Beatrice Decommissioning Programmes

Final Version

17th December 2018

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Document Control

Approvals

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Contents

Terms and Abbreviations

Abbreviation	Explanation
Beatrice AD	Beatrice Alpha Drilling Platform
Beatrice AP	Beatrice Alpha Production Platform
Beatrice B	Beatrice Bravo Platform
Beatrice C	Beatrice Charlie Platform
BEIS	(Department for) Business, Energy and Industrial Strategy (formerly DECC)
BOWL	Beatrice Offshore Windfarm Ltd
CA	Comparative Assessment
C&P	Contracting and Procurement
CES	Crown Estate Scotland
CoP	Cessation of Production
CSS	Conductor Support Structure
DCR	The Offshore Installation and Wells (Design and Construction etc.) Regulations 1996 (SI1996/913)
DECC	Department of Energy and Climate Change (now BEIS)
DP	Decommissioning Programme
DPN	Disused Pipeline Notice issued by DTI, DECC or BEIS
DSV	Diving Support Vessel
DTI	Department of Trade and Industry
EDPR	EDP (Energias de Portugal, S.A.) Renewables
EIA	Environmental Impact Assessment
ENVID	Environmental Impact Identification
HDJU	Heavy Duty Jack Up rig
HLV	Heavy Lift Vessel
HSE	Health and Safety Executive or Health, Safety and Environment
ICES	International Council for the Exploration of the Seas
IPR	Interim Pipeline Regime
Jacket	Structure formed of legs connected by horizontal and diagonal trusses usually made of steel and piled into the seabed, supports the platform's "topsides"
Jack-up	Mobile floating drilling rig
JNCC	Joint Nature Conservation Committee
km	Kilometre
KP	Kilometre Point (e.g. on pipeline)
LAT	Lowest Astronomical Tide

m	Metre
m^3	Cubic Metres
MAT	Master Application Template
MoD	Ministry of Defence
Module	Collection of equipment mounted on a single frame for lifting purposes
MSF	Modular Support Frame
MW	Megawatt
NCMPA	Nature Conservation Marine Protected Area
NORM / LSA	Naturally Occurring Radioactive Material / Low Specific Activity
OGA	Oil and Gas Authority
OGUK	Oil and Gas UK
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	from Oslo/Paris, the Convention for the Protection of the Marine Environment of the North East Atlantic
OSPAR 2006/5	OSPAR Recommendation on a Management Regime for Offshore Cuttings Piles
PL	Pipeline
PMFs	Priority Marine Features
PON5	Petroleum Operations Notice 5
pSPA	Proposed Special Protection Area
Repsol Sinopec Resources UK	Repsol Sinopec Resources UK Limited
S29	Section 29
SAC	Special Area of Conservation
SAT	Subsidiary Application Template
SCAP	Supply Chain Action Plan
SFF	Scottish Fisheries Federation
SLV	Single Lift Vessel
SNH	Scottish Natural Heritage
SOSI	Seabird Oil Sensitivity Index
SPA	Special Protection Area
SSCV	Semi-Submersible Crane Vessel
te	tonnes
Topsides	Upper section of the platform comprising modules and decks resting on the jacket
TR	Temporary Refuge
UKCS	United Kingdom Continental Shelf
µm	Micrometre

Water Injection	Pumping water down dedicated wells to maintain pressure in the hydrocarbon reservoir
WTG	Wind Turbine Generator

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1 EXECUTIVE SUMMARY

1.1 Decommissioning Programme

Combined Decommissioning Programmes

This document contains four Decommissioning Programmes (DPs) for four oil installations, two wind turbines, eight pipelines and three power cables operated by Repsol Sinopec Resources UK Limited (herein after referred to as Repsol Sinopec Resources UK).

- Programme (1) covers four oil installations covered by four Section 29 (S29) notices;
- Programme (2) covers two wind turbines covered by one S29 notice;
- Programme (3) covers the eight pipelines supported by five S29 notices;
- Programme (4) covers one power cable (PL2331) covered by one S29 notice.

A summary of the pipelines and power cables is detailed in Tables 1.4.1 and 1.4.2 below. It should be noted that two of the power cables are not in the S29s' but their decommissioning is captured here.

A DP proposing re-use of the offshore installations was submitted by Talisman Energy (UK) Limited and partners and approved by the Secretary of State for Trade and Industry under the Petroleum Act 1998 on the 23 December 2004. That programme is superseded by this current submission.

1.2 Requirement for Decommissioning Programme

Installations
In accordance with the Petroleum Act 1998, the S29 notice holders of the Beatrice Field (see Table 1.2) are applying to the Department for Business, Energy and Industrial Strategy (BEIS) to obtain approval for decommissioning of the installations detailed in Section 2.1 and 2.2 of this programme.

Partner letters of support are included in Section 8.

Pipelines
In accordance with the Petroleum Act 1998, the S29 notice holders of the Beatrice Field pipelines (see Table 1.4) are applying to BEIS to obtain approval for decommissioning the pipelines detailed in Section 2.3 of this programme.

In conjunction with public, stakeholder and regulatory consultations, the DPs are submitted in compliance with national and international regulations and BEIS guidelines. The schedule outlined in this document is for a decommissioning project of some 14 years covering selection and definition of options and execution. Plugging and abandonment of wells commenced in 2017 with the abandonment of Beatrice Charlie (2 wells) and Bravo (11 wells). All the lessons learned from this campaign will be incorporated into the Alpha abandonment project (30 wells). The Alpha well abandonment schedule includes 3 years for the Alpha well abandonment designs to be finalised and the tender / award of the rig selected. The Beatrice well abandonments are planned to be fully completed by 2026. An overview of the Decommissioning Schedule is given in Section 6.4.

1.3 Introduction

The Beatrice Field is in the outer Moray Firth (UKCS Block 11/30a) approximately 22 km from the East Caithness Cliffs (Figure 1.1). Production began in 1981 with cessation approved in March 2015. The bridge-linked Beatrice Alpha Drilling (Beatrice AD) and Beatrice Alpha Production (Beatrice AP) platforms are centrally located in the field, with the Beatrice Bravo (Beatrice B) and Beatrice Charlie (Beatrice C) platforms located 5.6 km to the northeast and 5 km to the southwest of the Alpha complex respectively.

Crude oil was exported from Beatrice AP through a 67 km submarine pipeline to Shandwick Bay and a buried 9 km onshore section of pipeline carried the crude to the Nigg Oil Terminal. The onshore section of the pipeline and the oil terminal are not covered by the offshore DPs and are managed separately under a distinct legal framework. Power is supplied to the facilities by a 25 km submarine cable from Dunbeath and from two offshore Wind Turbine Generators (WTG) which are located to the south of the Beatrice Alpha complex. The cable and turbines will be decommissioned with the oil facilities.

The Beatrice Field was initially developed by Mesa Petroleum with first oil being produced in September 1981; in 1997 the field was transferred to Talisman Energy (UK) Limited. In 2007 Talisman Energy (UK) Limited and partners completed the installation of two 5MW wind turbine generators to test the potential for a deep-water wind farm. Several wind farm projects are now being taken forward in the Moray Firth. In 2008 the field was leased to Ithaca Energy (UK) Limited who developed the adjacent Jacky Field with production exported through Beatrice facilities. Cessation of Production (CoP) from Beatrice was approved in March 2015 and Talisman Sinopec Energy (UK) Limited resumed ownership and operatorship and subsequently, following an acquisition changed its name to Repsol Sinopec Resources UK.

Field life extension options have been investigated and were all found to be sub-economic, and consequently the facilities are to be decommissioned. Repsol Sinopec Resources UK has reviewed other reuse options for the facilities, and this has been a key consideration leading to a final decision on the nature and timing of the field decommissioning.

A DP for Beatrice for the reuse of the platforms was originally approved in 2004 by the Department of Trade and Industry (DTI) - relevant regulatory functions now reside within BEIS and OGA. This Programme was based on an agreement with the Ministry of Defence (MoD) to use the Beatrice Complex for military training after CoP. The MoD has subsequently exercised their right to terminate the agreement, and therefore the DP is required to be updated.

Further re-use options for the facilities have since been taken into consideration. Installation of the Beatrice wind turbine generators was completed in 2007 as a demonstrator project for future wind turbine developments in the area. Since 2007 developments in the design of wind turbines has advanced significantly and therefore the Beatrice WTG's cannot economically be re-used.

An assessment was completed into how the Beatrice Wind turbines could be incorporated into the Beatrice Offshore Windfarm Ltd (BOWL) wind farm (to be installed 2017 – 2019) however the partners in that development cited the obsolete design and the associated high maintenance burden as a reason to exclude the two existing turbines from the development.

A community funded development option was also investigated. Although the wind turbines were considered suitable for reuse individually, the project stalled due to commercial and shareholder requirements. There was also the additional complexity that there is currently no grid connection from the Beatrice Wind Turbines, up until this point they have only provided power to the Beatrice platforms via inter-field cables. The costs associated with this grid connection were prohibitive to advancing the community project.

As a result, the Beatrice wind turbines are currently scheduled for decommissioning at the same time as the removal of the Beatrice facilities (2024 – 2029).

These DPs therefore explain the proposed decommissioning activities and are supported by a Comparative Assessment (CA) [Ref: 1] for the pipelines, subsea cables and stabilisation features and an Environmental Impact Assessment (EIA) [Ref: 2].

1.4 Overview of Installations/Pipelines Being Decommissioned

1.4.1 Installations

Table 1.1: Installations Being Decommissioned			
Field:	Beatrice Field	**Production Type (Oil/Gas/Condensate)**	Oil
Water Depth (m)	40-50 m	**UKCS block**	11/30a
Surface Installations			
Number	**Type**	**Topsides Weight (Te)**	**Jacket Weight (Te)** (Note 1)
6	4 fixed steel jacket/topsides and 2 wind turbines on fixed steel jackets	21,773 1,302	13,866(Note 2) 2,468
Subsea Installations		**Number of Wells**	
Number	**Type**	**Platform**	**Subsea**
1	AD Drilling Template	43	0
Drill Cuttings pile		**Distance to median**	**Distance from nearest UK coastline**
Number of Piles	**Total Estimated volume (m^3)**	**km**	**km**
1	678 m^3	266 km to UK/Norwegian median.	22

Note 1 Jacket weights also include total weight of piles.

Note 2 Pipelines PL2610 and PL2611 have been included in the "Installations" weight estimate as they are in integral part of the Beatrice Bravo jacket structure.

Table 1.2: Installations Section 29 Notice Holders Details		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)** *If zero show 0%*
Beatrice AD, AP, B and C		
Repsol Sinopec Resources UK Limited	00825828	75%
Repsol Sinopec North Sea Limited	01061863	25%
Beatrice WTG A and B		
Repsol Sinopec Resources UK Limited	00825828	37.5%
Repsol Sinopec North Sea Limited	01061863	12.5%
SSE Generation Limited	02310571	50%

1.4.2 Pipelines and Power Cables

Table 1.3: Pipelines and Power Cables Being Decommissioned		
Number of Pipelines	8	(See Table 2.3)
Number of Power Cables	3	(See Table 2.3)

Table 1.4: Pipelines and Power Cables Section 29 Notice Holders Details		
Section 29 Notice Holders	**Registration Number**	**Equity Interest (%)** *If zero show 0%*
PL16, PL111, PL112, PL112A, PL252, PL1838, PL2610, PL2611, PL4330, PL4331		
Repsol Sinopec Resources UK Limited	00825828	75%
Repsol Sinopec North Sea Limited	01061863	25%
PL2331		
Repsol Sinopec Resources UK Limited	00825828	37.5%
Repsol Sinopec North Sea Limited	01061863	12.5%
SSE Generation Limited	02310571	50%

1.5 Summary of Proposed Decommissioning Programme

Table 1.5: Summary of Decommissioning Programme		
Selected Option	**Reason for Selection**	**Proposed Decommissioning Solution (Note 1)**
1. Topsides		
Complete removal and recycling onshore.	Complies with OSPAR requirement for complete removal and maximises recycling of materials.	The topsides will be removed and transported to shore and recycled unless alternative options are identified to be viable and more appropriate.
2. Jackets		
Complete removal and recycling onshore.	To comply with OSPAR requirement to leave an unobstructed seabed. Removes a potential obstruction to fishing operations and maximises recycling of materials.	The piles will be severed below the natural seabed level, with best endeavours to achieve -3m. Any change in this depth will be discussed with BEIS at the time of execution. Pile severance using internal cutting tools is the base case option. This could be unsuccessful if, for example the piles have sustained permanent deformation during installation, e.g. through local buckling of the pile wall, or bending / ovalisation of the cross section, during driving. The original pile driving records were reviewed, and there is no indication of any 'pile refusal' during installation being recorded. It should be noted that soil plug removal and internal water jet cutting tools have been developed, tried and tested over a period of more than 20 years. Therefore, the risk of internal cutting being unsuccessful is deemed to be relatively small. It should be noted that the large grout bags (1.25 te and 22.5 te) supporting the conductor guide frame will be removed to shore for reuse/recycle/disposal. If they cannot be recovered Repsol Sinopec Resources UK will consult with BEIS before any alternative option is executed.
3. Subsea Installations		
AD Drilling Template - Complete removal and recycling onshore.	To comply with OSPAR requirement to leave an unobstructed seabed. Removes a potential obstruction to fishing operations and maximises recycling of materials.	The template piles will be severed below the natural seabed level, with best endeavours to achieve -3m. Any change in this depth will be discussed with BEIS at the time of execution The drilling template below AD jacket will be removed and transported to shore for recycling.

Table 1.5: Summary of Decommissioning Programme		
Selected Option	**Reason for Selection**	**Proposed Decommissioning Solution (Note 1)**
4. Pipelines, Flowlines & Umbilicals		
Decommission in-situ where buried. Remediate any exposed sections.	All pipelines are trenched and buried for most of their length and will not affect other users of the sea.	The trenched and buried sections of pipelines and cables will be decommissioned *in situ*. The exposed sections at each pipeline end and at any reported exposures along the pipelines and cables will be remediated by rock cover, trench and burial or cut out with removal to shore The flexible concrete mattresses will be recovered either by grab or dependent on their condition with the use of baskets (filled either by ROV or divers). In the event that a group or series of mattresses are identified that cannot be recovered using a grab, Repsol Sinopec Resources UK will consult with BEIS regarding an alternative approach, e.g. use of rock cover. The grout filled mattresses will be recovered and transported to shore. If there are problems during execution, Repsol Sinopec Resources UK will consult with BEIS before any alternative option is executed.
5. Wells		
Wells will be plugged and abandoned to Repsol Sinopec Resources UK standards which comply with "Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996" and align with Oil & Gas UK Guidelines for the Suspension and Abandonment of Wells (Issue 5, July 2015).	Meets the HSE regulatory requirements.	The Beatrice wells will be plugged and abandoned from surface installations – options for this work include utilising the existing facilities to locating temporary mobile facilities to carry out the work. A Master Application Template (MAT) and the supporting Subsidiary Application Template (SAT) will be submitted in support of activities carried out. A PON5 will also be submitted to BEIS for application to abandon the wells. Additionally, planned work will be reviewed by a well examiner to Repsol Sinopec Resources UK standards then submitted to the HSE for review.
6. Drill Cuttings		
Left to degrade naturally.	Recent multi-beam surveys did not detect noticeable piles at the Beatrice B and Beatrice C platforms. The cuttings pile at Beatrice AD falls below both of OSPAR 2006/5 thresholds.	The drill cuttings pile at the Beatrice AD platform will be left in situ but a small area may be disturbed in order to facilitate recovery of the jacket and template. The expected maximum volumes of disturbance and the associated impacts are discussed in detail in the supporting EIA Report.
7. Interdependencies		
When compared against the OSPAR Recommendation 2006/5 Cuttings Pile Management Regime Stage 1 thresholds, the rate of oil loss and persistence of the Beatrice AD cuttings pile if left undisturbed were found to		

Table 1.5: Summary of Decommissioning Programme		
Selected Option	**Reason for Selection**	**Proposed Decommissioning Solution (Note 1)**
be below the thresholds considered to be of environmental concern. The removal of the Beatrice AD jacket, conductor guide frame and drilling template will result in some disturbance to the cuttings pile. The level of disturbance will be dependent on the selected cutting method i.e. whether it will be internal or external cutting. However, given the small size of the pile, it is expected that following disturbance the pile will remain within the OSPAR thresholds. Repsol Sinopec Resources UK have carried out a BAT assessment and are in ongoing discussions with BEIS and Marine Scotland Science to determine the optimal approach to managing the cuttings pile. These discussions will continue as the project progresses.		

