REPSOL SINOPEC Resources UK

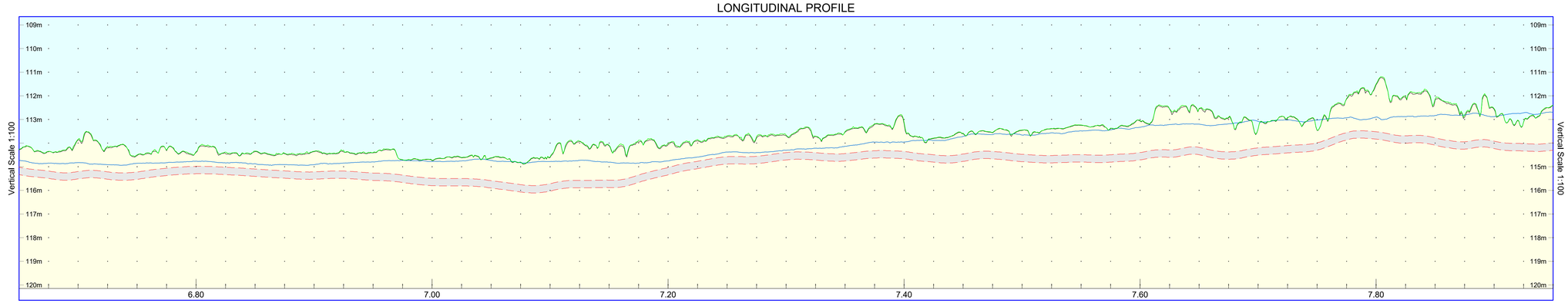
PRJ000836 - SUR - CHA - PL2336 - 003 02

Drawing No. | Sheet No. | Rev.

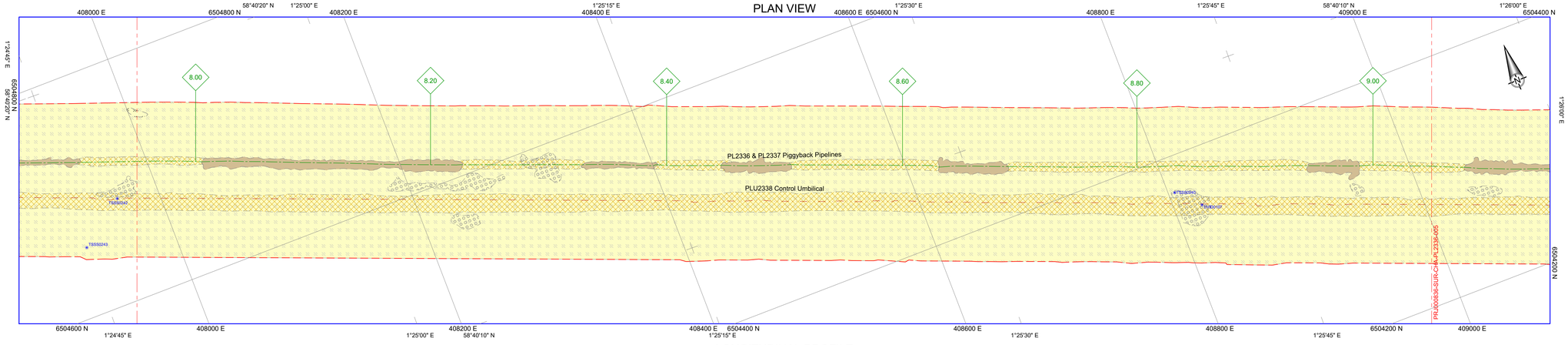
PLAN VIEW



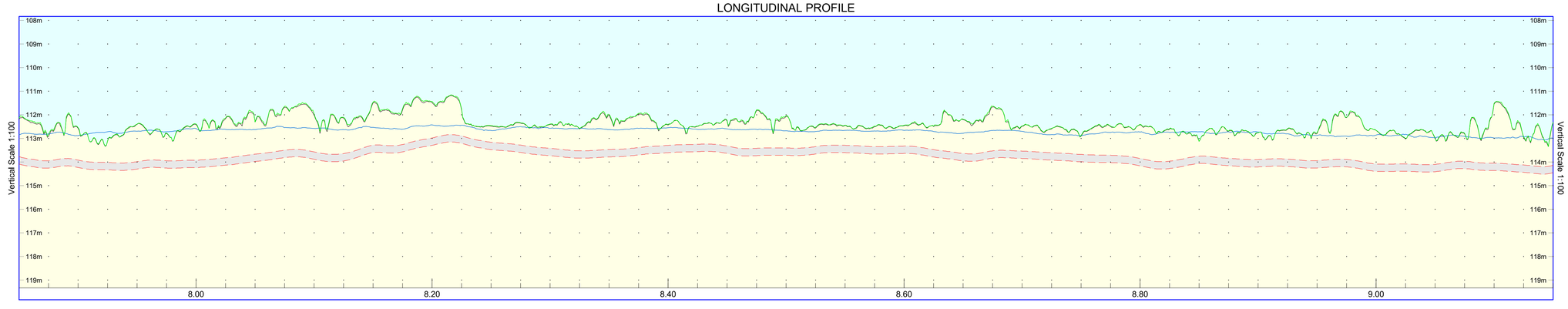
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
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Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

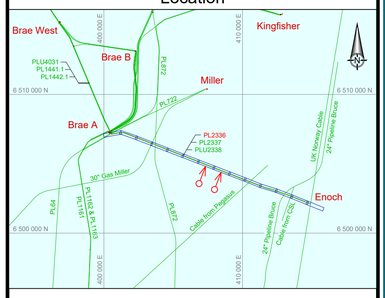
PLAN VIEW

- 9.00 — Kilometre post
- KP database
- Product Exposure ≥10m
- Product Freespan ≥10m
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
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- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product
- Freespans ≥10m

Location



0 — 50 — 100 — 150 — 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-PL2336-004_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project: 2023 Decommissioning Survey Clyde Area and Enoch PL2336

Title: Plan View and Longitudinal Profile KP 6.700 to KP 9.100

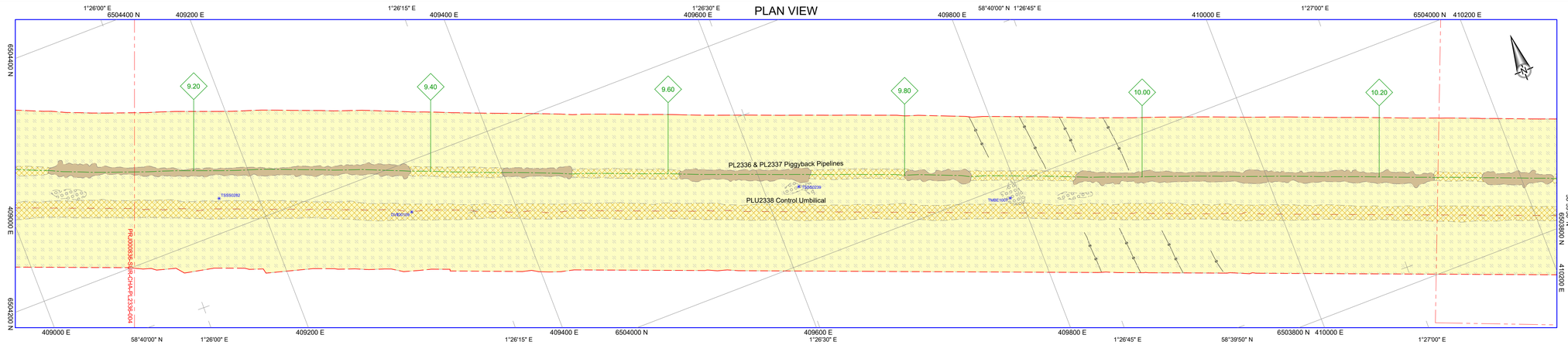
PL2336 - Production Pipeline - Brae A to Enoch

Contract No. : RL23003

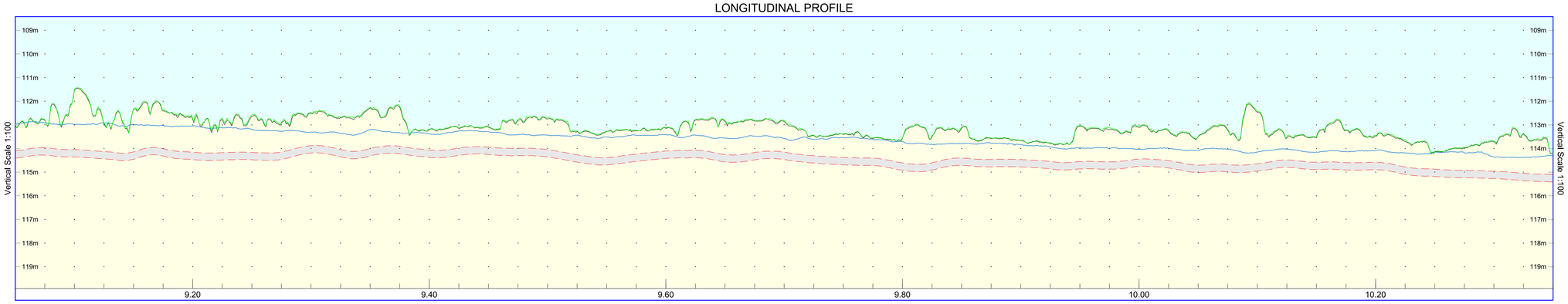
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PL2336 -	004	02