Note 1 Any permit applications required for any work associated with the Proposed Decommissioning Solutions will be submitted as appropriate.

1.6 Field Location Including Field Layout and Adjacent Facilities

Figure 1.1: Field Location in UKCS

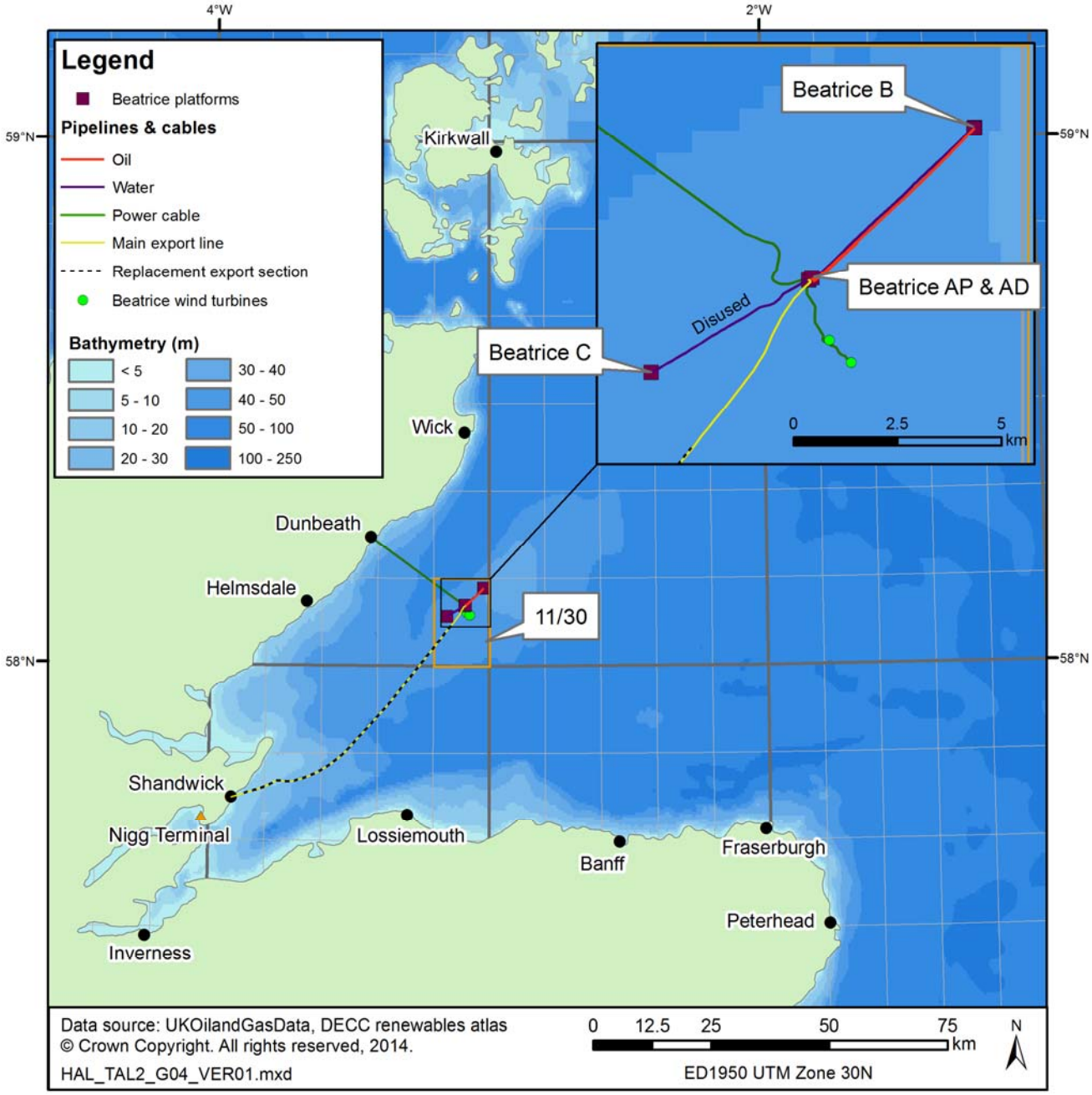


Figure 1.2: Field Layout

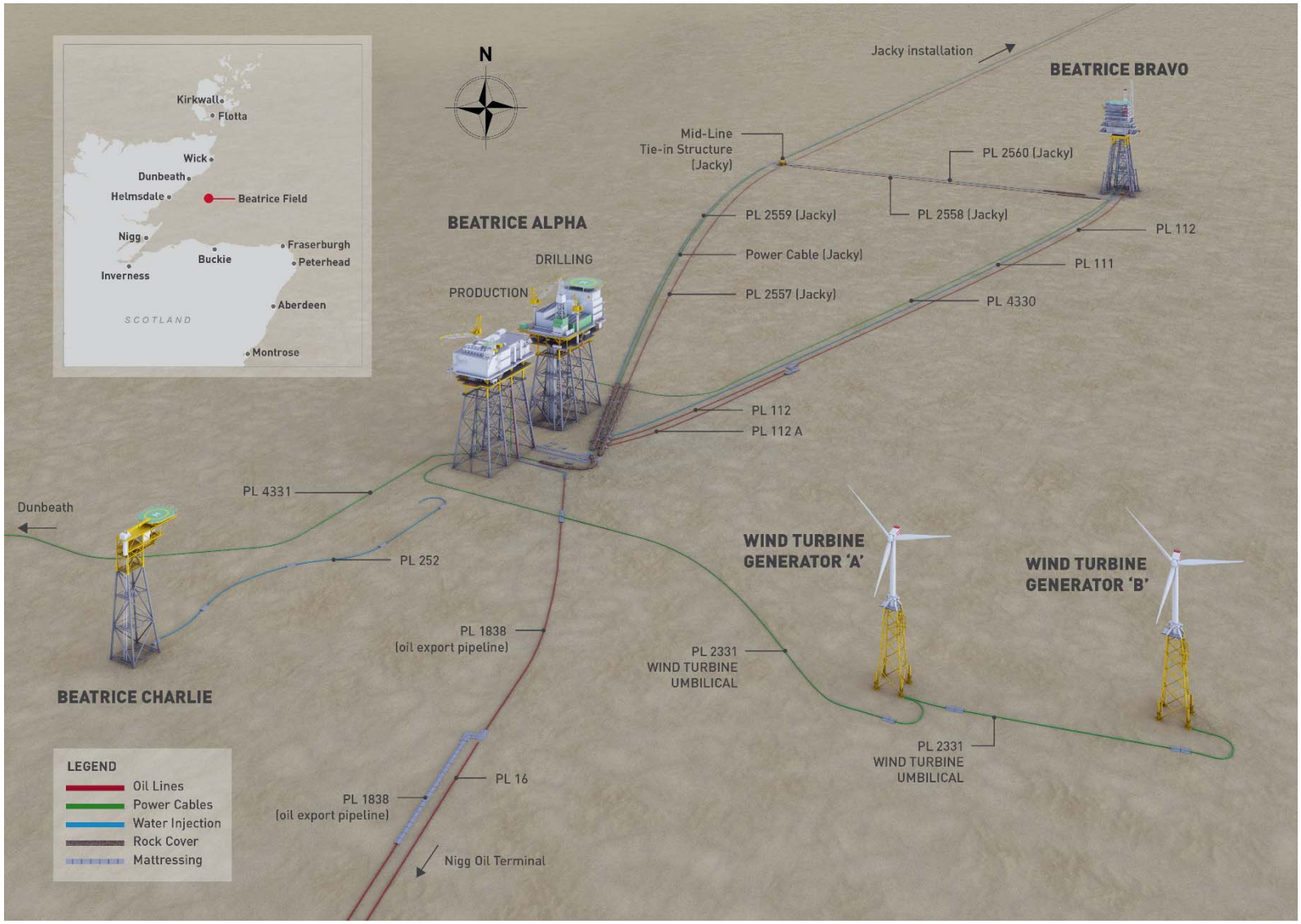
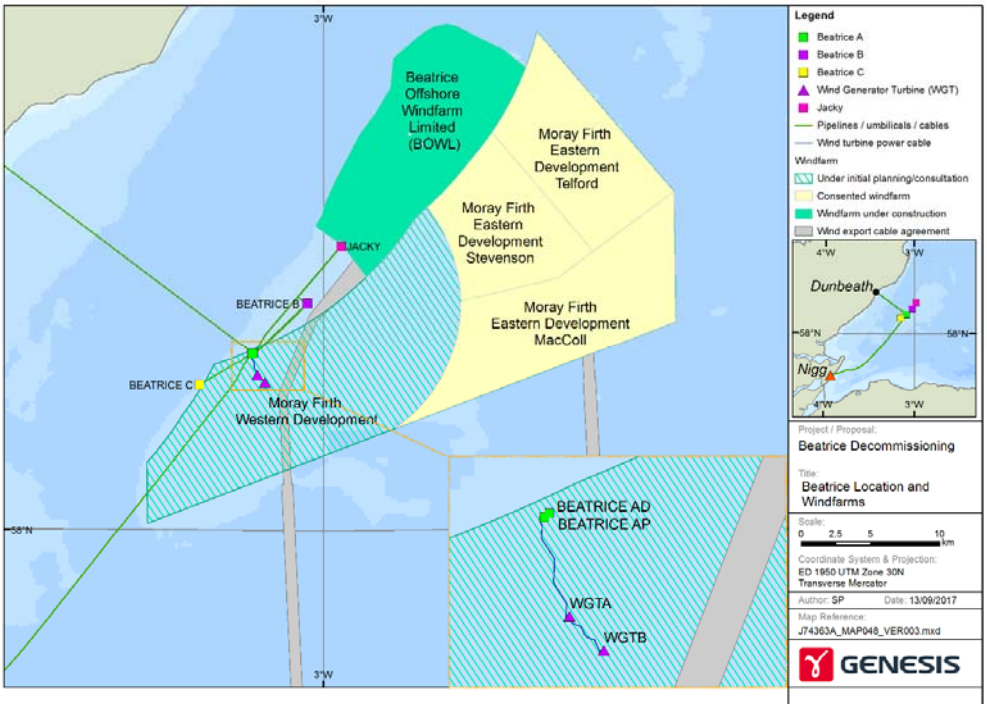


Table 1.6: Adjacent Facilities					
Owner	**Name**	**Type**	**Distance/Direction**	**Information**	**Status**
Ithaca Energy (UK) Limited	Jacky	Platform	10.5km	Unmanned wellhead platform located in Block 12/21c. Tied back to the Beatrice Alpha platform.	Out of use
Ithaca Energy (UK) Limited	PL2557	6" Oil Pipeline	10.5km from Jacky to AD	Crosses Beatrice AP to B Power Cable, PL111, PL112 and PL112A	Out of use and currently filled with inhibited seawater
Ithaca Energy (UK) Limited	PL2558	6" Oil Pipeline	0.8km from Beatrice B to midline structure (PL2557)	Crosses Beatrice AP to B Power Cable and PL111	Out of use and currently filled with inhibited seawater
Ithaca Energy (UK) Limited	PL2559	8" Water Injection Pipeline	10.5km from Jacky to AD	Crosses Beatrice AP to B Power Cable, PL111, PL112 and PL112A	Out of use and currently filled with inhibited seawater
Ithaca Energy (UK) Limited	PL2560	8" Water Injection Pipeline	0.8km from Beatrice B to midline structure (PL2559)	Crosses Beatrice AP to B Power Cable and PL111	Out of use and currently filled with inhibited seawater
Ithaca Energy (UK) Limited	PLU2561	Power cable	10.5km from Jacky to AD	Crosses Beatrice AP to B Power Cable, PL111, PL112 and PL112A	Out of use

Impacts of Decommissioning Proposals
Decommissioning of the Jacky platform and infrastructure is not part of this programme but the operators of the two fields will liaise on decommissioning activities and schedules to investigate any benefits and cost savings available through co-operation and alignment of decommissioning activities. Initial exploratory discussions with the host operator Ithaca Energy (UK) Ltd have been held with regard to potential collaboration and interfacing around the Jacky Infrastructure and its decommissioning.

Figure 1.3: Field nearby Windfarm Developments



There are a number of nearby windfarm developments; these are shown in Figure 1.3. Beatrice AD platform, Beatrice AP platform, WTGA, WTGB and associated subsea infrastructure are located within the Western Moray Firth Round 3 windfarm zone, which to date has been subject to scoping for a development of up to 90 turbines. Initial proposals for development were published in 2016 and 2017 (Moray Offshore Renewable Power, 2017; Scottish Government, 2017). The Moray Firth Round 3 windfarm zone also contains a consented Eastern Development Area, located c. 10 km east of Beatrice B, (Figure 1.3). The Eastern Development was granted consent in 2014 and comprises the Telford, Stevenson and MacColl offshore windfarms. Construction is expected to commence once the appropriate contracts have been awarded (Moray Offshore Renewable Power, 2017).

Beatrice B is located c. 4 km from the Beatrice Offshore Windfarm Limited (BOWL) and the export cable agreement area is located c. 1.3 km east of WTGB. The BOWL development was granted consent in March 2014, a final investment decision was made in 2016, and construction began in August 2017.

1.7 Industrial Implications

It is Repsol Sinopec Resources UK intention to develop a contract strategy that will result in an efficient and cost-effective execution of the decommissioning works. Repsol Sinopec Resources UK will also try to combine Beatrice decommissioning activities with other developments or decommissioning activities to reduce mobilisation and demobilisation costs should the opportunity arise. The decommissioning schedule is extended to allow flexibility for when decommissioning operations are carried out and completed.

Repsol Sinopec Resources UK will demonstrate this intention by:

- Publishing information on the decommissioning project and timelines on its decommissioning website;
- Working closely with the OGA and other industry bodies in engagement sessions with the decommissioning supply chain on issues relating to the DP and timelines, including engaging directly with disposal yards that serve the North Sea;
- Utilising the FPAL database as a source for establishing tender lists for contracts/purchases;
- Competitively tendering all removal scopes, including the onshore disposal scope;
- Aligning supply chain and decommissioning activity, wherever possible, with Operators of adjacent infrastructure to optimise efficiencies and cost reduction.

- The Supply Chain Action Plan (SCAP) has been developed and submitted to the OGA.

2 DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Installations: Surface Facilities (Topsides/Jackets)

Table 2.1: Surface Facilities Information

Name	Facility Type	Location		Topsides/Facilities		Jacket (if applicable)			
				Weight (Te)	No of modules	Weight (Te)	Number of legs	Number of piles	Weight of piles (Te)
Beatrice AD	Small fixed steel	WGS84 Decimal	58.115 N 03.088 W	7,723	18	2,201	8	8 Leg piles + 2 Skirt Piles	2,014
		WGS84 Decimal Minute	58° 6.878' N 03° 5.261' W						
Beatrice Bridge link AP to AD	Bridge	Between both installations		221	1	n/a	n/a	n/a	n/a
Beatrice AP	Small fixed steel	WGS84 Decimal	58.114 N 03.089 W	7,680	9	1,769	8	8 Leg piles	1,786
		WGS84 Decimal Minute	58° 6.847' N 03° 5.341' W						
Beatrice B (including Beatrice CSS)	Small fixed steel	WGS84 Decimal	58.147 N 03.022 W	5,743	8	2,946 (Note 1)	10	10 Leg piles + 4 Skirt piles	2,019
		WGS84 Decimal Minute	58° 8.835' N 03° 1.300' W						
Beatrice C	Small fixed steel	WGS84 Decimal	58.094 N 03.153 W	406	1 + helideck	601	4	4 leg piles	530
		WGS84 Decimal Minute	58° 5.644' N 03° 9.200' W						
Wind turbine A	Small fixed steel	WGS84 Decimal	58.1 N 03.082 W	651	1	804	4	4 skirt piles	430
		WGS84 Decimal Minute	58° 6.021’ N 03° 4.941’ W						
Wind turbine B	Small fixed steel	WGS84 Decimal	58.096 N 03.073 W	651	1	804	4	4 skirt piles	430
		WGS84 Decimal Minute	58° 5.735’ N 03° 4.400’ W						

Note 1 Pipelines PL2610 and PL2611 have been included in the “Installations” weight estimate as they are in integral part of the Beatrice Bravo jacket structure.