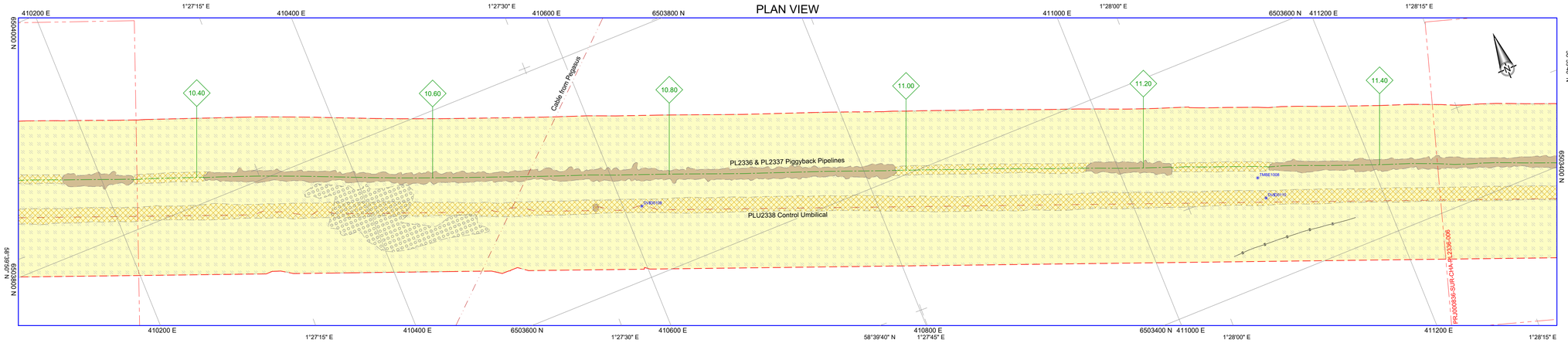
PLAN VIEW



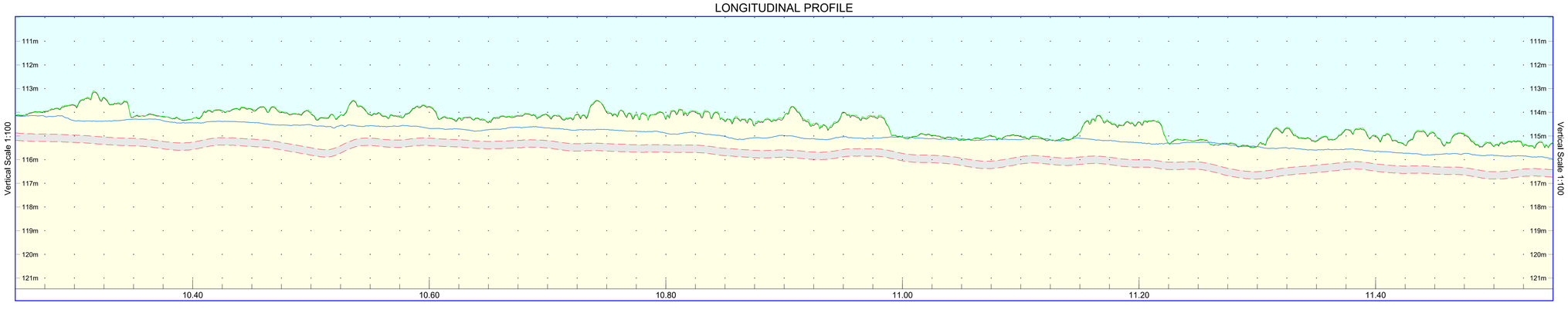
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

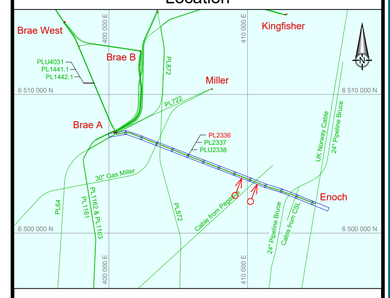
PLAN VIEW

- 9.00 — Kilometre post
- KP database
- Product Exposure ≥10m
- Product Freespan ≥10m
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
- TSS50001 — SSS Target with Target ID No.
- TMBE0002 — MBE Target with Target ID No.
- DVD0011 — Debris with Debris ID No.
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product
- Freespans ≥10m

Location



0 50 100 150 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-PL2336-005_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project: 2023 Decommissioning Survey Clyde Area and Enoch PL2336

Title: Plan View and Longitudinal Profile KP 9.100 to KP 11.500

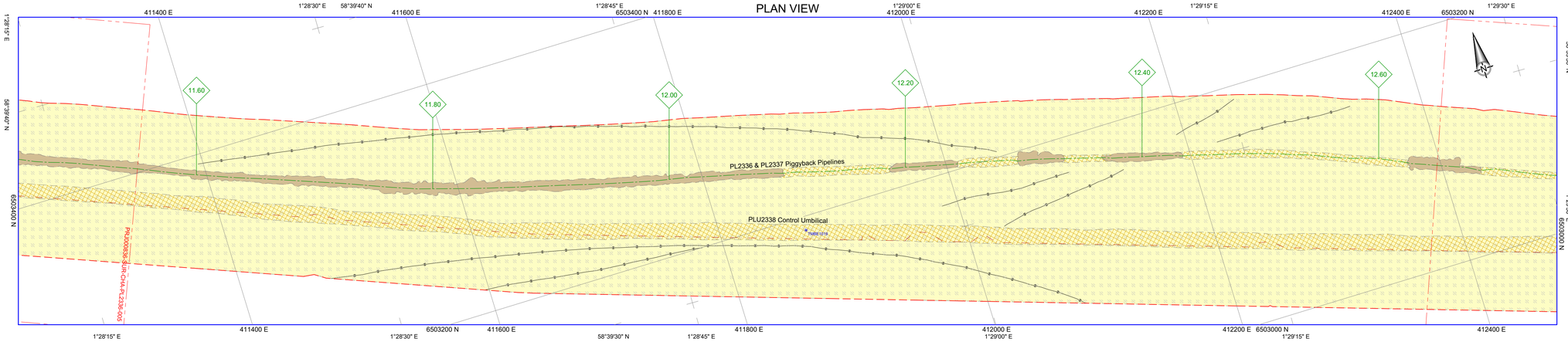
PL2336 - Production Pipeline - Brae A to Enoch

Contract No. : RL23003

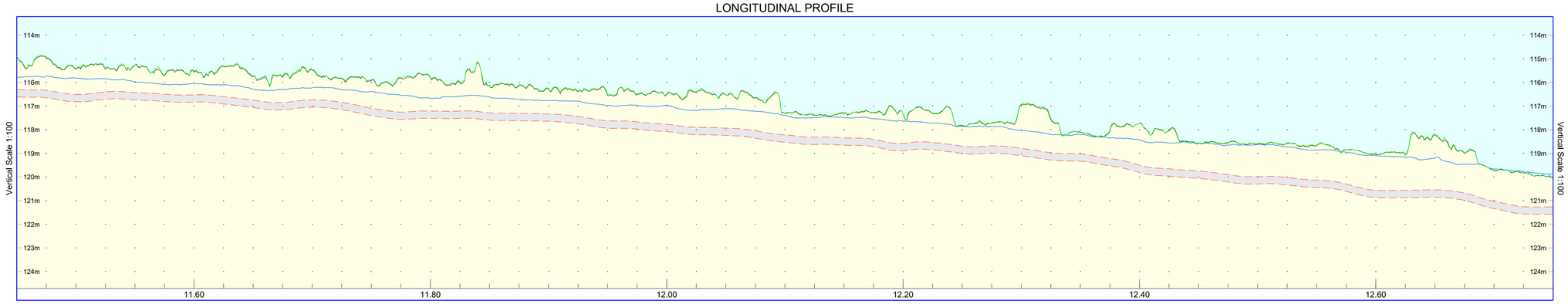
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PL2336 -	005	02

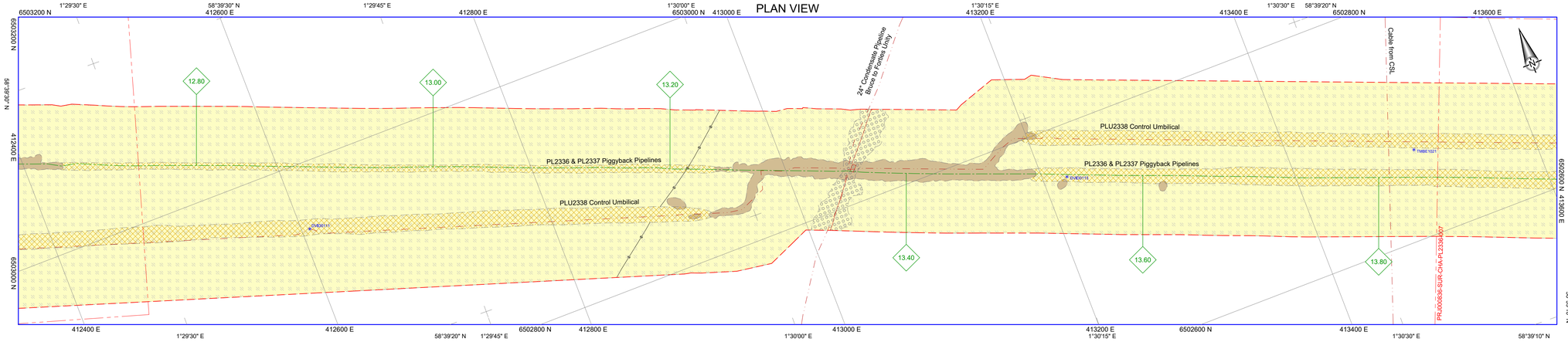
PLAN VIEW



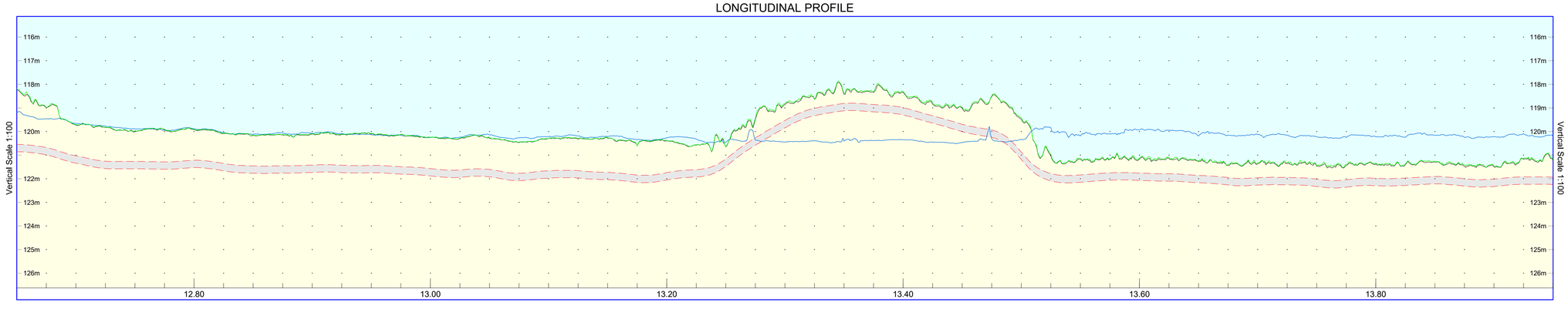
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

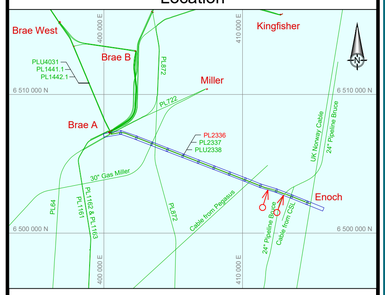
PLAN VIEW

- 9.00 — Kilometre post
- KP database
- Product Exposure ≥10m
- Product Freespan ≥10m
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
- TSS50001 — SSS Target with Target ID No.
- TMBE0002 — MBE Target with Target ID No.
- DVID0011 — Debris with Debris ID No.
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product
- Freespans ≥10m

Location



0 — 50 — 100 — 150 — 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
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DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-PL2336-006_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project: 2023 Decommissioning Survey Clyde Area and Enoch PL2336