2.2 Installations: Subsea including Stabilisation Features

Table 2.2: Subsea Installations and Stabilisation Features					
Subsea installations including Stabilisation Features	**Number**	**Size/Weight (Te)**	**Location**		**Comments/Status**
AD Drilling Template	1	8.7m x 5.6m x 4.1m 43 te	WGS84 Decimal	58.115 N 03.088 W	Structure is secured to the seabed by 4 conductor piles of 33 te total estimated weight.
			WGS84 Decimal Minute	58° 6.878' N 03° 5.261' W	
Flexible concrete mattresses	13	59.3 te	Beatrice A		These miscellaneous mattresses are on the seabed within 150 m of platform jacket structures and are additional to pipeline protection mattresses.
Large Grout filled bags	12	157.5 te	Beatrice AD		Underneath conductor guide frame.
Concrete mattresses	11	50.2 te	Beatrice B		These miscellaneous mattresses are on the seabed within 100 m of platform jacket structures and are additional to pipeline protection mattresses.

2.3 Pipelines Including Stabilisation and other Features

Table 2.3: Some Pipeline/Flowline/Umbilical Information									
Description	**Pipeline Number (as per PWA)**	**Diameter (inches)**	**Length (km)**	**Description of Component Parts**	**Product Conveyed**	**From – To End Points**	**Burial Status**	**Pipeline Status**	**Current Content**
Export line (Note 1)	PL16	16"	58.98	Concrete coated steel	Oil	Cut Point adjacent to PL1838 ident 4 to Cut Point adjacent to PL1838 ident 6	Trenched and buried	Out of use	Inhibited seawater
Export line replacement (Note 2)	PL1838	16”	67.005	Epoxy coated steel	Oil	Beatrice AP Platform to Zero Point Valve	Trenched and buried	Out of use	Inhibited seawater
Water injection line	PL111	8"	5.280	Concrete coated steel	Water	Beatrice AP Platform to Beatrice B Platform	Trenched and buried	Out of use	Inhibited seawater
Water injection line	PL252	8”	4.80	Composite flexible	Water	Beatrice AD Platform to Beatrice C Platform	Trenched and buried	Out of use	Inhibited seawater
Infield line	PL112	6”	5.213	Concrete coated steel	Oil	Beatrice B Platform to Beatrice AP Platform	Trenched and buried	Out of Use	Inhibited seawater
Infield line (Note 3)	PL112A	6”	1.550	3LPP coated steel	Oil	Pipeline Collet Connector Flange to Spoolpiece Tie-in Spool Piece Flange	Trenched and buried	Out of use	Inhibited seawater
Oil Riser	PL2610	6”	0.081	Neoprene coated steel	Oil	Tie-in flange to PL2558 at seabed on South side of Beatrice B to topsides flange at +8m	Above seabed	Out of use	Inhibited seawater
Water Injection Riser	PL2611	8”	0.081	Neoprene coated steel	Water	Tie-in flange to PL2560 at seabed on South side of Beatrice B to topsides flange at +8m	Above seabed	Out of use	Inhibited seawater

Table 2.3: Some Pipeline/Flowline/Umbilical Information									
Description	Pipeline Number (as per PWA)	Diameter (inches)	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points	Burial Status	Pipeline Status	Current Content
Power cable	PL4331	4.25”	26.00	Composite flexible	Electricity	Beatrice AP Platform to Dunbeath	Trenched and buried	Operational	N/A
Power cable	PL4330	2.9”	6.30	Composite flexible	Electricity	Beatrice AP Platform to Beatrice B Platform	Trenched and buried	Out of use	N/A
Power cable	PL2331	4.7”	2.90	Composite flexible	Electricity	Beatrice AP Platform to WTG B	Trenched and buried	Operational	N/A

Note 1 There are two steam injection points on PL16: one at KP22 and one at KP44.085 both of which will be recovered. (see Table 3.7: Pipeline Stabilisation and other Features).

Note 2 Total length of PL1838 includes 4 spool pieces (total length of 115.58 m) which will be removed and returned to shore for recycling.

Note 3 Total length of PL112A includes 2 spool pieces (total length of 50 m) which will be removed and returned to shore for recycling.

Table 2.4: Subsea Pipeline Stabilisation Features				
Stabilisation Feature	**Total Number**	**Weight (Te)**	**Location(s)**	**Exposed/Buried/Condition**
Flexible concrete mattresses	184	834	Over or under PL1838, PL112A, PL252, PL2331 and power cables	Various
Grout filled mattresses	37	758	Over PL252, PL4331and PL4330.	Exposed, various condition
Grout bags (25Kg)	1920	48	Over or under PL1838, PL112A and PL2331	Various
Concrete tunnel	2	10	Over PL4331 at AP tie-in and on the Alpha to Bravo power cable	Exposed

2.4 Wells

Table 2.5: Well Information			
Platform Wells	**Designation**	**Status**	**Category of Well**
Beatrice AD			
11/30a-A1	Oil Production	Shut-In	PL 3-3-1
11/30a-A2	Water Injection	Shut-In	PL 4-3-1
11/30a-A3	Oil Production	Shut-In	PL 4-3-1
11/30a-A4	Oil Production	Shut-In	PL 3-4-1
11/30a-A5	Oil Production	Shut-In	PL 4-4-1
11/30a-A6	Water Injection	Shut-In	PL 4-3-1
11/30a-A9	Water Injection	Shut-In	PL 4-3-1
11/30a-A10	Water Injection	Shut-In	PL 4-4-1
11/30a-A11	Water Injection	Shut-In	PL 3-4-1
11/30a-A12	Water Injection	Shut-In	PL 3-4-1
11/30a-A13	Water Injection	Shut-In	PL 3-4-1
11/30a-A14	Water Injection	Shut-In	PL 3-3-1
11/30a-A15	Water Injection	Shut-In	PL 4-4-1
11/30a-A16	Water Injection	Shut-In	PL 3-4-1
11/30a-A17	Water Injection	Shut-In	PL 4-4-1
11/30a-A18	Oil Production	Shut-In	PL 4-4-1
11/30a-A19	Water Injection	Shut-In	PL 3-3-1
11/30a-A20	Oil Production	Shut-In	PL 4-3-1
11/30a-A21	Oil Production	Shut-In	PL 4-4-1
11/30a-A22	Water Injection	Shut-In	PL 4-4-1
11/30a-A23	Oil Production	Shut-In	PL 3-4-1
11/30a-A25	Oil Production	Shut-In	PL 4-4-1
11/30a-A26z	Oil Production	Shut-In	PL 4-4-1
11/30a-A27	Oil Production	Shut-In	PL 3-4-1
11/30a-A28	Oil Production	Shut-In	PL 4-3-1
11/30a-A29	Oil Production	Shut-In	PL 3-4-1
11/30a-A30	Oil Production	Shut-In	PL 4-4-1
11/30a-A31	Water Injection	Shut-In	PL 3-3-1
11/30a-A32	Oil Production	Shut-In	PL 3-3-1
11/30a-A33z	Oil Production	Shut-In	PL 4-4-1

Table 2.5: Well Information (Continued)			
Platform Wells	**Designation**	**Status**	**Category of Well**
Beatrice B			
11/30a-B1	Oil Production	Abandoned	PL 3-4-3
11/30a-B4	Oil Production	Abandoned	PL 4-3-3
11/30a-B5	Oil Production	Abandoned	PL 4-4-3
11/30a-B6A	Water Injection	Abandoned	PL 4-4-3
11/30a-B7	Water Injection	Abandoned	PL 3-4-3
11/30a-B8	Oil Production	Abandoned	PL 1-2-3
11/30a-B9z	Water Injection	Abandoned	PL 4-3-3
11/30a-B10	Oil Production	Abandoned	PL 3-3-3
11/30a-B11z	Oil Production	Abandoned	PL 3-4-3
11/30a-B12	Oil Production	Abandoned	PL 3-4-3
11/30a-B13	Oil Production	Abandoned	PL 4-4-3
Beatrice C			
11/30a-C1	Water Injection	Abandoned	PL 3-4-3
11/30a-C2	Water Injection	Abandoned	PL 3-3-3
Subsea Wells			
None			

Table 2.6: Historic Well Numbering	
Platform Wells	**Status**
Beatrice AD (Note 1)	
11/30a-A7	Donor well for 11/30a-A32 (original well bore plugged and slot/upper section used to drill 11/30a - A32)
11/30a-A8	Donor well for 11/30a-A31
11/30a-A24	Donor well for 11/30a-A33
11/30a-A26	Well plugged and side-tracked as 11/30a-A26z
11/30a-A33	Well plugged and side-tracked as 11/30a-A33z
Beatrice B (Note 1)	
11/30a-B2	Donor well for 11/30a - B12
11/30a-B3	Donor well for 11/30a - B11
11/30a-B6	Re-spud and completed as well 11/30a - B6A
11/30a-B9	Well plugged and side-tracked as 11/30a - B9z
11/30a-B11	Well plugged and side-tracked as 11/30a - B11z

Note 1 Historic Well Numbering included to clarify existing abandoned wells identified by OGA.

2.5 Drill Cuttings

(See Section 3.7 for further information)

Table 2.7: Drill Cuttings Pile Information		
Location of Pile Centre (Latitude/Longitude)	**Seabed Area (m^2)**	**Estimated volume of cuttings (m^3)**
Beatrice AD	1,688	678

2.6 Inventory Estimates

The pie charts (Figure 2.1 and Figure 2.12) show the inventory estimates for different elements of the DPs contained in this document.

For reference pipelines PL2610 and PL2611 have been included in the “Installations” weight estimate as they are an integral part of the Beatrice Bravo jacket structure.

In addition, see the EIA Report [Ref: 2] Chapter 14 for further information.

Figure 2.1: Pie Chart of Estimated Inventory (Installations)

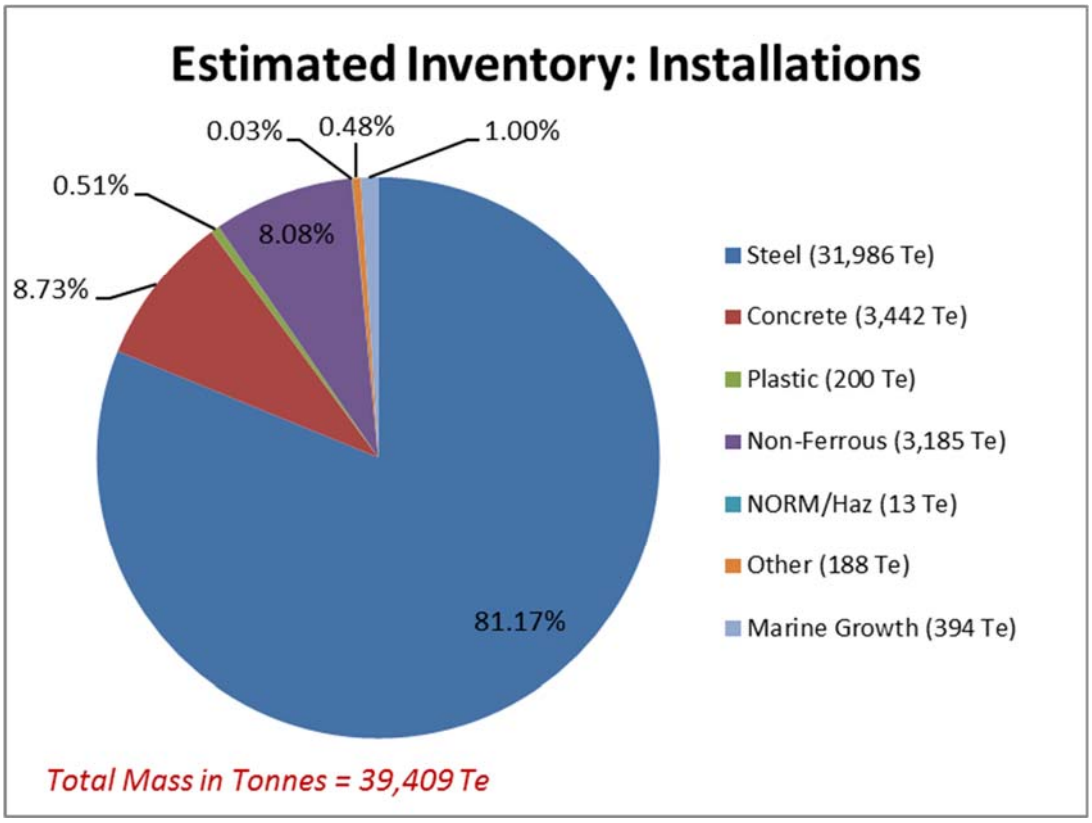
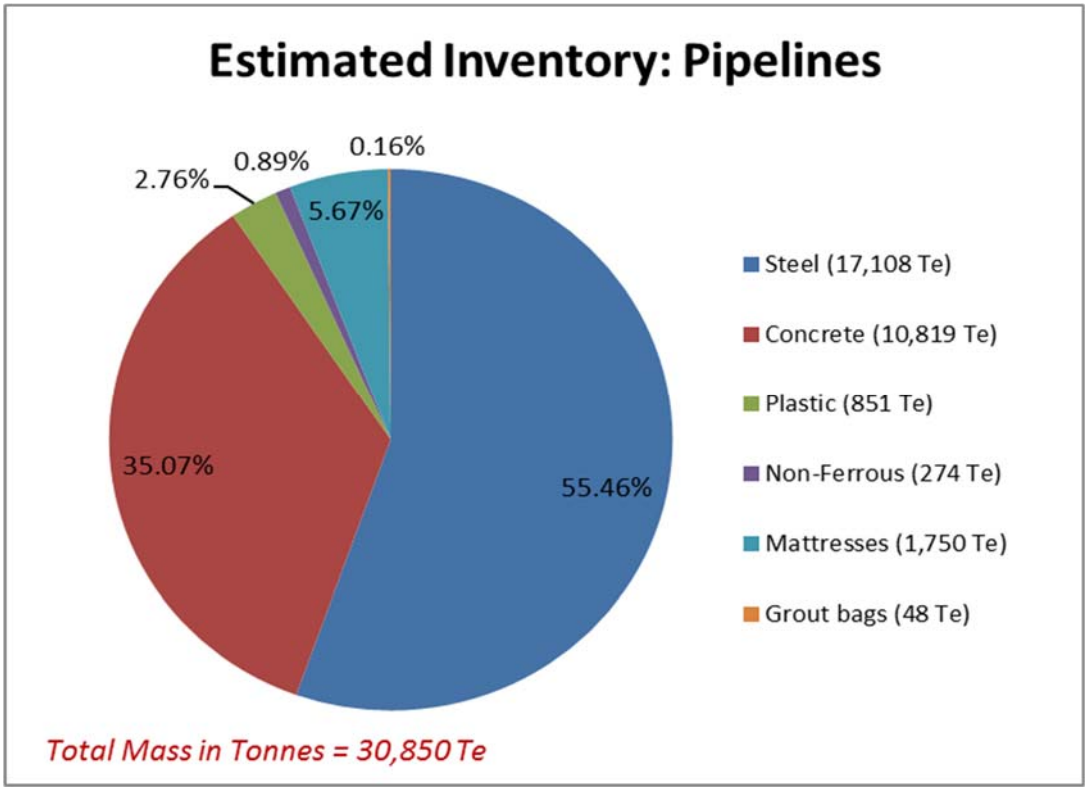


Figure 2.2: Pie Chart of Estimated Inventory (Pipelines)



3 REMOVAL AND DISPOSAL METHODS

In line with the waste hierarchy, Repsol Sinopec Resources UK have considered other reuse options for the facilities, and this was a key consideration leading to a final decision on the nature and timing of field decommissioning. A Decommissioning Programme for the Beatrice field was originally approved in 2004 by the DTI (relevant regulatory functions now within BEIS and OGA). This Programme was based on an agreement with the MoD to use the platforms for military training after CoP. The MoD subsequently exercised their right to terminate the agreement.