Title: Plan View and Longitudinal Profile KP 11.500 to KP 13.900

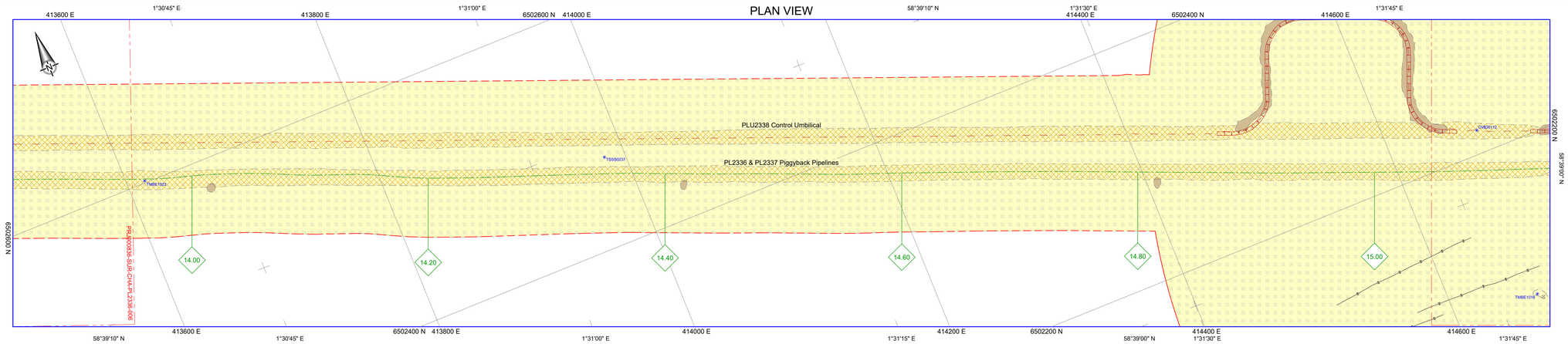
PL2336 - Production Pipeline - Brae A to Enoch

Contract No. : RL23003

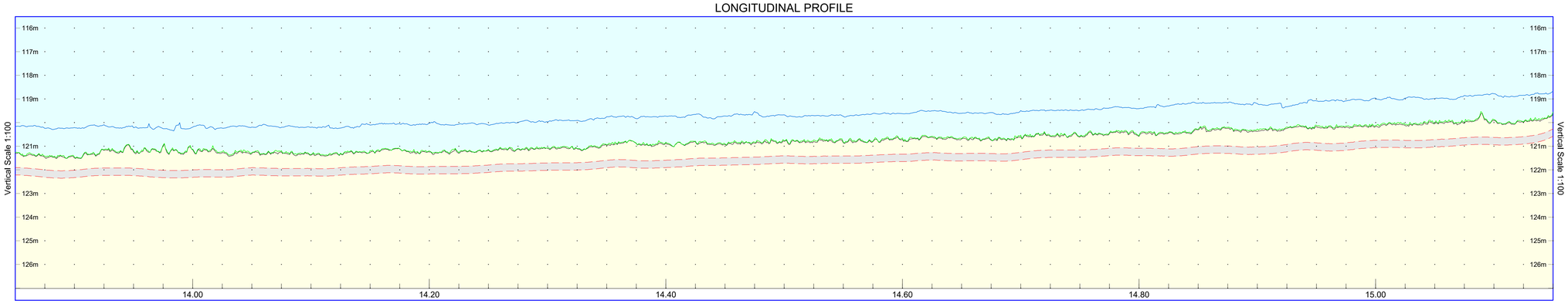
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PL2336 -	006	02

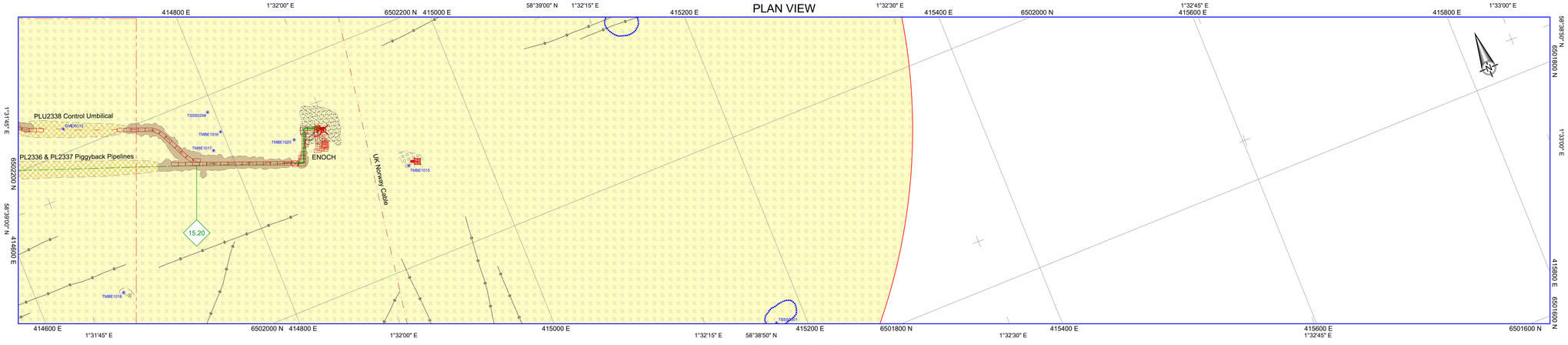
PLAN VIEW



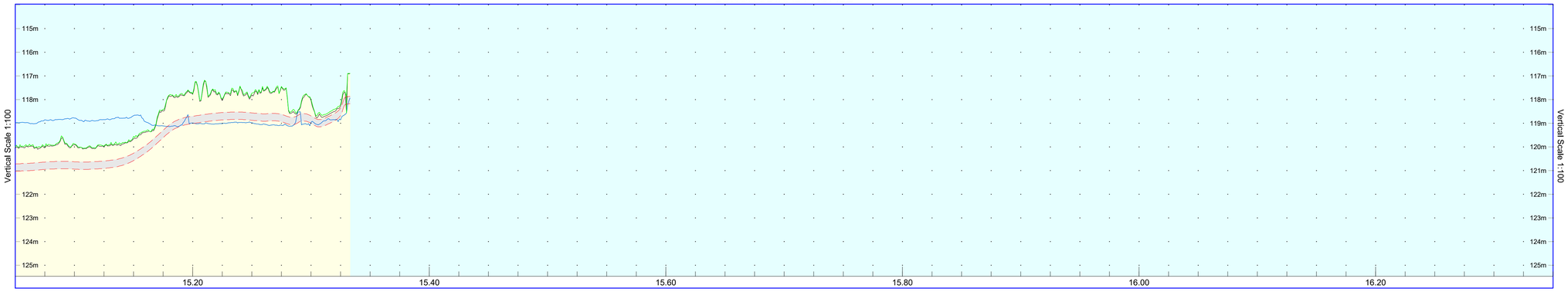
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

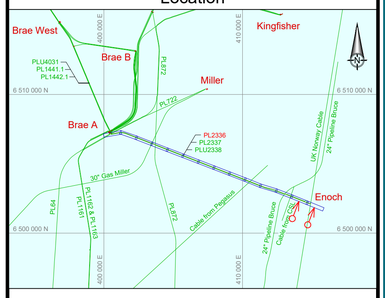
PLAN VIEW

- 9.00 — Kilometre post
- KP database
- Product Exposure ≥10m
- Product Freespan ≥10m
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
- TSS50001 — SSS Target with Target ID No.
- TMBE0002 — MBE Target with Target ID No.
- DVD0011 — Debris with Debris ID No.
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product
- Freespans ≥10m

Location



0 — 50 — 100 — 150 — 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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Drawing filename : PRJ000836-SUR-CHA-PL2336-007_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project

2023
Decommissioning Survey
Clyde Area and Enoch
PL2336

Title

Plan View and
Longitudinal Profile
KP 13.900 to KP 15.333

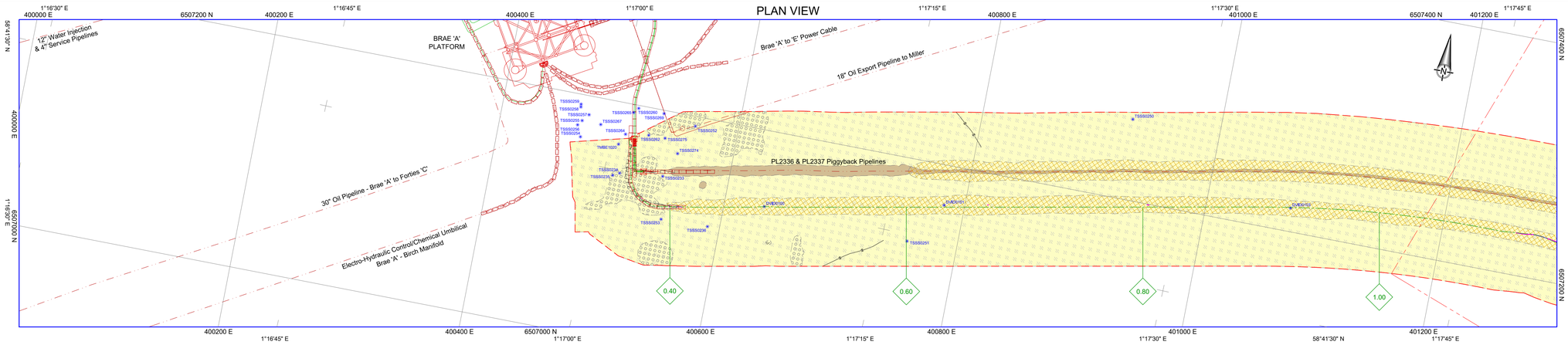
PL2336 - Production Pipeline - Brae A to Enoch

Contract No. : RL23003

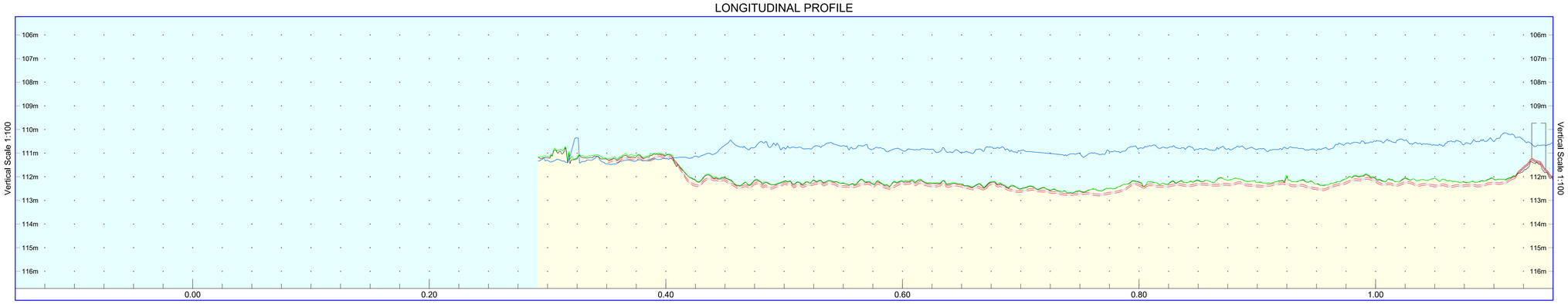
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PL2336 -	007	02

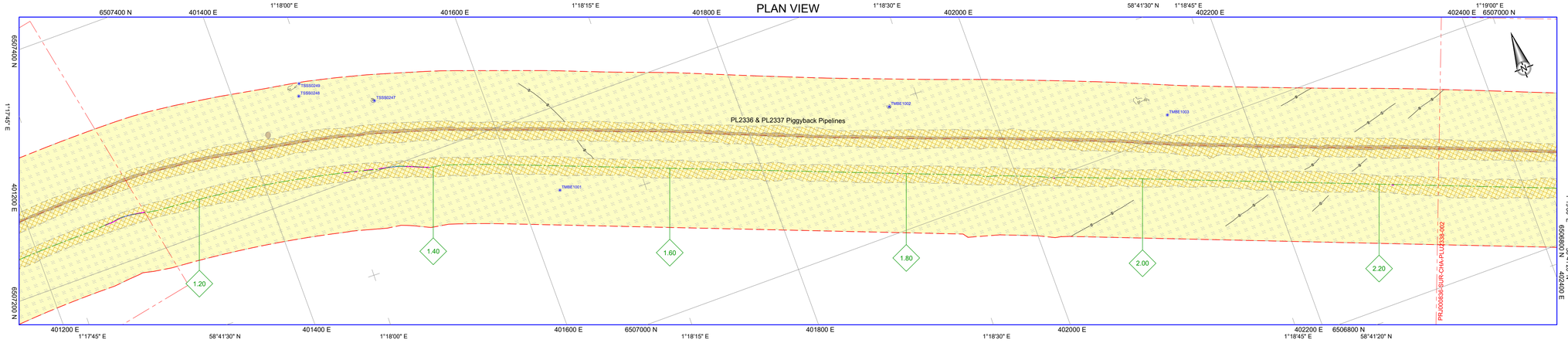
PLAN VIEW



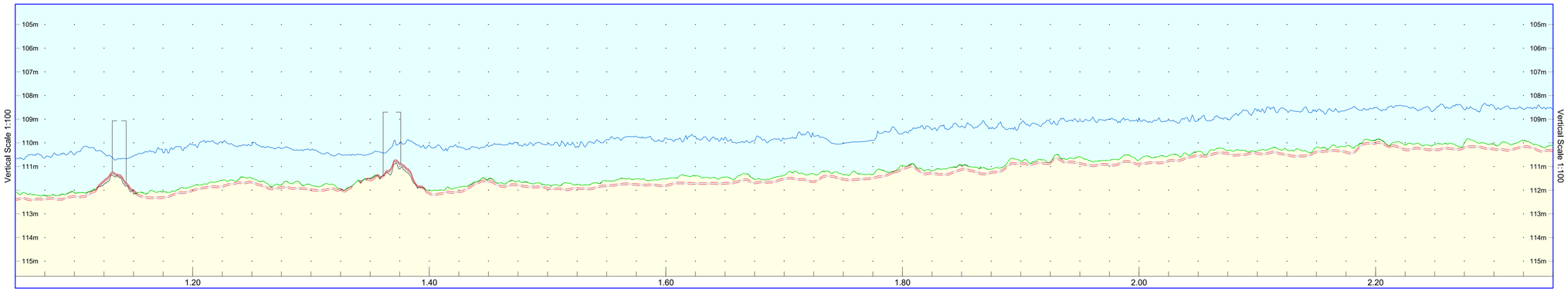
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

PLAN VIEW

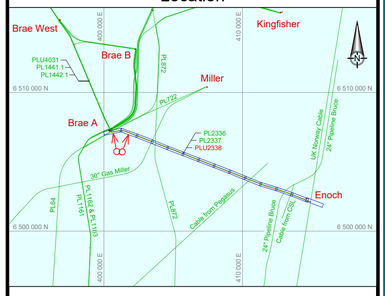
- 9.00 — Kilometre post
- KP database
- Product Exposure
- Product Freespan
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
- TSS50001 — SSS Target with Target ID No.
- TMBE0002 — MBE Target with Target ID No.
- DVD0011 — Debris with Debris ID No.
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product

Freespans

Location



0 50 100 150 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
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Drawing filename : PRJ000836-SUR-CHA-PLU2338-001_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project: 2023 Decommissioning Survey Clyde Area and Enoch PLU2338

Title: Plan View and Longitudinal Profile KP 0.292 to KP 2.300

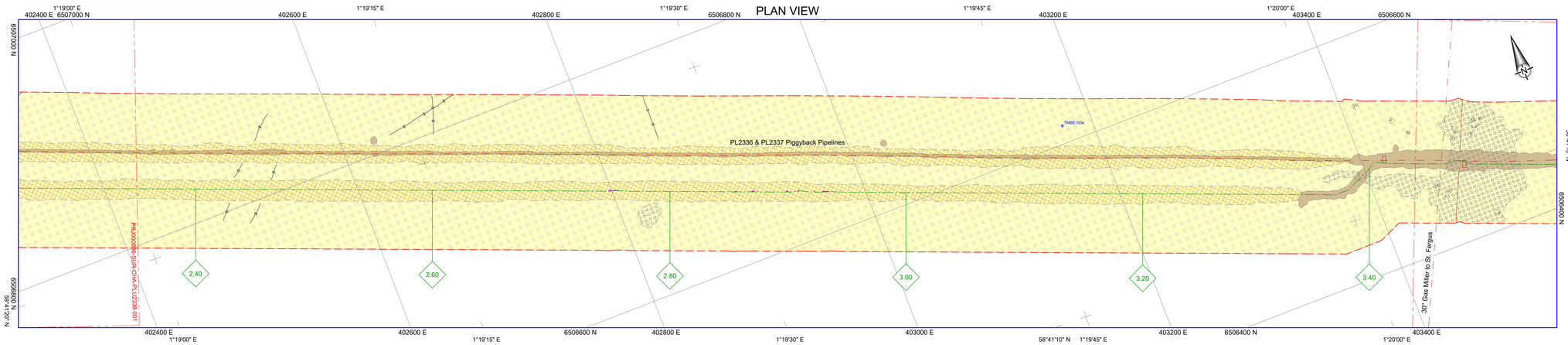
PLU2338 - Control Umbilical - Brae A to Enoch

Contract No. : RL23003

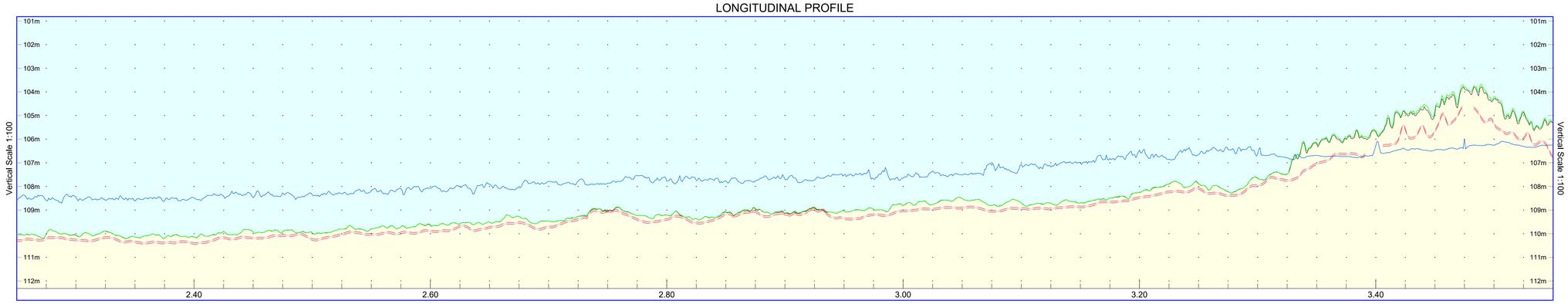
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PLU2338 -	001	02

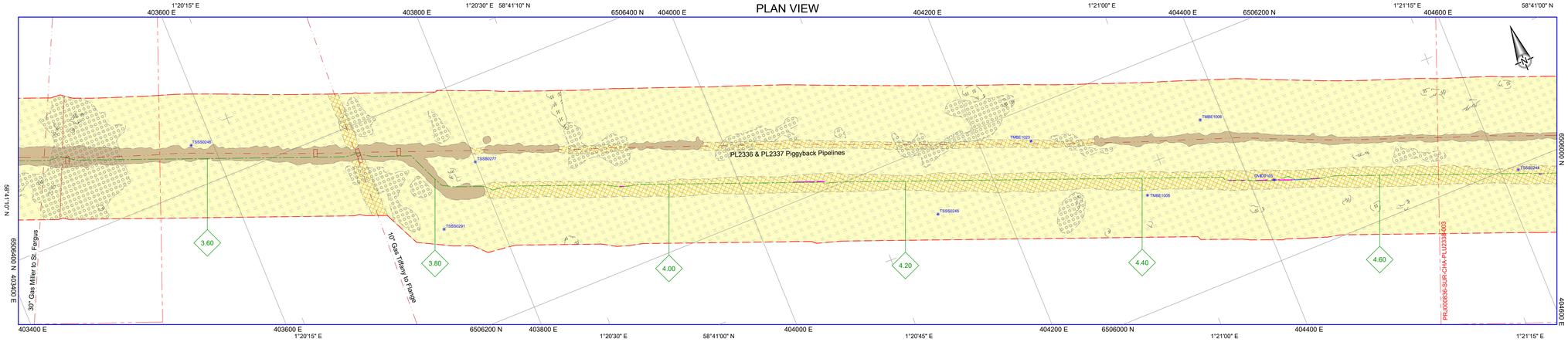
PLAN VIEW



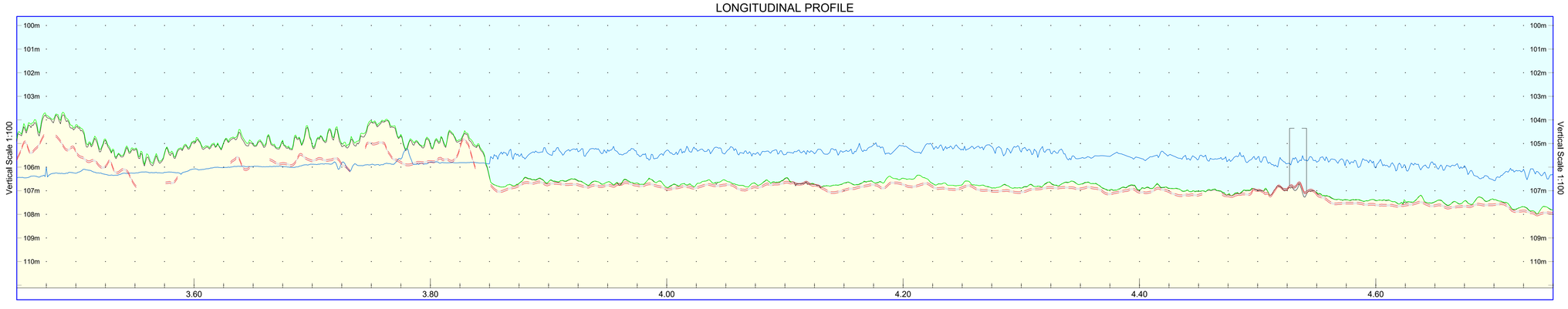
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