Further field life extension options were also investigated and other reuse options including the incorporation of the Beatrice Wind turbines into the 'BOWL' windfarm and a community funded development opportunity to connect the turbines to the grid were taken into consideration. All were found to be sub-economic, and consequently the facilities are to be decommissioned. On removal and where practical Repsol Sinopec Resources UK will ensure the principles of the waste hierarchy and in accordance with the Waste Framework Directive and will ensure segregation by type and transport to shore in an auditable manner through licensed waste contractors. It is anticipated that the chosen waste management provider's/disposal yards shall follow the waste management hierarchy in the handling of materials from Beatrice Decommissioning to maximize the amount of material from the projects which is reused or recovered/recycled.

Repsol Sinopec Resources UK and the selected removal contractor(s) will monitor and review the disposal route of all materials and waste to the point of final reuse, recycling or disposal. As the decommissioning is not scheduled to be completed for a further 14-years Repsol Sinopec Resources UK propose to take cognizance of any future advances in technology to aid waste management, including the further reuse, recycle or scrapping of parts of the installations as appropriate.

3.1 Topsides – Decommissioning Overview

Beatrice Alpha Complex

Figure 3.1: Beatrice Alpha Complex

The Beatrice Alpha complex comprises two bridge-linked platforms; the Beatrice AD platform (drilling platform) and Beatrice AP platform (production platform). The AD platform was installed in 1979, and the AP platform and bridge were installed in 1980. An image of the complex is shown in Figure 3.1.

Beatrice Alpha Drilling (AD) Platform

The topside is a barge-placed steel truss deck and comprises: cellar deck/ Modular Support Frame (MSF), a module deck supporting the drilling infrastructure with two pedestal cranes on the East and West sides and a four-tiered accommodation block and a helideck.

AD Cellar Deck/MSF

The cellar deck/ MSF was used primarily for the storage of fuels, potable water, brine and injection water along with their respective distribution equipment and associated instrumentation.

The MSF was installed in two pieces by lowering the legs into stabbing cones on the jacket leg. The two halves of the frame were welded together after installation by way of sections installed top and bottom on both sides, which in turn support the modules which comprise the Module Deck.

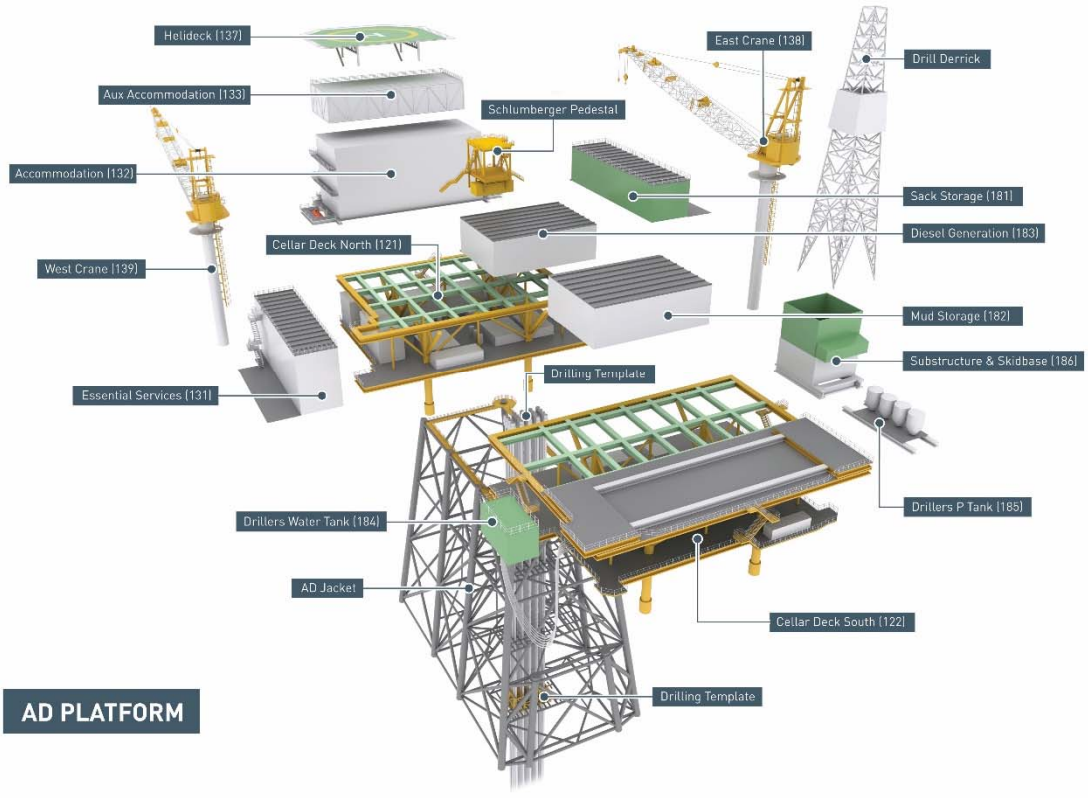
AD Module Deck

The module deck consists of two levels and was set up for a number of operations, primarily based around drilling activity. The Module Deck was constructed from individual modules which were installed in approximately 15 separate lifts.

AD Accommodation and Helideck

The accommodation block is on four levels situated at the northern end of the AD platform and has a two-tiered auxiliary module installed above it. The main accommodation block is the designated 'temporary refuge' (TR) for the collective Beatrice Alpha complex. It is positioned away from the wellhead area and separated from the process facilities and crude risers which are all located on the Beatrice AP platform. The accommodation, auxiliary modules and helideck were installed as separate lifts. Figure 3.2 provides a schematic diagram of AD Platform.

Figure 3.2: Beatrice AD Schematic Showing Exploded View of Topsides Modules



The AD topsides will be fully removed and returned to shore for recycling. Options on removal methods are still under consideration and include single Heavy Lift, Reverse Installation (Multiple Lifts) and Piece Small removal. Contracting and Procurement (C&P) engagement and the tendering process will be completed before a decision is made on the removal method to be adopted.

Beatrice Alpha Production (AP) Platform

The topside comprises three main decks: cellar deck/ MSF and two module levels located above it along with a crane on the west side of the platform.

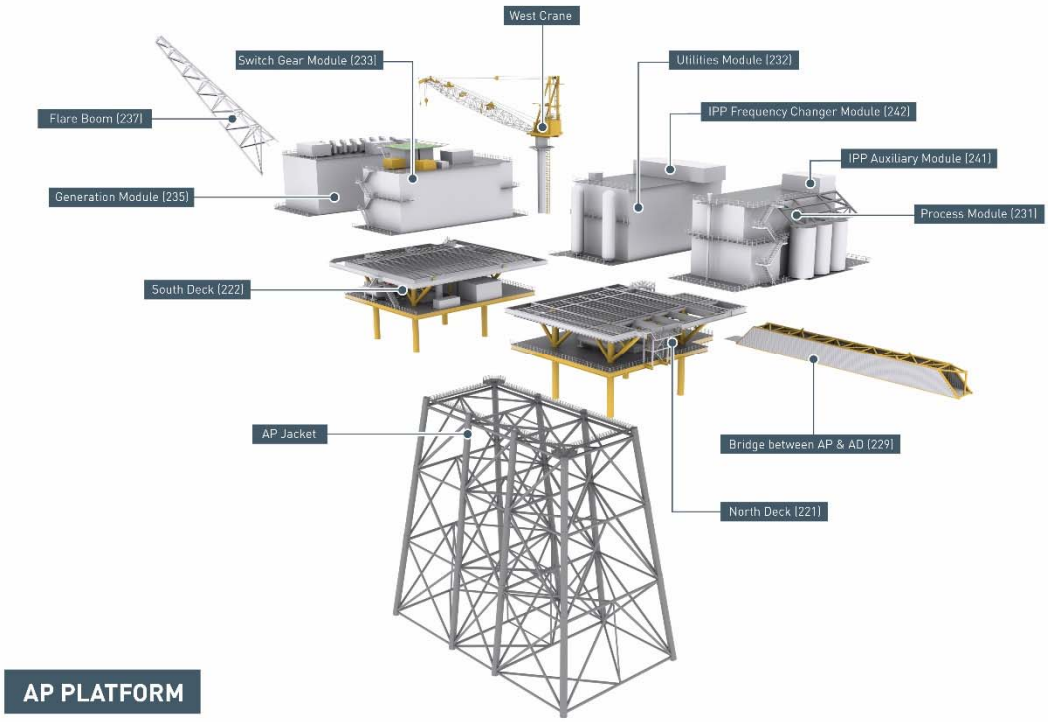
AP Cellar Deck/MSF

This area was largely reserved for storage, water pumps and booster pump equipment. Although it houses some process and utilities equipment for drainage and produced water clean-up, its primary purpose is to support utilities and power generation modules which are installed above it. The MSF was installed in two separate lifts and welded together.

AP Module Decks

The main module deck houses all the processing and export facilities. The modules are spread over two levels and contain processing, utilities, switchgear and power generation/distribution equipment. Figure 3.3 provides a schematic diagram of AP Platform including the bridge link to AD.

Figure 3.3: Beatrice AP Schematic Showing Exploded View of Topsides Modules



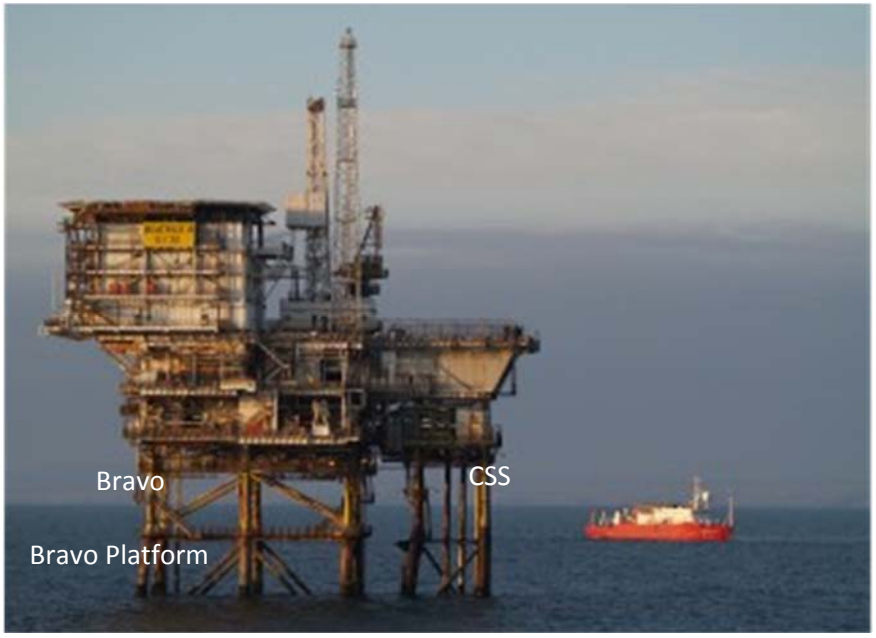
The AP topsides will be fully removed and returned to shore for recycling. Options on removal methods are still under consideration and include Heavy Lift, Reverse Installation (Multiple Lift) and Piece Small removal. C&P engagement and tendering process will be completed before a decision is made on the removal method to be adopted. Following the commercial tender process Repsol Sinopec Resources UK Limited will inform OPRED of the selected removal option.

Beatrice Bravo (B) Platform

The Beatrice B platform is located to the north east of the Beatrice A complex. The B platform was originally a workover and production facility. All drilling and processing facilities have been placed out of service but are retained on the platform and the platform is now not normally manned. Power for the B platform is provided by a diesel generator.

The B platform consists of the main platform (BB) which was installed in 1983 and a smaller adjacent structure serving as a Conductor Support Structure (CSS) which was installed in 1989. A cantilever/bridge structure extends from the MSF deck of BB over to the adjacent CSS deck structure. An image of the BB and CSS is shown in Figure 3.4.

Figure 3.4: Beatrice Bravo Platform



BB Cellar Deck/MSF

The Cellar Deck/MSF supports the deck structure and has storage facilities for drill water, potable water and diesel fuel as well as an equipment area containing distribution pumps and the seawater lifting pump. The MSF was installed in a single lift.

BB Integrated Deck Structure

The integrated module deck structure comprises three levels, the main deck, mezzanine deck and upper deck. The main deck houses the control room, a utilities module, further storage and the crude processing area all of which are no longer in use. The mezzanine deck contains emergency equipment and the electrical, mud and workover modules. The upper deck supports the accommodation block, the pipe deck, and a crane on the north-west side, the disused flare tower and the workover and drilling facilities. The integrated deck was installed in a single lift.

BB Accommodation and Helideck

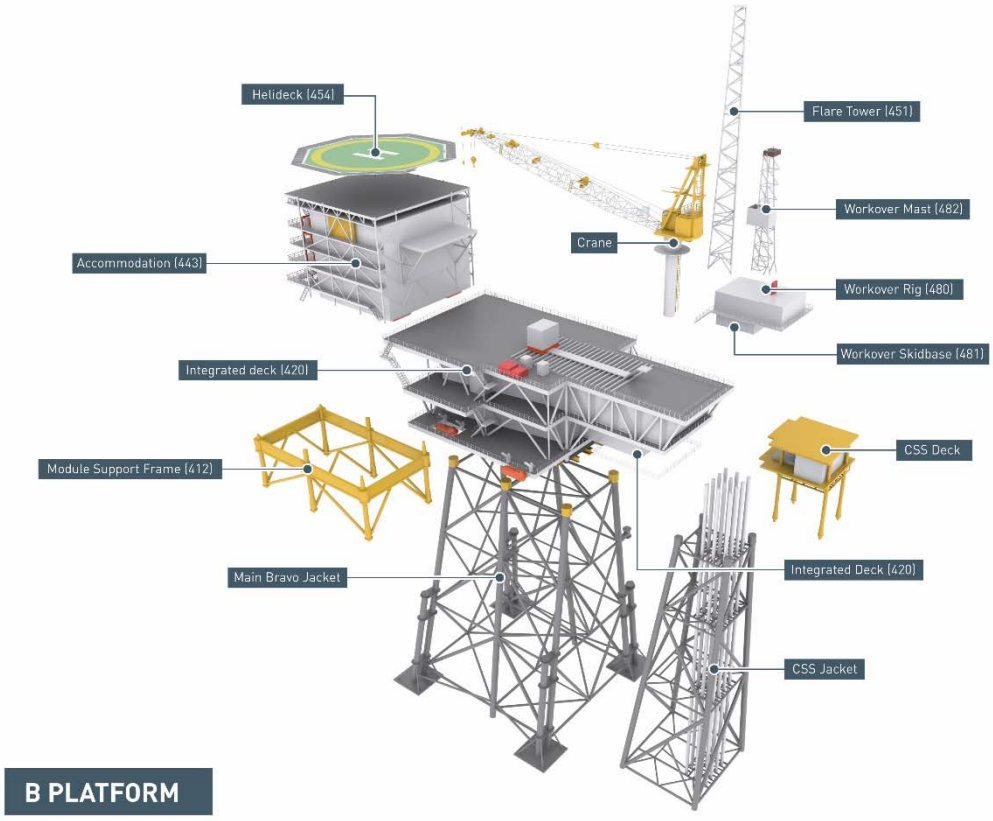
The accommodation block, the workover rigs and equipment, and the disused flare tower were all installed as separate units.

Conductor Support Structure

The CSS structure contains wellheads and a closed drains containment tank. The well bay area is located on the lower deck.

Figure 3.5 provides a schematic diagram of B Platform, including CSS.

Figure 3.5: Beatrice B/CSS Schematic Showing Exploded View of Topsides Modules



The BB and CSS topsides will be fully removed and returned to shore for recycling. Options on removal methods are still under consideration and include Heavy Lift, Reverse Installation (Multiple Lift) and Piece Small removal. C&P engagement and tendering process will be completed before a decision is made on the removal method to be adopted.

Beatrice Charlie (C) Platform

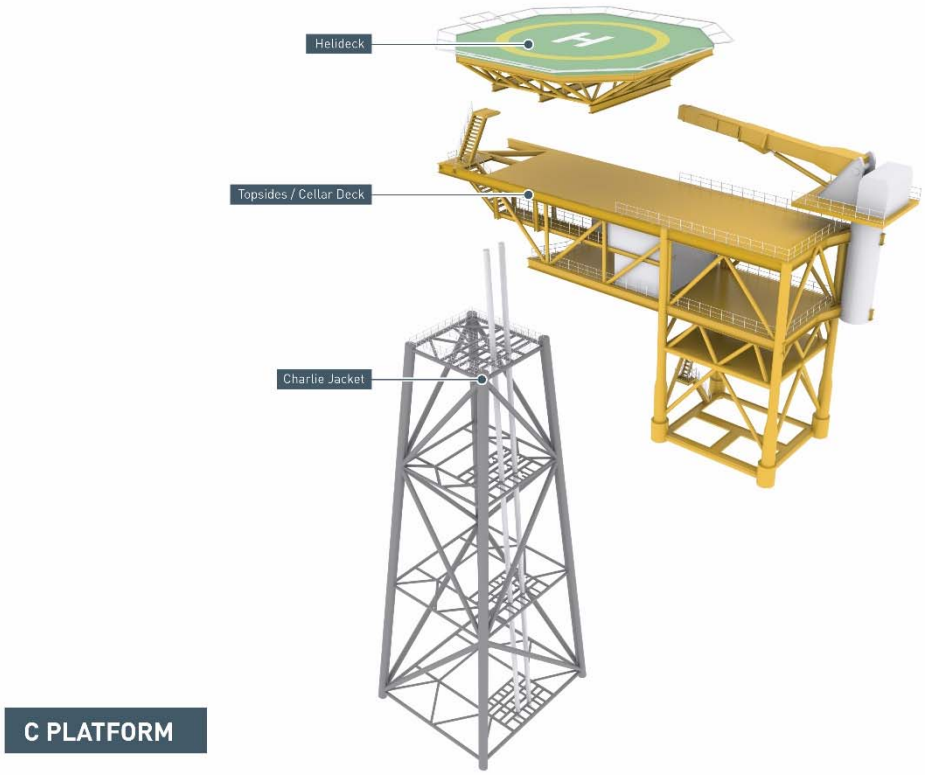
The Beatrice C platform originally served as an unmanned minimum facilities satellite water injection platform with injection water being imported from AP; no caissons or outfalls were necessary, and power was generated on-board by diesel generators.

The platform has only minimal topsides with no drilling facilities and is no longer in use. All topside equipment has been placed out of service but is retained on the platform. A back-up generator is used during platform visits. Photovoltaic panels with battery storage are located on the platform in order to power navigation equipment, limited smoke detection and a telemetry link to Beatrice AD. An image of the C platform is shown in Figure 3.6.

Figure 3.6: Beatrice Charlie Platform

The Beatrice C topside structure consists of a helideck and a main deck which was installed in 1984. The main deck is distributed over three levels and is cantilevered out and over the north side of the jacket. There is a pedestal crane located on the south west corner of the main deck. Figure 3.7 provides a schematic diagram of the Beatrice C Platform.

Figure 3.7: Beatrice C Schematic Showing Exploded View of Topsides Modules



The C topsides will be fully removed and returned to shore for recycling. Options on removal methods are still under consideration and include Heavy Lift, Reverse Installation (Multiple Lift) and Piece Small removal. C&P engagement and tendering process will be completed before a decision is made on the removal method to be adopted.

Wind Turbine Generators (WTG)

Latterly power was supplied to the Beatrice Alpha complex from two 5MW turbines, see Figure 3.9, (Turbines A and B), each mounted on a four-leg piled steel jacket structure. Each turbine has three rotor blades 126m in diameter, with a hub height of 88 m above Lowest Astronomical Tide (LAT).

Both turbines were installed by 2007 and each structure comprises a four-leg jacket, transition piece, tower, rotor hub and blades.

The jacket and transition piece were installed in one lift, and the tower, rotor hub and blades in another discrete lift. The jacket boat landings, stairs and internal transition modules were installed as separate lifts.

It is anticipated that the turbines will be removed utilising reverse installation methods and will be returned to shore for re-use or recycling. Figure 3.8 shows the turbines during the installation phase

Figure 3.8: Beatrice Wind Turbines Installation

Figure 3.9: Beatrice Wind Turbines Schematic Showing Exploded View

Preparation/Cleaning:

Table 3.1: Cleaning of Topsides for Removal		
Waste Type	**Composition of Waste**	**Disposal Route**
Onboard hydrocarbons	Hydrocarbons	Return to shore for separation and use.
Other hazardous materials	The presence of NORM will be identified. (e.g. Batteries and smoke detectors)	NORM, if present, will be disposed of in accordance with the appropriate permit. Transported onshore for re-use/disposal by appropriate methods.
Original paint coating	The presence of lead-based paints will be identified.	May give off toxic fumes / dust if flame-cutting or grinding/blasting is used so appropriate safety measures will be taken. Painted items will be disposed of onshore with consideration given to any toxic components.
Asbestos and Ceramic Fibre	Asbestos (Chrysotiles) has been identified in surveys, additional surveys will be undertaken.	Asbestos will be disposed of via an appropriately licenced waste management contractor.
Note: Hazardous and non-hazardous materials will be captured within the Project's Material Inventory, which will remain live, and form a key part of the active Waste Management Plan.		

Removal Methods:

Table 3.2: Topsides Removal Methods	
1) HLV (semi-submersible crane vessel) √ 2) Monohull crane vessel √ 3) Piece small √ 4) Combination of Piece Small and Modular Removal √	
Method	**Description**
The topsides of each facility will be fully removed and returned to shore for recycling. However, a final decision on the decommissioning method will be made following a commercial tendering process.	
Modular Removal/ Reverse Installation by HLV	Removal of parts/modules of topsides for transportation to shore using work barge(s) for re-use of selected equipment, recycling, break up, and/or disposal
Modular Removal/ Reverse Installation by Monohull SSCV	Removal of parts/modules of topsides for transportation to shore using work barge(s) for re-use of selected equipment, recycling, break up, and/or disposal
Removal by HLV	Removal of topsides as complete units for transportation to shore for re-use of selected equipment, recycling, break up, and/or disposal.
Offshore removal 'piece small'	Removal of topsides by breaking up offshore and containerising before transporting to shore using supply boats. Items will then be sorted for re-use, recycling or disposal
Combination of Piece Small and Modular Removal	Part piece small and part modular removal may be used as some modules may be unfit for lifting in original configuration.

3.2 Jackets – Decommissioning Overview

Beatrice AD Jacket

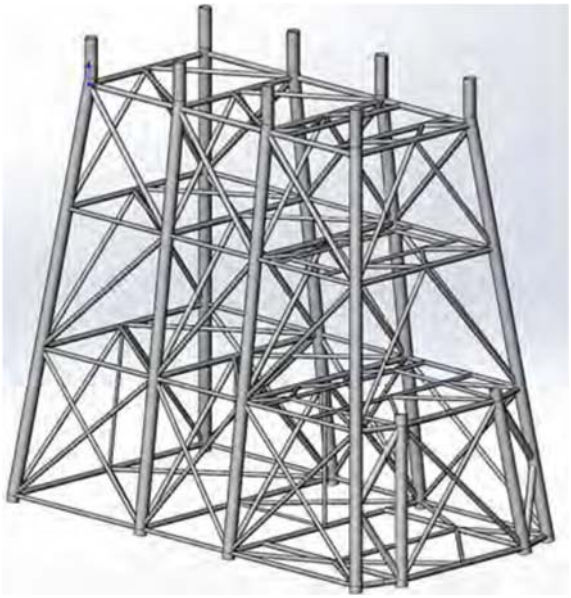
The AD support structure comprises an eight-legged, piled and grouted steel jacket with maximum dimensions at jacket base of 35 m x 62 m x 55.4 m high, located in a water depth of 45 m. The jacket was barge launched over the subsea drilling template and up ended using a Semi-Submersible Crane Vessel (SSCV). There are no risers on the AD platform. Marine growth is present on the jacket.

Due to the weight of drill cuttings accumulated at the base of the AD Jacket, there is existing structural damage and 14 horizontal members at an elevation of -45 m and one vertical member between elevations -45 m and -26 m of row 3 were cut free from the jacket. Due to these remedial works both the conductor framing at -45 m and the drilling template are now separated from the jacket.

Flooded member status of the jacket is also uncertain and therefore draining of members during removal will be a consideration.

The jacket will be removed either as a single Heavy lift, Multiple Lifts or Piece Small. A final decision on the decommissioning method will be made following a commercial tendering process. The conductor frame of the jacket will be removed in one piece separately and after the removal of the jacket above. The drilling template will be removed in one piece after the damaged conductor frame has been removed. Figure 3.10 provides a diagram of the structure.

Figure 3.10: Diagram of Beatrice AD Jacket



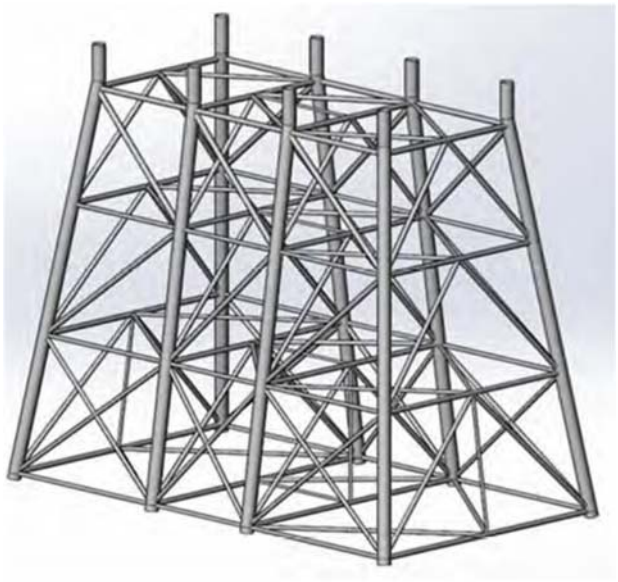
Beatrice AP Jacket

The AP support structure comprises an eight-legged, piled and grouted steel jacket with maximum dimensions at jacket base of 35 m x 62 m x 55.4 m high, located in a water depth of 45 m. The jacket was barge launched and manoeuvred into position using an SSCV. Similar to the AD jacket significant marine growth is also present on the AP jacket. There are two risers (16'' and 6'') on the AP platform.

There are no instances of structural damage reported and no members were reported to have flooded.

The jacket will be removed either as one lift, multiple lift or piece small. A final decision on the decommissioning method will be made following a commercial tendering process. Figure 3.11 provides a diagram of the structure.

Figure 3.11: Diagram of Beatrice AP Jacket



Beatrice B Jacket

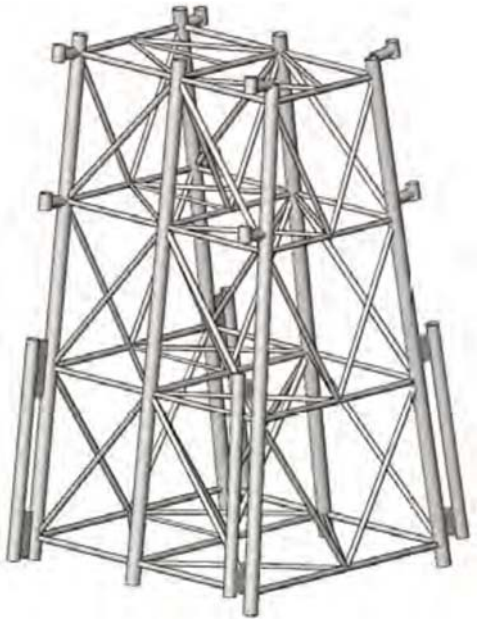
The B support structure is a six-legged, piled steel jacket with maximum dimensions at jacket base of 40 m x 36 m x 56 m high, located in a water depth of 46 m.

The B jacket is installed adjacent to the CSS and is supported on grouted piles inside the raked legs and four skirt piles, one at each corner leg. There are two risers on the B platform (PL2610 and PL2611).

There are no reports of structural damage or flood of members.

The jacket will be removed either as a heavy lift, multiple lifts or piece small. A final decision on the decommissioning method will be made following a commercial tendering process. Figure 3.12 provides a diagram of the structure.

Figure 3.12: Diagram of Beatrice Bravo Jacket



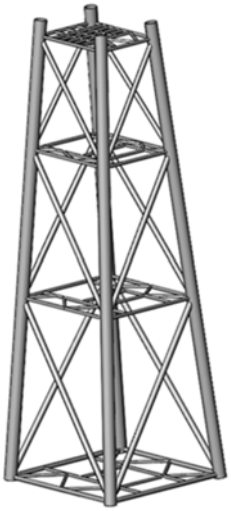
Conductor Support Structure

The CSS is a four-legged structure with grouted piles inside the legs with maximum dimensions at jacket base of 19.9 m x 18.2 m x 56.5 m high, located in a water depth of 46 m. It is designed to allow a jack-up rig set up alongside.

In 1987 a repair clamp was added to the CSS at elevation -46 m between leg A1 and member 45A2 to arrest crack propagation.

The CSS will be removed either as a single lift, or two lifts. A final decision on the decommissioning method will be made following a commercial tendering process. Figure 3.13 provides a diagram of the structure.

Figure 3.13: Diagram of Conductor Support Structure



Beatrice C Jacket

The C jacket was installed by an SSCV and comprises a four legged, piled, tubular steel jacket, which has a raked construction with maximum dimensions at jacket base of 22.6 m x 19 m x 61 m high; it is located in a water depth of 50 m. The piles are not grouted in the annulus and are welded to the top of the jacket via shim plates. There are 12 conductor guides in 4 x 3 guide frame matrix, which is incorporated into the jacket structure. There are no caissons or structural outfalls on C jacket. There is a single 8" water injection riser on C.

The jacket will be removed either as a single lift, or two lifts. A final decision on the decommissioning method will be made following a commercial tendering process. Figure 3.14 provides a diagram of the structure.

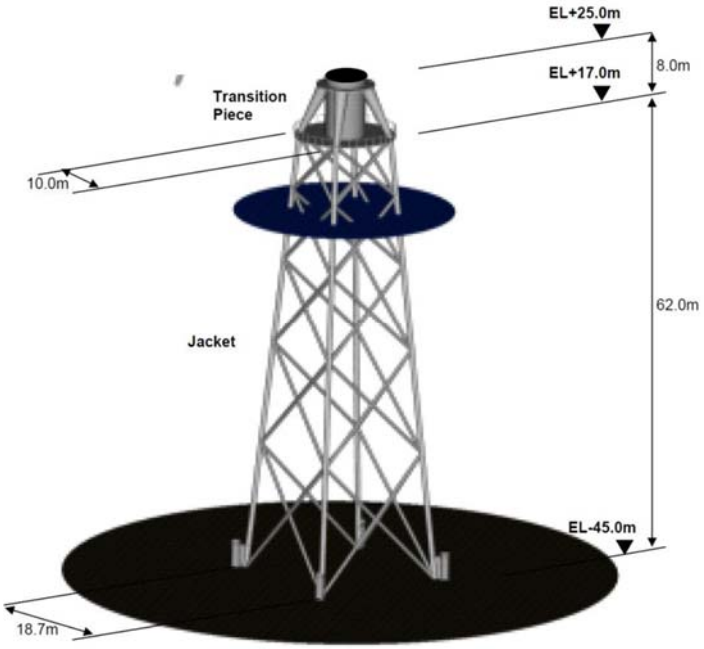
Figure 3.14: Diagram of Beatrice Charlie Jacket

Wind Turbines A&B

The wind turbine substructures are identical and consist of four-legged steel jackets, piled through a skirt pile at each leg. Maximum dimensions at the jacket bases are 26.8 m x 26.8 m x 70 m high, located in a water depth of 45 m.

The jacket will be removed as a single lift (Reverse Installation) or two lifts. A final decision on the decommissioning method will be made following a commercial tendering process. Figure 3.15 provides a diagram of the structure.