PLAN VIEW

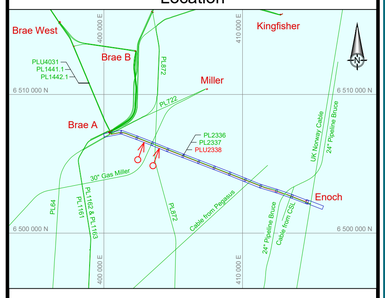
- 9.00 — Kilometre post
- KP database
- Product Exposure
- Product Freespan
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
- TSSS0001 — SSS Target with Target ID No.
- TMBE0002 — MBE Target with Target ID No.
- DVID0011 — Debris with Debris ID No.
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product

Freespans

Location



0 — 50 — 100 — 150 — 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
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DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-PLU2338-002_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project

2023
Decommissioning Survey
Clyde Area and Enoch
PLU2338

Title

Plan View and
Longitudinal Profile
KP 2.300 to KP 4.700

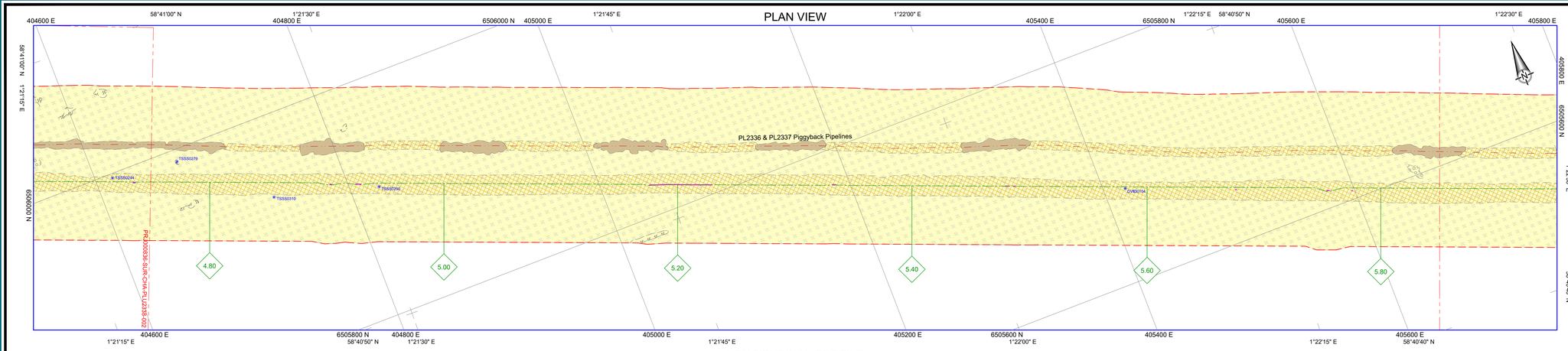
PLU2338 - Control Umbilical - Brae A to Enoch

Contract No. : RL23003

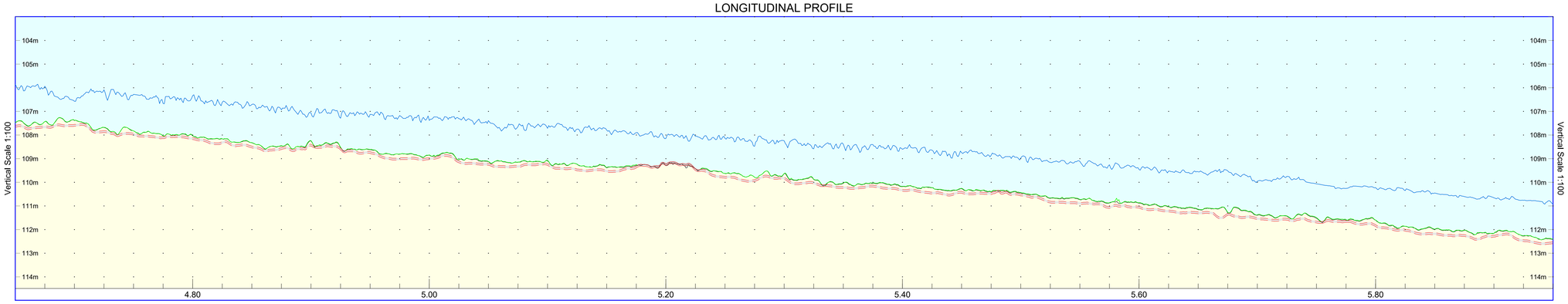
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PLU2338 -	002	02

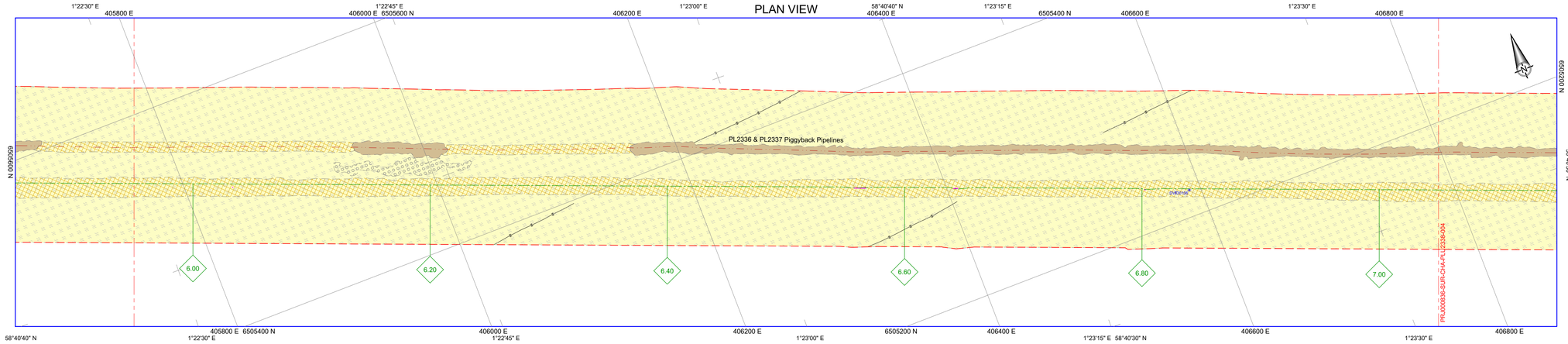
PLAN VIEW



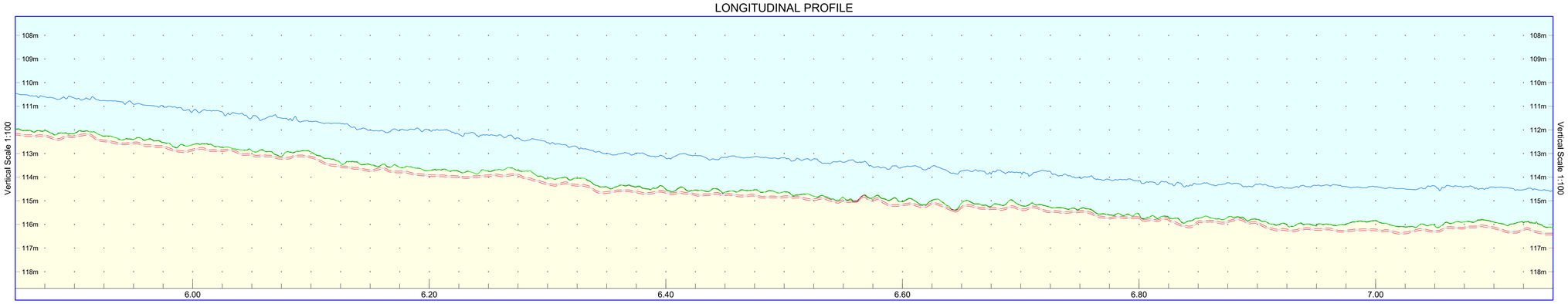
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

PLAN VIEW

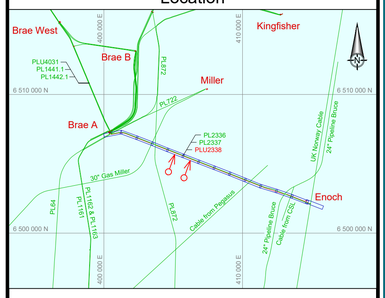
- Kilometre post (9.00)
- KP database
- Product Exposure
- Product Freespan
- Existing pipelines / cables (Database As-found)
- Limit of survey
- Anchor scar / plough mark
- SSS Target with Target ID No. (TSS50001)
- MBE Target with Target ID No. (TMBE0002)
- Debris with Debris ID No. (DVD0011)
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product

Freespans

Location



0 50 100 150 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-PLU2338-003_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project

2023
Decommissioning Survey
Clyde Area and Enoch
PLU2338

Title

Plan View and
Longitudinal Profile
KP 4.700 to KP 7.100

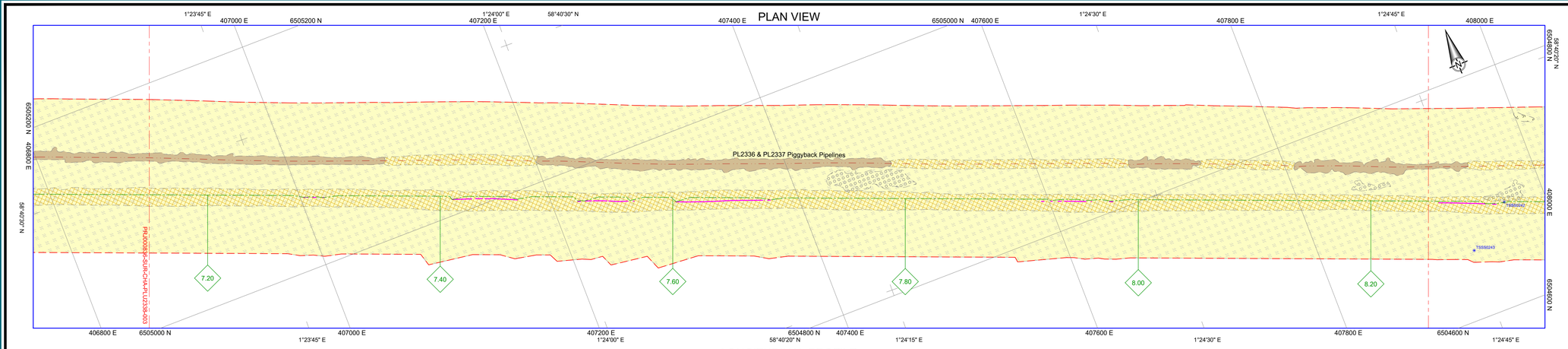
PLU2338 - Control Umbilical - Brae A to Enoch