Figure 3.15: Diagram of Beatrice WTG Jacket



3.2.2 Jacket Removal Methods

Table 3.3: Jacket Decommissioning Methods	
1) HLV (semi-submersible crane vessel) √ 2) Monohull crane vessel √ 3) Piece small √ 4) Other ☐	
Method	**Description**
Onshore Disposal using either HLV or Monohull crane vessel	Removal of the jacket as complete unit or as multiple units and transport ashore for dismantling, recycling and/ or disposal at a licensed dismantling yard. It is anticipated that up to 95% of the returned material will be reused or recovered/recycled.
Dismantle using 'piece small' at location	Remove jacket in several pieces using as smaller capacity crane vessel + attendant work barge and transport ashore for dismantling, recycling and/ or disposal at a licensed dismantling yard. It is anticipated that up to 95% of the returned material will be reused or recovered/recycled.
Proposed removal method and disposal route	The approaches being considered for jacket removal are removal in sections using multiple lifts or a single heavy lift of each jacket for shipment to shore. A final decision on the decommissioning method will be made following a commercial tendering process.
Note: If there is a delay between jacket and topsides removal activities, appropriate navigational aids shall be in place, as per Consent to Locate requirements.	

3.3 Subsea Installations, Stabilisation and Other Features

Table 3.4: Subsea Installations, Stabilisation and other Features			
Subsea installations and stabilisation features	**Number**	**Option**	**Disposal Route (if applicable)**
Drilling Template (Beatrice AD)	1	Full removal	Return to shore for reuse or recycling
Flexible concrete mattresses	24	Base case full removal	Return to shore for reuse/ recycling/ disposal
Large grout filled bags (under Beatrice AD conductor guide frame)	12	Base case full recovery	Return to shore for reuse/ recycling/ disposal

Due to the design, installation method and condition of the mattresses it is anticipated that they may not be fully recoverable, certainly not in one piece, and recovery can only be attempted if safe to do so.

A Comparative Assessment was carried out to determine the most appropriate decommissioning strategy for these mattresses, in line with the recommendations in BEIS Guidance Notes.

The comparative assessment considered Technical, Safety and Environmental Risks and Societal and Economic Impacts. The assessment closely followed the Guidelines on Comparative Assessments in DPs published by Oil and Gas UK.

Workshops were held by Repsol Sinopec Resources UK (which included representatives from the safety, environmental, subsea, topside and decommissioning teams) using established terms of reference, detailed data on field facilities and recorded results approved by participants.

3.4 Pipelines

Decommissioning Options:

*Key to Options:

1) Total removal – by reverse reeling

2) Total removal - by reverse S-Lay

3) Remediation in-situ – exposed sections rock covered

4) Remediation in-situ – exposed sections trenched and buried

5) Remediation in-situ – exposed sections cut and removed

6) Leave in-situ

Table 3.5: Pipeline or Pipeline Groups Decommissioning Options

Pipeline or Group (Note 1) **(as per PWA)**	**Condition of line/group** (Surface laid/Trenched/ Buried/ Spanning)	**Whole or part of pipeline/group**	**Decommissioning Options considered**
A (PL16, PL111, PL112)	Offshore: • Rigid pipeline • Concrete coated • Trenched and buried	All	2, 3, 4, 5
B (PL112A, PL1838)	Offshore: • Rigid pipeline • Trenched and buried	All	1, 2, 3, 4, 5
C (PL252)	Offshore: • Flexible pipeline • Trenched and buried	All	1, 3, 4, 5
D (PL16, PL1838)	Nearshore: • Inside the area of special environmental interest • To mean low water mark	All	2, 3, 4, 5
E (PL2331, PL4331, PL4330)	Offshore: • Trenched and buried	All	1, 3, 4, 5
F (PL4331 [Nearshore]) (Note 2)	Nearshore: • Inside the area of special environmental interest • Surface laid • To mean low water mark	All	1, 2, 3, 6

Note 1 Pipelines PL2610 and PL2610 have not been comparatively assessed as they are an integral part of the Beatrice Bravo jacket structure and hence will be recovered as part of the jacket removal.

Note 2 The nearshore (2.82km) section of PL4331 – Dunbeath Power Cable is surface laid, on rocky terrain, and contained within a protective caisson. During installation the cable could not be trenched and buried due to the terrain. The option to trench and bury during decommissioning was therefore not considered practical.

Comparative Assessment Method:

A comparative assessment was carried out for all pipelines and power cables in line with the recommendations in BEIS Guidance Notes. The comparative assessment considered Technical, Safety and Environmental Risks and Societal and Economic Impacts. The assessments closely followed the Guidelines on Comparative Assessments in DPs published by Oil and Gas UK.

Workshops were held by Repsol Sinopec Resources UK (representatives from the safety, environmental, subsea, topside and decommissioning teams were present) using established terms of reference, detailed data on field facilities and recorded results approved by participants.

Outcome of Comparative Assessment:

Table 3.6: Outcomes of Comparative Assessment

Pipeline or Group	Recommended Option	Justification
A (PL16, PL111, PL112)	Decommission by leaving trenched and buried sections in-situ and decommissioning exposed sections by trench and bury. (Note 1)	Total removal options were discounted for the already trenched and buried sections of pipeline as excessive seabed disturbance in uncovering the pipeline would occur, also more risk exposure time to project personnel both offshore and onshore in having to handle large pipelines lengths was a concern. Technically full removal of the lines would be difficult. There will be minimum legacy risk to other users of the seas in leaving the pipelines in-situ as the trenched and buried sections of the pipeline will remain so. Exposed sections will be remediated by trench and bury (Note 1) as the residual safety risk to other users of the seas if left exposed on the seabed and potential deterioration was deemed unacceptable.
B (PL112A, PL1838)	Decommission by leaving trenched and buried sections in-situ and decommissioning exposed sections by trench and bury. (Note 1) The spool pieces associated with PL1838 (4 pieces with total length of 115.58 m) and PL112A (2 pieces with total length of 50 m) will be removed and returned to shore for recycling	
C (PL252)	Decommission by leaving trenched and buried sections in-situ and decommissioning exposed sections by trench and bury. (Note 1) Decommissioning by total removal using Reverse S-Lay is retained as an option although could be compromised by the fact that sections of the line are covered by grout filled mattresses.	Justification for Pipelines Groups A and B is same for this pipeline except that since PL252 is a small diameter flexible line, it was considered that there would be less seabed disturbance and would technically be more achievable compared to the pipeline groups A and B, therefore total removal of the pipeline remains an option. Decision on total removal of the pipeline will be influenced by the decommissioning of the grout filled mattresses covering it. See Table 3.7.

Table 3.6: Outcomes of Comparative Assessment		
Pipeline or Group	**Recommended Option**	**Justification**
D (PL16, PL1838)	Decommission by leaving trenched and buried sections in-situ and decommissioning exposed sections by trench and bury. (Note 1)	Justification for Pipelines Groups A and B is same for this pipeline group
E (PL2331, PL4331, PL4330)	**PL4331:** Remediation by leaving trenched and buried sections in-situ and decommissioning exposed sections by trench and bury. (Note 1) **PL2331 and PL4330:** Remediation by leaving trenched and buried sections in-situ and exposed sections by trench and bury. (Note 1)	**PL4331:** Justification for Pipelines Groups A and B is same for the above cables. **PL2331 and PL4330:** Justification for Pipelines Groups A and B is same for the above cables.
F (PL4331 [nearshore])	**PL4331 [nearshore]:** Remediation by leave in-place / do nothing (Note 2)	**PL4331 [nearshore]:** Cable is surface laid, on rocky terrain, and contained within a protective caisson. Technically cut and lift is the most appropriate strategy, if removal options considered.

Note 1 The conclusion of the CA was that there is no significant differentiator on each of the remediation options for the exposed sections of pipeline, however the slight differences during the evaluation have resulted in the options being prioritised as follows:

- Priority 1 – Trench and bury
- Priority 2 – Cut-and-Lift
- Priority 3 – Rock cover in-situ

Priority 1 - Trench and bury will be carried forward as the recommended option in the DP. However, and due to the only slight difference in performance of each option across the criteria evaluated, Repsol Sinopec Resources UK intend to carry out a Contracting and Procurement (C&P) engagement exercise and tendering process on all three options and will consult with BEIS should this exercise result in a change in preference of the remediation option.

Note 2 The 2.82km nearshore section of the Dunbeath power cable (PL4331) is surface laid and installed in a protective caisson for its fully exposed length, the outcome of the CA for this nearshore exposed section of cable was that “Leave In-situ/ Do Nothing” is the preferred option as it scored significantly better than all other options:

- During original installation the cable could not be trenched and buried due to the terrain. The option to trench and bury during decommissioning was therefore not considered as it was deemed impractical.
- Residual safety risk across all the options available was not identified as a significant differentiator due to the fact that the cable is located in an area of special environmental

interest, trawler fishing in the area was unlikely and therefore the potential as a snagging hazard is low.

- Environmental Legacy impact of introducing foreign materials (Rock cover) to an area of special environmental interest was not deemed as a good strategy and therefore the option to remediate in-situ by introducing rock cover to exposed sections was scored significantly worse than all other options for legacy impact. Leave -in-situ and do nothing was therefore viewed as being the best option environmentally as the cable and protective caisson had been in-place for many years and was already established in the environment.

3.5 Pipeline Stabilisation and Other Features

Table 3.7: Pipeline Stabilisation and Other Features

Stabilisation features	Number	Option	Disposal Route (if applicable)
Flexible concrete mattresses	169 15	Base case is full removal To remain *in situ* until Jacky pipeline crossings are decommissioned	Return to shore for reuse/ recycling/ disposal
Grout filled mattresses	37	Base case is full removal	Return to shore for reuse/ recycling/ disposal
Grout bags (25 kg)	1,920	Full removal	Return to shore for reuse/ recycling/ disposal
Steam Injection Points (on PL16 at KP22 and KP44.085)	2	Full removal	Return to shore for reuse/ recycling/ disposal
Concrete tunnel (over PL4331)	2	Full removal	Return to shore for reuse/ recycling/ disposal

3.6 Wells

Table 3.8: Well Plug and Abandonment
The Beatrice Field consists of 43 platform wells comprising 24 production wells and 19 water injection wells. There are no subsea wells. The wells (listed in Table 2.5) will be plugged in compliance with the requirements of the DCR and abandoned in accordance with the latest version of the Oil & Gas UK Guidelines for the Suspension and Abandonment of Wells (Issue 5, July 2015). A Master Application Template (MAT) and the supporting Subsidiary Application Template (SAT) will be submitted in support of works carried out. A PON5 will also be submitted to BEIS for application to abandon the wells. Plugging and abandonment was scheduled to occur from June to August 2017 at Beatrice C; and from September 2017 to December 2018 at Beatrice B and from 2021 to 2024 at Beatrice A.

3.7 Drill Cuttings

Drill Cuttings Decommissioning Options:
Surveys carried out in Q4 2016 detected no discernible cuttings piles at the Beatrice B and Beatrice C platforms (Fugro, 2017). This section is completed for the small cuttings pile at Beatrice AD.

Table 3.9: Drill Cuttings Decommissioning Options	
How many drill cuttings piles are present?	1
Tick options examined: ☐Remove and re-inject ☐Leave in place ☐Cover ☐Relocate on seabed ☐Remove and treat onshore ☐Remove and treat offshore ☑Other *partial relocation of the cuttings pile to allow decommissioning of the AD jacket and template.*	
Review of Pile characteristics	**Pile 1**
How has the cuttings pile been screened? (desktop exercise/actual samples taken) –	Samples taken
Dates of sampling (if applicable)	1992 and 2016
Sampling to be included in pre-decommissioning survey?	Yes (was included)
Does it fall below both OSPAR thresholds?	Yes
Will the drill cuttings pile have to be displaced in order to remove the jacket?	Yes
What quantity (m^3) would have to be displaced/removed?	576 m^3
Will the drill cuttings pile have to be displaced in order to remove any pipelines?	No
What quantity (m^3) would have to be displaced/removed?	None required
Have you carried out a Comparative Assessment of options for the Cuttings Pile?	Not required as below OSPAR thresholds

Comparative Assessment Method:
N/A

Outcome of Comparative Assessment:
N/A

3.8 Waste Streams

Table 3.10: Waste Stream Management Methods	
Waste Stream	**Removal and Disposal method**
Bulk liquids	Residual hydrocarbons will be removed from the topsides at all four platforms. At the Beatrice C and Beatrice B platforms it is anticipated that the residual hydrocarbons and associated flushing fluids will be recovered to shore in tote tanks for disposal. At the Beatrice Alpha complex, the residual hydrocarbons and any associated flushing fluids will be flushed into the export pipeline and returned to shore for disposal before the pipeline cleaning campaign takes place. All export pipelines will be flushed, cleaned and filled with inhibited seawater prior to decommissioning activities taking place.
Marine growth	Where necessary and practicable to allow access and inspection, some marine growth will be removed offshore. In addition, a portion is expected to 'drop off' during recovery operations. The remainder will be brought to shore for disposal should a recycling route (e.g. potential for use as a fertiliser) not be identified.
NORM/LSA Scale	Tests for NORM will be undertaken offshore and work will be carried out in full compliance with all relevant regulations.
Asbestos	The final disposal route will depend on the quantities found but will be dealt with and disposed of in full compliance with all relevant regulations.
Other hazardous wastes	Will be recovered to shore and disposed of in full compliance with all relevant regulations.
Onshore Dismantling sites	Appropriate licensed sites will be selected. Dismantling sites must demonstrate waste stream management throughout the deconstruction process and the ability to deliver innovative reuse and recycling options. Existing sites would need a proven track record.

As part of the Contracting Strategy, Repsol Sinopec Resources UK will ensure the selection of waste competent Contractor(s), experienced in the handling of all wastes associated with the Decommissioning of Oil and Gas Platforms.

The waste management provider's/disposal yards shall follow the waste management hierarchy in the handling of materials from Beatrice Decommissioning to maximize the amount of material from the projects which is reused or recovered/recycled. Repsol Sinopec Resources UK and the selected removal contractor(s) will, monitor and review the disposal route of all materials and waste to the point of final reuse, recycling or disposal and reserves the right to audit to fulfil any Duty of Care responsibilities.

It is anticipated that up to 90% of the returned material will be reused or recovered/recycled.

Table 3.11: Inventory Disposition			
	Total Inventory Tonnage	**Planned tonnage to shore**	**Planned left *in situ***
Installations (Note 1)	32,200	32,200	0
Installation Piles (Note 2)	7,209	3,976	3,233
Pipelines (Note 1)	30,850	2,822 (Note 3)	28,028

Note 1 Pipelines PL2610 and PL2611 have been included in the "Installations" weight estimate as they are an integral part of the Beatrice Bravo jacket structure.

Note 2 Installation Pile weights includes weight of grout (3,274te) which is assumed to be fully recovered to shore.

Note 3 Planned tonnage to shore includes flexible concrete mattresses, grout filled mattresses, grout Bags (larger bags and 25 kg bags), spools and pipeline sections.

4 ENVIRONMENTAL IMPACT ASSESSMENT

4.1 Environmental Sensitivities (Summary)

<table>
<tr><th colspan="2">Table 4.1: Environmental Sensitivities</th></tr>
<tr><th>Environmental Receptor</th><th>Main Features</th></tr>
<tr><td>Conservation interests</td><td>The East Caithness Cliffs are located c. 20 km northwest of the Beatrice platforms. The cliffs are designated as a Special Area of Conservation (SAC) (vegetated sea cliffs of the Atlantic and Baltic Coasts), Special Protection Area (SPA) (a number of bird species) and a Nature Conservation Marine Protected Area (NCMPA) (black guillemot). The three designated areas overlap, with the SPA and NCMPA extending c. 2 km offshore and covering an area of 114 km^2. This designated area is intersected by the power cable to Dunbeath.

The Moray Firth SAC is located c. 24 km southwest of the Beatrice platforms and is intersected by the export pipeline. The area is primarily designated for its bottlenose dolphin populations and to a lesser degree for ‘sandbanks which are slightly covered by seawater all the time’. A large area of the SAC is also under consideration for designation as an SPA (currently considered a possible SPA).

The designated areas identified above are the protected areas with the potential to be impacted in any way as a result of the planned decommissioning options. A number of other coastal designated areas may be impacted in the event of an accidental release of diesel due to a vessel collision. These areas are identified in the EIA Report [Ref: 2].</td></tr>
<tr><td>Seabed</td><td>Sediments in the area of the Beatrice project generally comprises Subtidal Sands and Gravels [Priority Habitat] (UK Biodiversity Action Plan) with three EUNIS (European Nature Information System) biotope complexes identified across the area as summarised in the table below.