Contract No. : RL23003

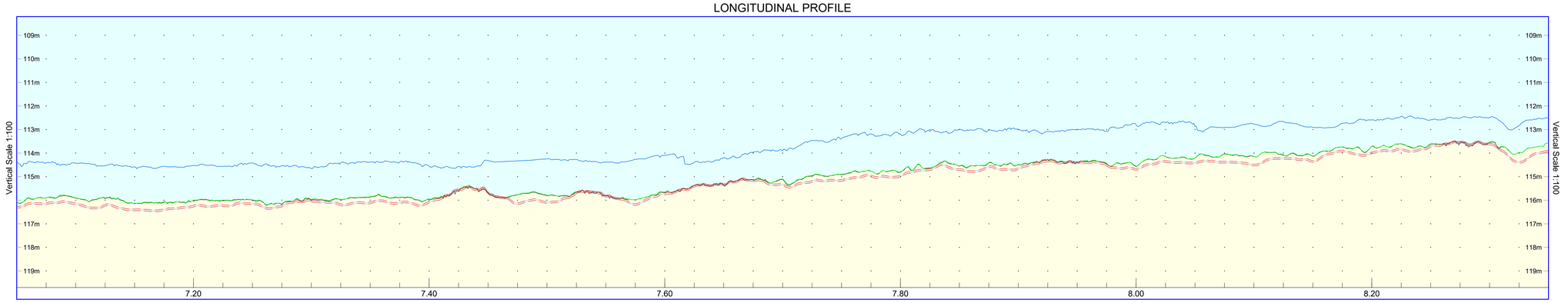
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PLU2338 -	003	02

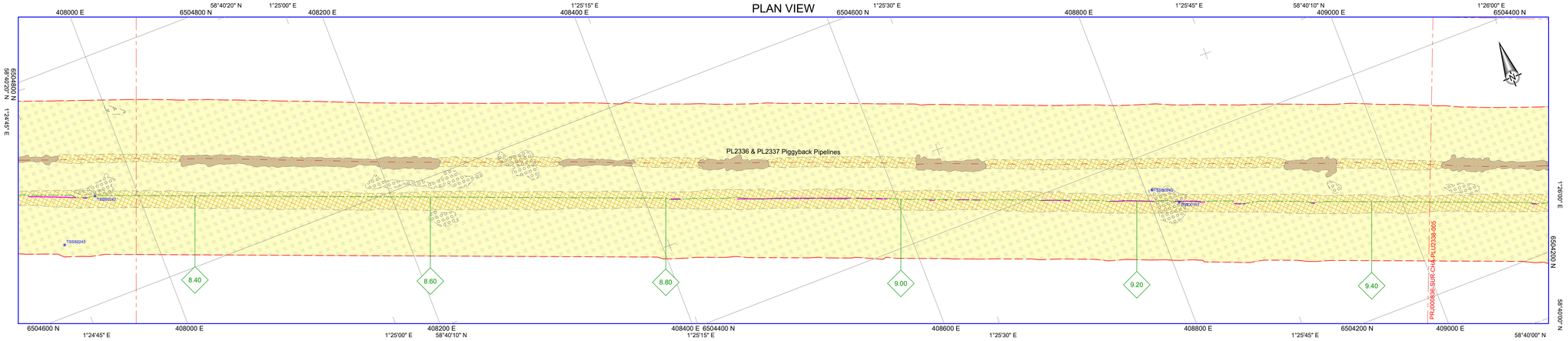
PLAN VIEW



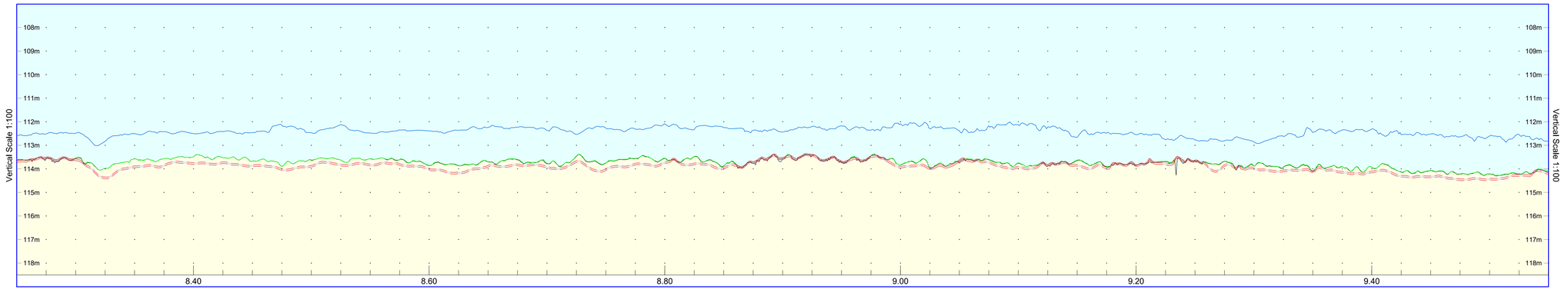
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

PLAN VIEW

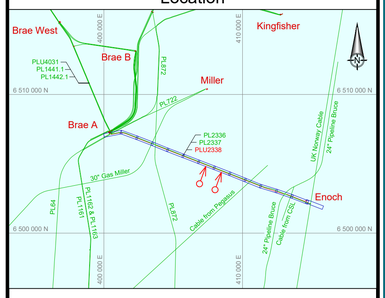
- 9.00 — Kilometre post
- KP database
- Product Exposure
- Product Freespan
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
- TSS50001 — SSS Target with Target ID No.
- TMBE0002 — MBE Target with Target ID No.
- RVD0011 — Debris with Debris ID No.
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product

Freespans

Location



0 — 50 — 100 — 150 — 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-PLU2338-004_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project: 2023 Decommissioning Survey Clyde Area and Enoch PLU2338

Title: Plan View and Longitudinal Profile KP 7.100 to KP 9.500

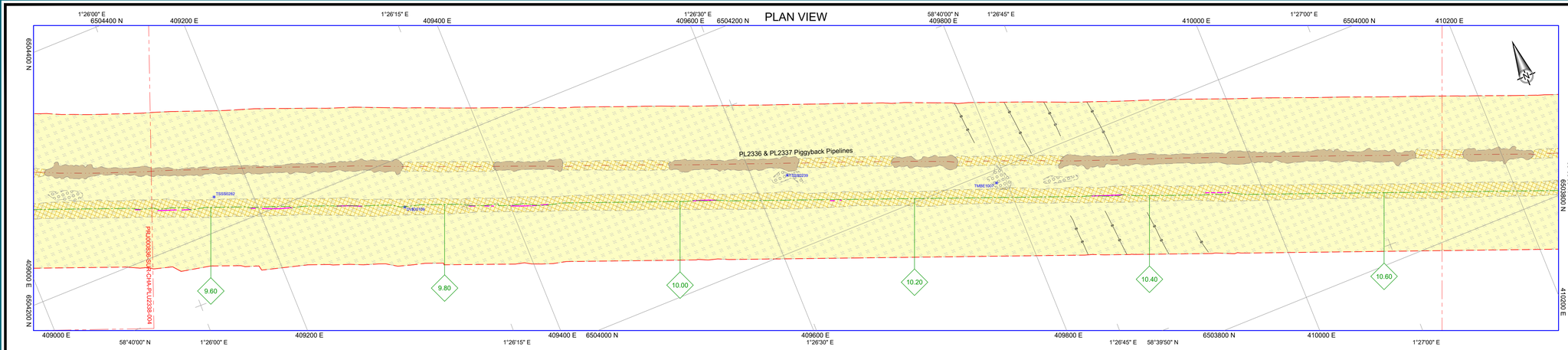
PLU2338 - Control Umbilical - Brae A to Enoch

Contract No. : RL23003

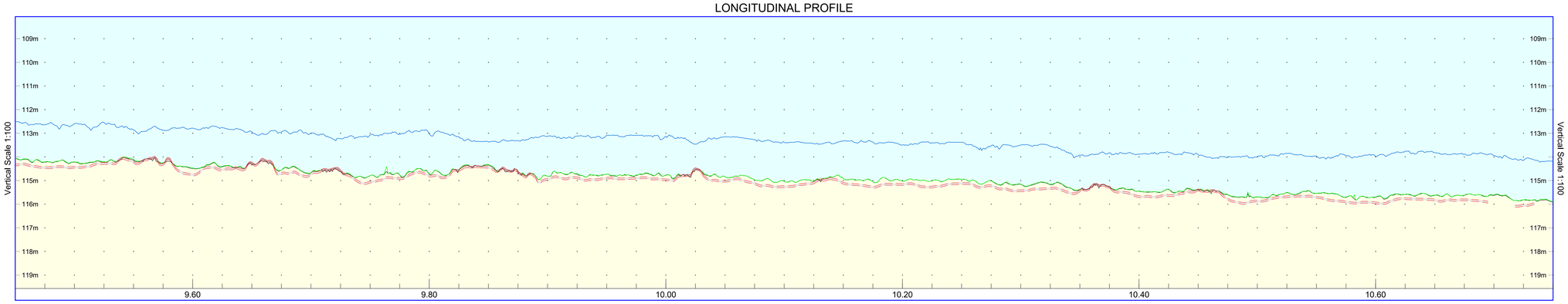
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PLU2338 -	004	02