<table>
<tr><th rowspan="2">Location</th><th colspan="3">EUNIS biotope</th></tr>
<tr><th>Circalittoral fine sand</th><th>Circalittoral mixed sediment</th><th>Circalittoral muddy sands</th></tr>
<tr><td>Beatrice Alpha</td><td>X</td><td>X</td><td>X</td></tr>
<tr><td>Beatrice Bravo</td><td>X</td><td>X</td><td></td></tr>
<tr><td>Beatrice Charlie</td><td></td><td></td><td>X</td></tr>
<tr><td>Wind Turbine Generator</td><td>X</td><td></td><td></td></tr>
<tr><td>Infield pipelines</td><td>x</td><td></td><td></td></tr>
<tr><td>Export pipeline to Nigg</td><td>x</td><td>x</td><td>x</td></tr>
<tr><td>Power cable to Dunbeath</td><td>x</td><td></td><td>x</td></tr>
</table>

Sediments in the area of the platforms comprise coarse silt, coarse sand, medium sand and fine sand with a mean particle size diameter ranging from 46 µm (silt) to 456 µm (medium sand). Drill cuttings deposits occur within 100 m of the Beatrice A platforms. Sediments within the WTG area are relatively homogenous with mean particle size diameters of 207 µm to 213 µm (fine sand). Along the export pipeline and infield lines the mean particle size diameters range from 49 µm (silt) at Nigg to 817 µm (coarse sand) along the infield pipelines.</td></tr>
</table>

Table 4.1: Environmental Sensitivities	
Fish	A number of fish species are known to use the area as a spawning and/or nursery ground. Species known to use the area for both spawning and as a nursery include herring, lemon sole, *Nephrops*, plaice, saithe, sandeel, ling and whiting. Cod are also known to spawn in the area whilst anglerfish, blue whiting, European hake, mackerel and various species of ray are known to use the area as a nursery ground. Of the fish species identified in the area, anglerfish, herring, mackerel, ling, blue whiting, cod, ling, saithe, sandeels and whiting have been assessed by SNH and JNCC as PMFs in Scotland.
Fisheries	A number of gear types are active in the area of the Beatrice infrastructure including seine nets, demersal trawls, *Nephrops* trawls, scallop dredges and pots. Given the different sources of data available it is difficult to draw conclusions on the relative value of the area to the UK or Scottish fishing industry as a whole. However, it can be seen that the area is an important fishing ground for smaller vessels whilst in terms of effort and landings it is of less importance to larger vessels. For both larger and smaller vessels, shellfish comprise the most valuable landings and these are targeted with a mixture of static and mobile gear.
Marine Mammals	Given the proximity to haul out sites along the northeast coast, grey seals and to a lesser extent harbour seals occur in the area of the Beatrice Field. Cetaceans known to occur in the area include harbour porpoise, bottlenose dolphin, white-beaked dolphin and minke whale. A number of SACs for the European otter occur in the area where the export pipeline comes on shore. Bottlenose dolphin, harbour porpoise, grey seal and harbour seal and European otter are Annex II species.
Birds	The Moray Firth is an important foraging ground for a number of bird species occurring in the SPAs along the north east Scottish Coast. Species include kittiwake, fulmar, gannet, great black-backed gull, herring gull, great skua, shag, meadow pipit, sooty shearwater, arctic tern, arctic skua and a number of auk species (including guillemot, black guillemot, little auk, puffin and razor bill). Based on the Seabird Oil Sensitivity Index (SOSI) seabird sensitivity to oil pollution varies throughout the year in the area of the Beatrice platforms, ranging from low to extremely high.
Onshore Communities	Waste generated during decommissioning will be transported to shore in an auditable manner through licensed waste contractors. The waste management hierarchy of 'reduce, re-use, recycle' will be followed. Repsol Sinopec Resources UK intends to engage approved waste management contractors to handle, store and dispose of all waste generated by the decommissioning activities.

Table 4.1: Environmental Sensitivities	
Other Users of the Sea	Based on available data shipping activity in the area of the Beatrice platforms and along the export and power cable routes is considered very low. The Beatrice facilities are partly located within the Moray Firth Round 3 wind farm zone, which comprises Eastern and Western Development Areas. The Eastern Development Area lies 11 km from the Beatrice B facilities and within the area there are consents for three offshore wind farms: Telford, Stevenson and MacColl, although construction has not yet started on any of them. Within the Western Development Area there are plans for one wind farm of up to 90 turbines that has recently completed Scoping. Adjacent to Beatrice there is the Beatrice Scottish Territorial Waters Wind Farm Leasing Zone within which there is consent for one wind farm, the Beatrice Offshore Wind Farm, for which construction has started. Once complete the wind farm will comprise 84 turbines. The Beatrice Field is in an area noted to be of concern to the Ministry of Defence because it lies within training ranges.
Atmosphere	Emissions to atmosphere offshore will arise from the vessels used to decommission the Beatrice infrastructure. Onshore emissions will result from the yard activities including recycling of the steel etc. associated with the structures returned to shore.

4.2 Potential Environmental Impacts and their Management

Environmental Impact Assessment Summary:

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
Topsides Removal	Decommissioning of the topsides will require cutting and lifting activities using anchored lift vessels. The principal environmental and societal impacts associated with the planned activities are: • Physical presence of vessels; • Energy use and atmospheric emissions; • Underwater noise from vessels; • Discharges to sea from vessels and possible residual fluids from the topsides (including drainage spaces); • Disturbance to the seabed from anchoring of the vessels; • Production of waste materials. Potential impacts resulting from accidental events include: • Disturbance to the seabed as a result of dropped objects; • Discharges to sea as a result of hydrocarbon releases (e.g. during bunkering operations or a loss of diesel inventory due to vessel collision). Following the mitigations summarised in this table (detailed in the EIA Report) the environmental and societal significance of the planned activities are considered low. In addition, the environmental risk associated with dropped objects is considered low. The environmental risk associated with a loss of fuel during bunkering activities or a total loss of fuel inventory is considered to be moderate	During decommissioning of the topsides, a number of mitigation measures will be adhered to, in order to minimise the environmental and socio-economic impacts. These are detailed in the EIA Report and are summarised here: • Notice to mariners will be circulated. • Vessel traffic surveys (and collision risk assessments) will be undertaken to support Consent to Locates required for any anchored vessels. • Repsol Sinopec Resources UK will carry out a detailed assurance process on all vessels prior to contract award and all contractors will originate from countries signed up to the International Maritime Organisation and will adhere to their guidelines. • Vessel use will be optimised • Flushing and cleaning of topsides has been completed in line with BAT/BEP (Best Available Technique/Best Environmental Practice) requirements. • Work procedures will be in place to minimise duration of activities and minimise likelihood of dropped objects. • A waste management plan will be developed which will describe and quantify waste • Waste management options will take account of the waste management hierarchy. • SIMOPS (simultaneous operations) will be managed through bridging documents and communications.

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
	given the potential for beaching and proximity to protected areas.	• Regular maintenance checks of fuel transfer hose (identified as an environmentally critical element). • Emergency response plans in place including SOPEPs (shipboard oil pollution emergency plan) and the Beatrice OPEP (oil pollution emergency plan).
Jacket Removal	Decommissioning of the jackets will require cutting and lifting activities using anchored lift vessels. It is possible that some material may require to be excavated around the jacket piles should internal cutting not be possible. Some disturbance to the cuttings pile at the Beatrice AD platform will be required. The principal environmental and societal impacts associated with the planned activities are generally similar to those for the decommissioning of the topsides and include impacts associated with: • Physical presence of vessels; • Energy use and atmospheric emissions; • Underwater noise from vessels; • Discharges to sea from vessels and marine growth from the jackets; • Disturbance to the seabed from anchoring of the vessels and possible excavation of seabed material, including parts of the Beatrice AD cuttings pile, to access the jacket piles; • Production of waste materials. Potential impacts resulting from accidental events include: • Disturbance to the seabed as a result of dropped objects;	During decommissioning of the jackets, the mitigation measures identified for 'Topsides Removal' (see above) will be applied. In addition, • Disturbance to the Beatrice AD cuttings pile will be minimised. • Independent verification of seabed clearance will be obtained.

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
	• Discharges to sea as a result of hydrocarbon releases (e.g. during bunkering operations or a loss of diesel inventory due to vessel collision). Following the mitigations summarised in this table (detailed in the EIA Report) the environmental and societal significance of the planned activities associated with recovery of the jacket are mostly considered to be low. There are no activities considered to be of high significance and only the disturbance to the AD cuttings pile was considered to be of moderate significance. As for the activities associated with decommissioning of the topsides, the environmental risk associated with dropped objects is considered low whilst the risk associated with a loss of fuel during bunkering activities or a total loss of fuel inventory due to vessel collision is considered to be moderate given the potential for beaching and proximity to protected areas.	
Decommissioning Pipelines	Decommissioning of the pipelines and power cables *in situ* will require cutting of pipeline and power cable ends and trenching and burying these ends and any exposed mid-line sections. The principal environmental and societal impacts include: • Physical presence of vessels; • Energy use and atmospheric emissions; • Underwater noise from vessels; • Discharges to sea from vessels; • Disturbance to the seabed from cutting, trenching and burying activities; • Production of waste materials.	During decommissioning of the pipelines and power cables the relevant mitigation measures identified for 'Topsides Removal' (see above) will be applied. In addition: • Flushing and cleaning of all the hydrocarbon pipelines has been completed in line with BAT/BEP requirements. • Vessels carrying out these activities will use dynamic positioning thus minimising impact on the seabed. • Any pipelines or power cables decommissioned *in situ* will be marked on FishSafe and communicated accordingly. • Independent verification of seabed clearance will be obtained. • A survey strategy will be agreed with BEIS for monitoring the buried pipelines and power cables.

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
	Potential impacts resulting from accidental events include discharges to sea as a result of hydrocarbon releases (e.g. a loss of diesel inventory due to vessel collision). Following the mitigations summarised in this table (detailed in the EIA Report) the environmental and societal significance of the planned activities are considered low The environmental risk of a total loss of fuel inventory is considered to be moderate given the potential for beaching and proximity to protected areas.	
Decommissioning Stabilisation Features	The base case is to recover all stabilisation features including the mattresses (both flexible concrete and grout filled), grout bags (larger ones associated with the AD conductor guide frame and the 25 kg bags) and the two concrete tunnels. The principal environmental and societal impacts include: • Physical presence of vessels; • Energy use and atmospheric emissions; • Underwater noise from vessels; • Discharges to sea from vessels; • Disturbance to the seabed from recovery activities; • Production of waste materials. Potential impacts resulting from accidental events include: • Discharges to sea as a result of hydrocarbon releases (e.g. a loss of diesel inventory due to vessel collision). Following the mitigations summarised in this table (detailed in the EIA Report) the environmental and societal significance of the planned activities are considered to be low. The environmental risk of a total loss of fuel inventory	During decommissioning of the stabilisation features the relevant mitigation measures identified for 'Topsides Removal' (see above) will be applied. In addition: • Vessels carrying out these activities will use dynamic positioning thus minimising impact on the seabed. • Independent verification of seabed clearance will be obtained. • In the event that any stabilisation features cannot be recovered Repsol Sinopec Resources UK will consult with BEIS to discuss alternative approaches. • A survey strategy will be agreed with BEIS for monitoring any stabilisation features that will be decommissioned *in situ*.

Table 4.2: Environmental Impact Management		
Activity	**Main Impacts**	**Management**
	is considered to be moderate given the potential for beaching and proximity to protected areas.	
Decommissioning Drill Cuttings	Undisturbed the Beatrice AD cuttings pile falls below the OSPAR 2006/5 thresholds for rate of oil loss and persistence over time. Removal of the AD jacket, conductor guide frame and drilling template will result in some disturbance to the cuttings pile. The level of disturbance will be dependent on the selected cutting method i.e. whether it will be internal or external cutting. It is acknowledged that decommissioning the pile *in situ* could result in: • A long-term presence of hydrocarbons in sediments; and • A Low level leaching of hydrocarbons from the drill cuttings pile. However, given the small size of the pile, and the estimated hydrocarbon content (10 -20 te), it is expected that following disturbance the pile will remain within the OSPAR 2006/5 thresholds.	Repsol Sinopec Resources UK have carried out a BAT assessment and are in ongoing discussions with BEIS and Marine Scotland Science to determine the optimal approach to managing the cuttings pile. These discussions will continue as the project progresses. If decommissioned *in situ* the pile will be marked on FishSafe and communicated accor ndingly.

5 INTERESTED PARTY CONSULTATIONS

Consultations Summary:
During the public consultation period, copies of the Decommissioning Programmes and supporting documents were forwarded to the Statutory Consultees identified in Table 5.1. The documents were also made available for public consultation. Comments received following this consultation period are captured in the first part of Table 5.1.

In May 2017, as part of the informal stakeholder engagement process Repsol Sinopec Resources UK issued a scoping report to a number of stakeholders. The Scoping Report provided an overview of the Beatrice Field, the proposed decommissioning activities and an overview of the impacts to be assessed in this EIA. Stakeholders were invited to comment on the Scoping Report with respect to any concerns they may have. In addition to issuing the Scoping Report, Repsol Sinopec Resources UK have carried out a number of informal stakeholder engagement sessions including separate meetings with various stakeholders and a Stakeholder Engagement Workshop. The second part of Table 5.1 'Informal Consultations' summarises the main concerns that the stakeholders had and identifies who received the Scoping Report. Full details are provided in Chapter 2 of the EIA Report.

Table 5.1: Summary of Stakeholder Comments

Who	Comment	Response
Statutory Consultations		
Global Marine Systems Limited	No comments received following formal consultation.	N/A
National Federation of Fisherman's Organisations	No comments received following formal consultation.	N/A
Scottish Fishermen's Federation	No comments received following formal consultation. Comments received during informal consultation are provided below.	N/A
Northern Ireland Fish Producers Organisation Limited	No comments received following formal consultation.	N/A
Public	No comments received following formal consultation.	N/A
SEPA	(1) Request for further information with regards the windfarm elements and their disposal. (2) Request for copies of the Waste Management Plan's	(1) Approaches had been made regarding the re-use of the wind turbines, however Repsol Sinopec Resources UK Limited were informed that the technology is now outdated, and no interest was expressed. The ultimate fate of the materials (re-use/recycling etc.) and detailed engineering

Table 5.1: Summary of Stakeholder Comments		
		associated with the removals campaign (inc. timing of fluid removal) will not be finalised until a Contract has been awarded for Removal/Disposal. However, RSRUK recognise their Duty of Care responsibilities and will look to work with the selected Contractor(s) to drive waste management up the waste hierarchy. (2) A detailed project specific Waste Management Plan (WMP) will be prepared once the Removal/Disposal Contractor has been appointed. During its preparation, Repsol Sinopec Resources UK Limited will continue to engage/consult with SEPA and would welcome any comments and feedback. The WMP will be made available for comment to the applicable regulating bodies.
Offshore Energy OUKHO (United Kingdom Hydrographic Office)	(1) Requests that the operator follow and adhere to Section 16 (Marking of remains and safety zones) from – GUIDANCE NOTES – Decommissioning of Offshore Oil and Gas Installations and Pipelines. (2) Request an informal discussion with the operator, regarding the potential for annotating our charts with a 'decommissioning area'.	(1) Repsol Sinopec Resources UK Limited will adhere to Section 16, and this guidance is captured in the project's Permits, Licenses, Authorisations, Notifications and Consents (PLANC) Register, which will continue to be actively used as the Project progresses. (2) Repsol Sinopec Resources UK Limited welcome the opportunity for discussions with UKHO, however would propose that these discussions are held at a later date taking account of the current schedule of activities (indicative schedule provided in Section 6.4)