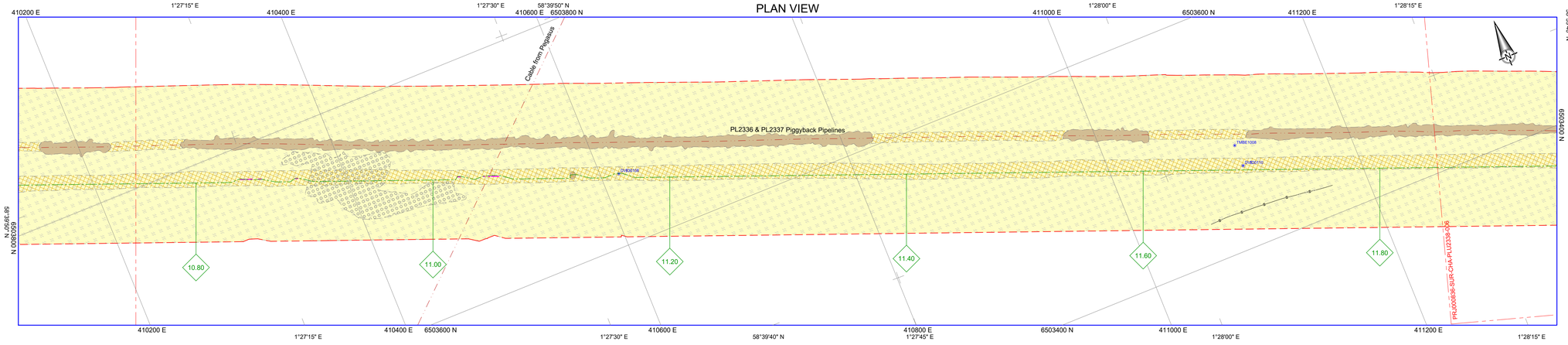
PLAN VIEW



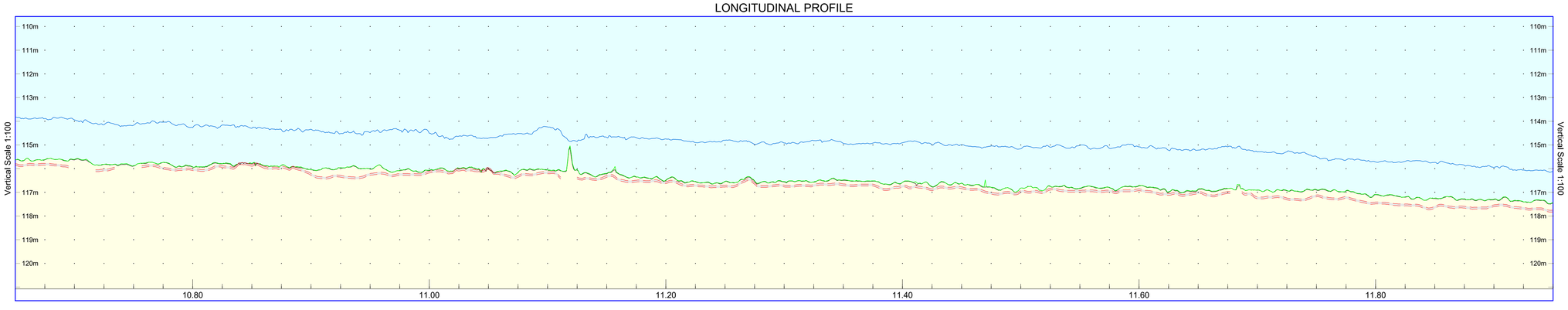
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

PLAN VIEW

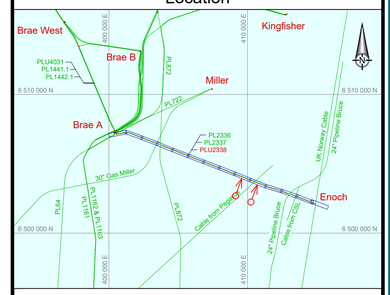
- Kilometre post (9.00)
- KP database
- Product Exposure
- Product Freespan
- Database As-found — Existing pipelines / cables
- Limit of survey
- Anchor scar / plough mark
- SSS Target with Target ID No. (TSS50001)
- MBE Target with Target ID No. (TMBE0002)
- Debris with Debris ID No. (DVD0011)
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product

Freespans

Location



0 50 100 150 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-PLU2338-005_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project

2023
Decommissioning Survey
Clyde Area and Enoch
PLU2338

Title

Plan View and
Longitudinal Profile
KP 9.500 to KP11.900

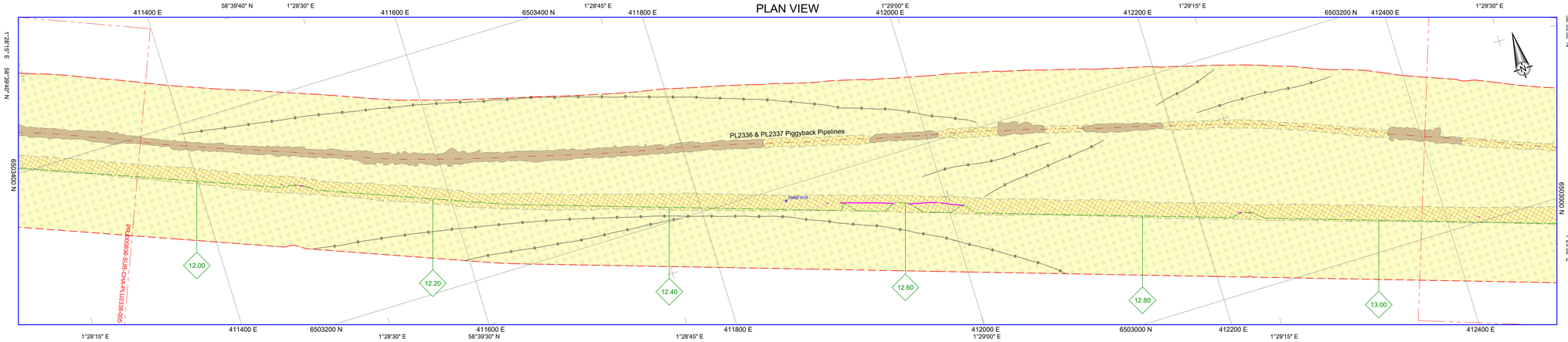
PLU2338 - Control Umbilical - Brae A to Enoch

Contract No. : RL23003

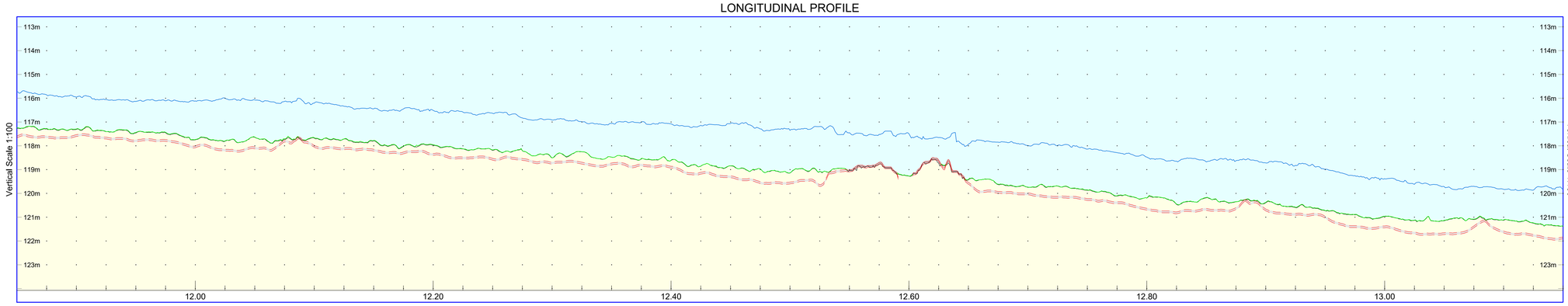
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PLU2338 -	005	02

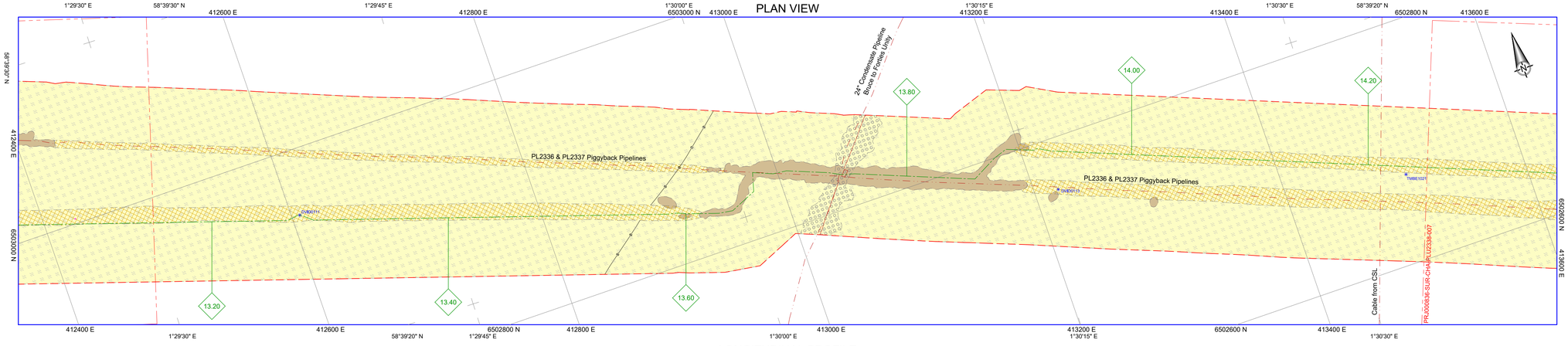
PLAN VIEW



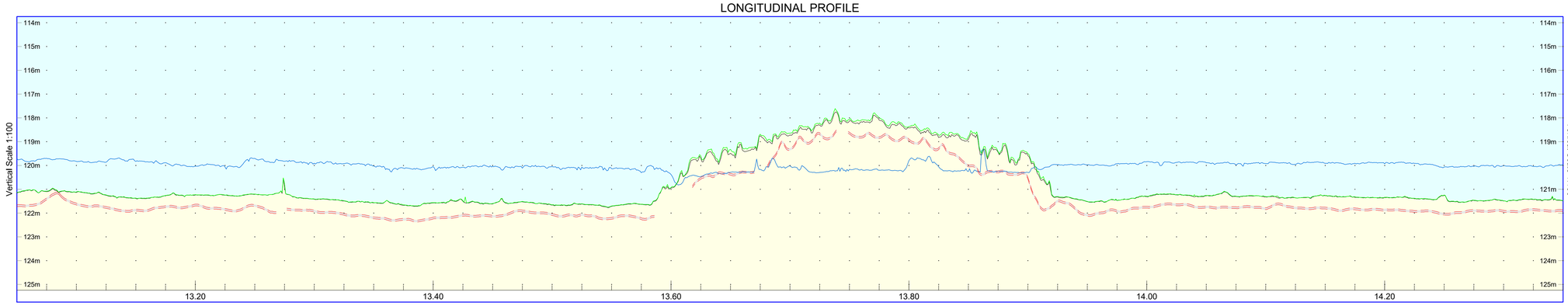
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

PLAN VIEW

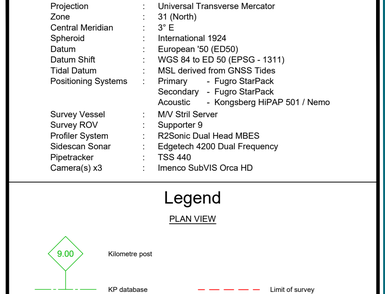
- Kilometre post (9.00)
- KP database
- Product Exposure
- Product Freespan
- Existing pipelines / cables (Database As-found)
- Limit of survey
- Anchor scar / plough mark
- SSS Target with Target ID No. (TSS50001)
- MBE Target with Target ID No. (TMBE0002)
- Debris with Debris ID No. (DVID0011)
- Sand
- Gravel
- Shell Matter with possible gravel intervention
- Spudcan footprint
- Drill cuttings
- Various protective covers and mattresses
- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product

Freespans

Location



0 50 100 150 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-PLU2338-006_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project

2023
Decommissioning Survey
Clyde Area and Enoch
PLU2338

Title

Plan View and
Longitudinal Profile
KP 11.900 to KP 14.300

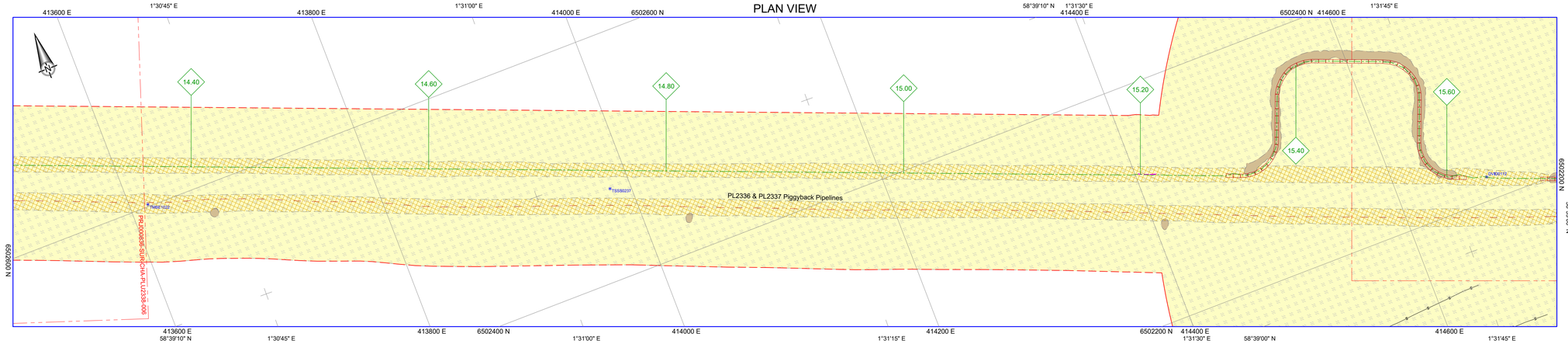
PLU2338 - Control Umbilical - Brae A to Enoch

Contract No. : RL23003

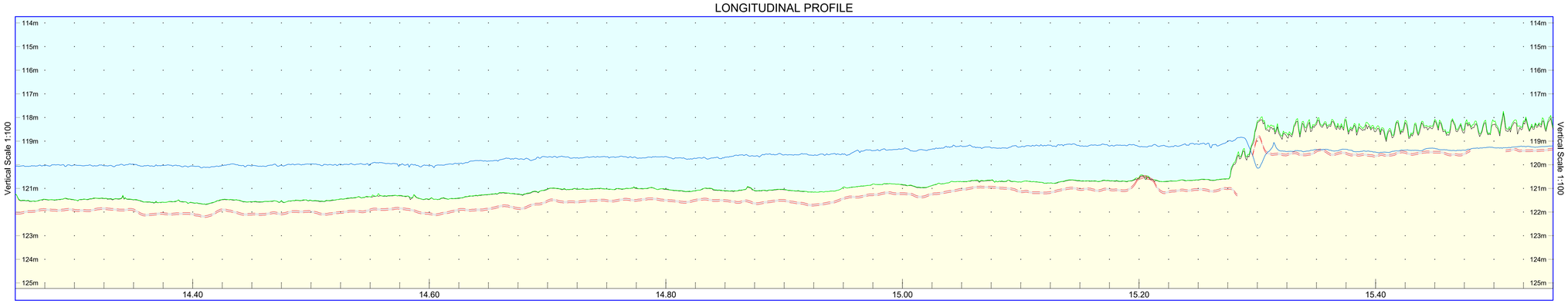
REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PLU2338 -	006	02

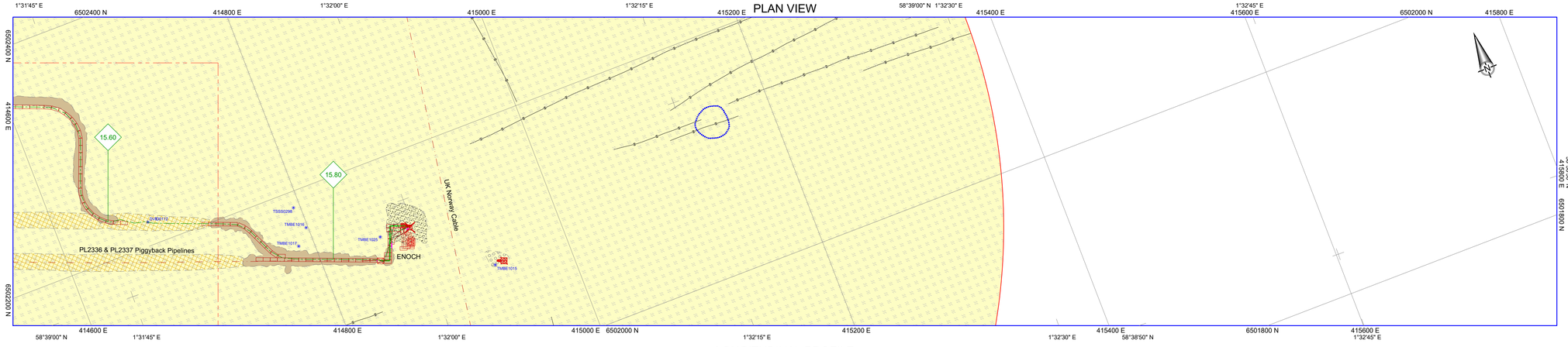
PLAN VIEW



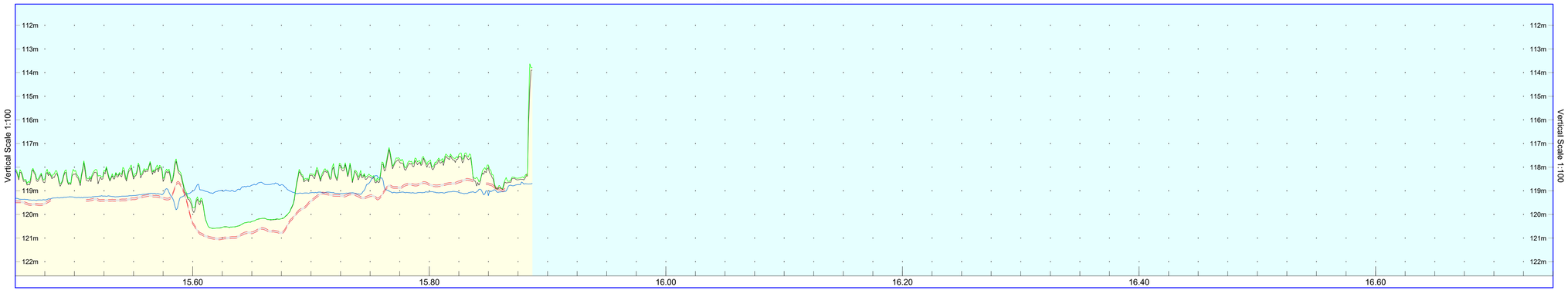
LONGITUDINAL PROFILE



PLAN VIEW



LONGITUDINAL PROFILE



Notes

Projection	:	Universal Transverse Mercator
Zone	:	31 (North)
Central Meridian	:	3° E
Spheroid	:	International 1924
Datum	:	European '50 (ED50)
Datum Shift	:	WGS 84 to ED 50 (EPSG - 1311)
Tidal Datum	:	MSL derived from GNSS Tides
Positioning Systems	:	Primary - Fugro StarPack
		Secondary - Fugro StarPack
		Acoustic - Kongsberg HiPAP 501 / Nemo
Survey Vessel	:	M/V Stril Server
Survey ROV	:	Supporter 9
Profiler System	:	R2Sonic Dual Head MBES
Sidescan Sonar	:	Edgetech 4200 Dual Frequency
Pipetracker	:	TSS 440
Camera(s) x3	:	Imenco SubVIS Orca HD

Legend

PLAN VIEW

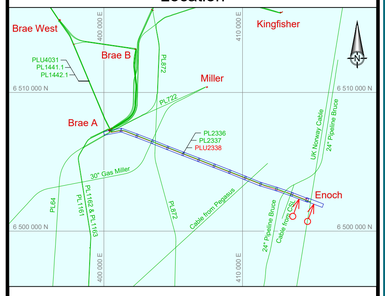
- Kilometre post (9.00)
- KP database
- Product Exposure
- Product Freespan
- Existing pipelines / cables (Database As-found)
- Limit of survey
- Anchor scar / plough mark
- SSS Target with Target ID No. (TSS50001)
- MBE Target with Target ID No. (TMBE0002)
- Debris with Debris ID No. (DVD0011)
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- Spudcan footprint
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- Dredged - Trench
- High reflectivity
- Medium reflectivity
- Low reflectivity
- Shell Aggregations
- Disturbed sediment
- Pockmark Cluster
- Pockmarks - isolated

LONGITUDINAL PROFILE

- Top / bottom of product
- Mean seabed level
- Mean seabed adjacent to product
- Top of cover
- Top / bottom of buried product

Freespans

Location



0 50 100 150 200m

Scale 1:2000

Rev.	Revision Description	Drawn	Checked	Appr.	Date
02	Issued for Client Review	VET	ANO	RDA	21 July '23
01	Issued for IDC	VET	ANO	RDA	20 July '23

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DEEPOCEAN

Drawing filename : PRJ000836-SUR-CHA-PLU2338-007_Rev02.dwg

Report No. : PRJ000836-SUR-REP-002

Survey date : May & June 2023

Horizontal Scale : 1:2000

Vertical Scale : 1:100

Chart size : A1

Project: 2023 Decommissioning Survey Clyde Area and Enoch PLU2338

Title: Plan View and Longitudinal Profile KP 14.300 to KP 15.887

PLU2338 - Control Umbilical - Brae A to Enoch

Contract No. : RL23003

REPSOL SINOPEC Resources UK

Drawing No.	Sheet No.	Rev.
PRJ000836 - SUR - CHA - PLU2338 -	007	02