Table 5.1: Summary of Stakeholder Comments		
BEIS	(1) Following formal consultation BEIS requested further information on the impact of disturbance to the Beatrice AD cuttings pile: specific information requested related to the likelihood of internal cutting of the jacket piles not being successful; what volume of oil could enter the water column; and mitigation measures relating to surface sheens. (2) BEIS requested that following commercial tendering process, they are updated with regards selected removal methods. (3) Requested clarification on handling/tracking of hazardous waste. (4) Requested confirmation that Beatrice OPEP will be in place during operations. (5) Requested following text is added to Table 3.3: *'If there is a delay between jacket and the topsides removal activities, appropriate navigational aids shall be in place, as per Consent to Locate requirements'.*	(1) Additional text has been added to Table 1.5 in relation to the likelihood of internal cuttings of the jacket piles not being successful. EIA report was amended to capture response to the cuttings pile. (2) Following the commercial tender process Repsol Sinopec Resources UK Limited will inform BEIS of selected removal option. (3) Table 3.10 updated to include the following text: 'Hazardous and Non Hazardous Materials will be captured within the Project's Material Inventory, which will remain live, and form a key part of the Active Waste Management Plan'. Text also added to EIA. (4) Table 4.2 updated to confirm this. EIA report also updated to capture that OPEP will be in place. (5) Text added as requested.
Informal Consultations		
Department of Business, Energy and Industrial Strategy (BEIS)	BEIS responded to the scoping report, were consulted separately and attended the Stakeholder Engagement Workshop. During these meetings they were informed of the proposed decommissioning plan for the Beatrice facilities. Their main area of concern was in relation to the management of the cuttings pile at Beatrice AD.	The EIA report presents modelling of a worst-case impact whereby 85% of the cuttings pile is disturbed to allow access to the jacket piles externally. Following presentation of the results at the stakeholder workshop, Repsol Sinopec Resources UK have carried out a BAT assessment are in ongoing discussions with BEIS and Marine Scotland Science to determine the optimal management approach for the pile. These discussions will

Table 5.1: Summary of Stakeholder Comments		
		continue as the project progresses.
Marine Scotland Science	Marine Scotland were consulted separately and attended the Stakeholder Engagement Workshop. During these meetings they were informed of the proposed decommissioning plan for the Beatrice facilities. Marine Scotland's main area of concern was in relation to the management of the cuttings pile at Beatrice AD.	Response: as for that provided above for BEIS.
Joint Nature Conservation Committee (JNCC)	JNCC were consulted separately and attended the Stakeholder Engagement Workshop. During these meetings they were informed of the proposed decommissioning plan for the Beatrice facilities. No major concerns were advised. JNCC expressed that their default position is that the seabed should be returned to an 'as found' condition. However, there is an appreciation that there may be safety issues associated with the decommissioning programme which may make this impossible.	Repsol Sinopec Resources UK will continue to take this into account during each stage of the decommissioning project.
Scottish Fishermen's Federation (SFF)	SFF were consulted separately and attended the Stakeholder Engagement Workshop. During these meetings they were informed of the proposed decommissioning plan for the Beatrice facilities. SFF raised concerns regarding the decommissioning of the grout filled bag mattresses *in situ*.	Subsequent to the stakeholder workshop, Repsol Sinopec Resources UK have undertaken a comprehensive technology appraisal, and have identified a methodology, that is notionally capable of breaking up the grout filled mattresses. Discussions are ongoing with BEIS about the emerging methodology/approach Repsol Sinopec Resources UK propose to trial, and as such recovery is now the base case decommissioning option for these mattresses and the larger grout bags found at the AD conductor guide frame.

Table 5.1: Summary of Stakeholder Comments		
Beatrice Offshore Wind Farm Limited (BOWL)	The aim of the meeting was to share information pack and identify synergies.	Given the timelines, synergies were not clearly identifiable (BOWL project is currently in the construction phase whilst offshore activities for Beatrice Decommissioning Project are expected to commence around 2023/2024).
Scottish Natural Heritage (SNH)	SNH responded to the Scoping Report and were consulted separately. No major concerns were advised.	SNH identified areas that they would like addressed in the EIA report. These are detailed in Chapter 2 of the EIA Report [Ref :2].
University of Aberdeen (Lighthouse Field Station)	University of Aberdeen were consulted separately and attended the Stakeholder Engagement Workshop. During these meetings they were informed of the proposed decommissioning plan for the Beatrice facilities. No major concerns were raised.	University of Aberdeen identified areas that they would like addressed in the EIA report. These are detailed in Chapter 2 of the EIA report [Ref :2].
Highland Council	Highland Council responded to the Scoping Report. No major concerns were identified.	Highland Council requested that information on disturbance to marine mammals be considered. This has been captured in the EIA Report.
Crown Estate Scotland (CES)	CES confirmed they would not be responsible for residual liabilities and that they are currently progressing this line with the UK Government with a view to getting a watertight written agreement in place. CES also requested that they are referenced in Sections 6.6 and 6.7 of the DP.	Repsol Sinopec Resources UK have taken this into consideration during all stages of the decommissioning project and have added CES to Sections 6.6 and 6.7 of the DP.
Others	The following organisations were issued the Scoping Report but did not respond: Health and Safety Executive, Oil and Gas Authority, National Federation of Fishermen's Organisations, Northern Ireland Fish Producers Organisation, Scottish Environmental Protection Agency, The United Kingdom Hydrographic Office, Historic Scotland, Marine Management Organisation, Maritime and Coastguard Agency UK	

Table 5.1: Summary of Stakeholder Comments	
	Fisheries Legacy Trust Fund, Royal Society for the Protection of Birds, Marine Conservation Society, Greenpeace, Scottish Wildlife Trust, Whale and Dolphin Conservation, Cetacean Research and Rescue Unit, a number of members of the Scottish Parliament, Oil and Gas UK, and a number of local councils.

6 PROGRAMME MANAGEMENT

6.1 Project Management and Verification

Repsol Sinopec Resources UK has established a multi-disciplinary team lead by a Project Manager responsible for the implementation of activities and co-ordination of all services. An execution plan will align with established Repsol Sinopec Resources UK Health, Safety and Environment policies and meet all relevant legislative requirements. A contracting strategy will be based on Repsol Sinopec Resources UK procurement and contracts policies, including competitive tendering for all contractor services. Where possible, activities will be co-ordinated with other decommissioning operations and take account of any initiatives promoted by the OGA. Repsol Sinopec Resources UK will report regularly on the execution of the DP to BEIS and discuss any changes in plans in advance.

6.2 Post-Decommissioning Debris Clearance and Verification

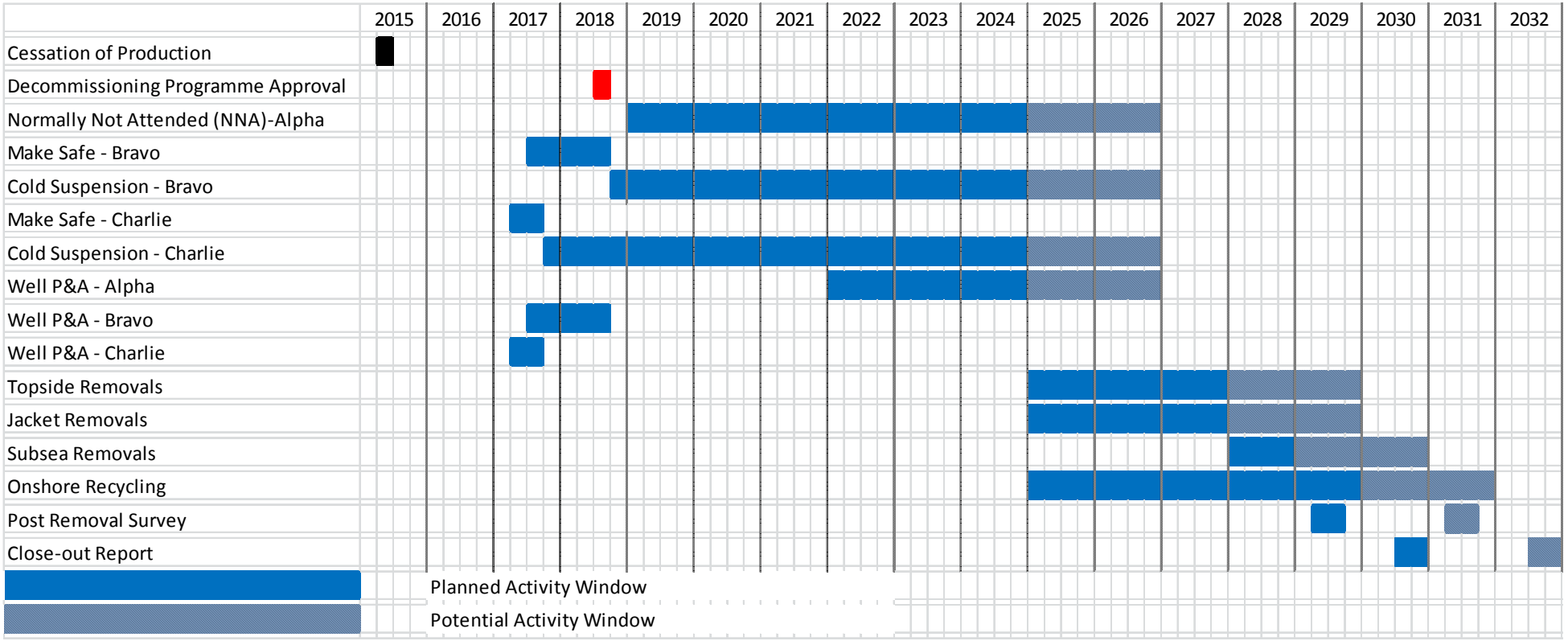
A pre-decommissioning survey has been conducted to identify debris within the installations' 500 m zones and within the 100 m pipeline corridors. Any seabed debris related to offshore oil and gas activities will be recovered for onshore recycling or disposal in line with existing waste management policies. Debris removal will form part of the subsea decommissioning execution scope of work. The clear seabed will either be validated by an independent verification trawl over the installation sites and pipeline corridors or by the post decommissioning survey. The post decommissioning survey will provide further verification.

6.3 Costs

Estimated Costs are confidential and have therefore been provided separately to BEIS

6.4 Schedule

Figure 6.1: Beatrice Area Decommissioning Project Plan



The main milestones for the Beatrice Decommissioning Programme are anticipated to be:

- Beatrice Alpha Well plugging: 2022-2027
- Facilities Removal: 2025-2030
- Close-out report: 2030-2032

The schedule may change to exploit opportunities to optimise the decommissioning programme with other decommissioning activities within the portfolio. Any changes to the schedule will be discussed and agreed with OPRED. The Beatrice Area Decommissioning Programme is outlined in Figure 6.1.

6.5 Close Out

A close out report will be submitted to BEIS/ OPRED within 12 months of the completion of decommissioning completion, including debris clearance and post-decommissioning surveys. The close out report will notify BEIS/ OPRED of any expected changes in parties to the DPs and will provide details in line with the undertakings given in section 6.7 below.

6.6 Post-Decommissioning Monitoring and Evaluation

A post decommissioning environmental seabed survey, covering pipeline routes and sites of wellheads and installations, will be carried out when decommissioning activity has been concluded. The survey will focus on chemical and physical disturbances due to the decommissioning and be compared with the pre-decommissioning survey. Results of the survey will be forwarded to BEIS and Crown Estate Scotland to enable a post monitoring survey regime to be agreed by both parties.

6.7 Management of Residual Liability

Repsol Sinopec Resources UK recognises that they will continue to retain ownership of, and residual liability for all decommissioned items allowed to remain in place through acceptance of the results of the comparative assessment process in Section 3.3. Repsol Sinopec Resources UK undertakes;

- to contact BEIS and Crown Estate Scotland in advance, in the event that any parties to the programmes will no longer have a presence in the UK, to provide the details of the organisation or individual who will act in their place;
- to notify BEIS and Crown Estate Scotland of any organisation/individual that will engage with BEIS and Crown Estate Scotland on future legacy and liability matters;
- to notify BEIS and Crown Estate Scotland of any organisation/individual that will be the contact point for any future third party claims for damage caused by pipelines left in place;
- to ensure that any alternative organisation/individual will have appropriate authority for, and knowledge of the DPs, to engage with BEIS and Crown Estate Scotland;
- to ensure that any alternative organisation/individual will have access to appropriate funding to carry out any actions relating to the residual legacy and liability as outlined in the approved DPs.

7 SUPPORTING DOCUMENTS

Table 7.1: Supporting Documents	
Document Number	*Title*
1	Beatrice Decommissioning Comparative Assessment Report **(RP-DTABEA001-GE-0035)**
2	Beatrice Decommissioning EIA Report **(RP-DTABEA001-HS-0051)**

Web link for all stakeholder / interested parties –

http://www.repsolsinopecuk.com/en/operations/beatrice-oil-field-decommissioning

8 PARTNER LETTERS OF SUPPORT

Repsol Sinopec North Sea Limited and SSE Generation Limited are partners with Repsol Sinopec Resources UK, therefore relevant letters of support are provided.

REPSOL SINOPEC RESOURCES UK LIMITED

163 Holburn Street
Aberdeen
AB10 6BZ

T +44 (0)1224 352500
F +44 (0)1224 353400
W www.repsolsinopecuk.com

19 December 2018
REF: RSRUK/18GEN007

Department for Business, Energy & Industrial Strategy
3rd Floor, Wing C
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ

Dear Sir/Madam

Beatrice DECOMMISSIONING PROGRAMMES

We acknowledge receipt of your letters dated 13th December 2018 with references:

- 01.08.07.06/340C
- 01.08.07.06/339C
- 01.08.07.06/260C
- 12.04.06.05/294C
- 12.04.06.05/296C
- 12.04.06.05/293C
- 12.04.06.05/300C
- 12.04.06.05/140C

We, Repsol Sinopec Resources UK Limited, on behalf of ourselves, Repsol Sinopec North Sea Limited and SSE Generation Limited hereby submit the Beatrice Decommissioning Programmes dated 17th December 2018 as directed by the Secretary of State on 13th December 2018.

The Beatrice Decommissioning Programmes dated 17th December 2018, are submitted by Repsol Sinopec Resources UK Limited on behalf of the Section 29 Notice Holders, Repsol Sinopec Resources UK Limited, Repsol Sinopec North Sea Limited and SSE Generation Limited under section 29 of the Petroleum Act 1998.

Yours faithfully

Director
For and on behalf of Repsol Sinopec Resources UK Limited

REPSOL SINOPEC NORTH SEA LIMITED

163 Holburn Street
Aberdeen
AB10 6BZ

T +44 (0)1224 352500
F +44 (0)1224 353400
W www.repsolsinopecuk.com

19 December 2018
REF: RSRUK/18GEN007

Department for Business, Energy & Industrial Strategy
3rd Floor, Wing C
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ

Dear Sir/Madam

Beatrice DECOMMISSIONING PROGRAMMES

We acknowledge receipt of your letters dated 13th December 2018 with references:

- 01.08.07.06/340C
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- 12.04.06.05/294C
- 12.04.06.05/296C
- 12.04.06.05/293C
- 12.04.06.05/300C
- 12.04.06.05/140C

We, Repsol Sinopec North Sea Limited, confirm that we authorise Repsol Sinopec Resources UK Limited to submit on our behalf an abandonment programme relating to the decommissioning of the Beatrice Facilities as directed by the Secretary of State on 13th December 2018.

We confirm that we support the proposals detailed in the Beatrice Decommissioning Programmes dated 17th December 2018, which is to be submitted by Repsol Sinopec Resources UK Limited in so far as it relates to those facilities in respect of which we are required to submit an abandonment programme under section 29 of the Petroleum Act 1998.

Yours faithfully

Director
For and on behalf of Repsol Sinopec North Sea Limited

REF: **SSE Generation Limited**
No.1 Forbury Place
43 Forbury Road
Reading
United Kingdom
RG1 3JH

Date: **9th January 2019**

Department for Business, Energy & Industrial Strategy [BEIS]
3rd Floor, Wing C
AB1 Building
Crimon Place
Aberdeen
AB10 1BJ

Dear Sir/Madam

BEATRICE DECOMMISSIONING PROGRAMMES – PIPELINE – PL2331

We, SSE Generation Limited, confirm that we authorise Repsol Sinopec Resources UK Limited to submit on our behalf an abandonment programme relating to the decommissioning of the Beatrice Facilities as directed by the Secretary of State.

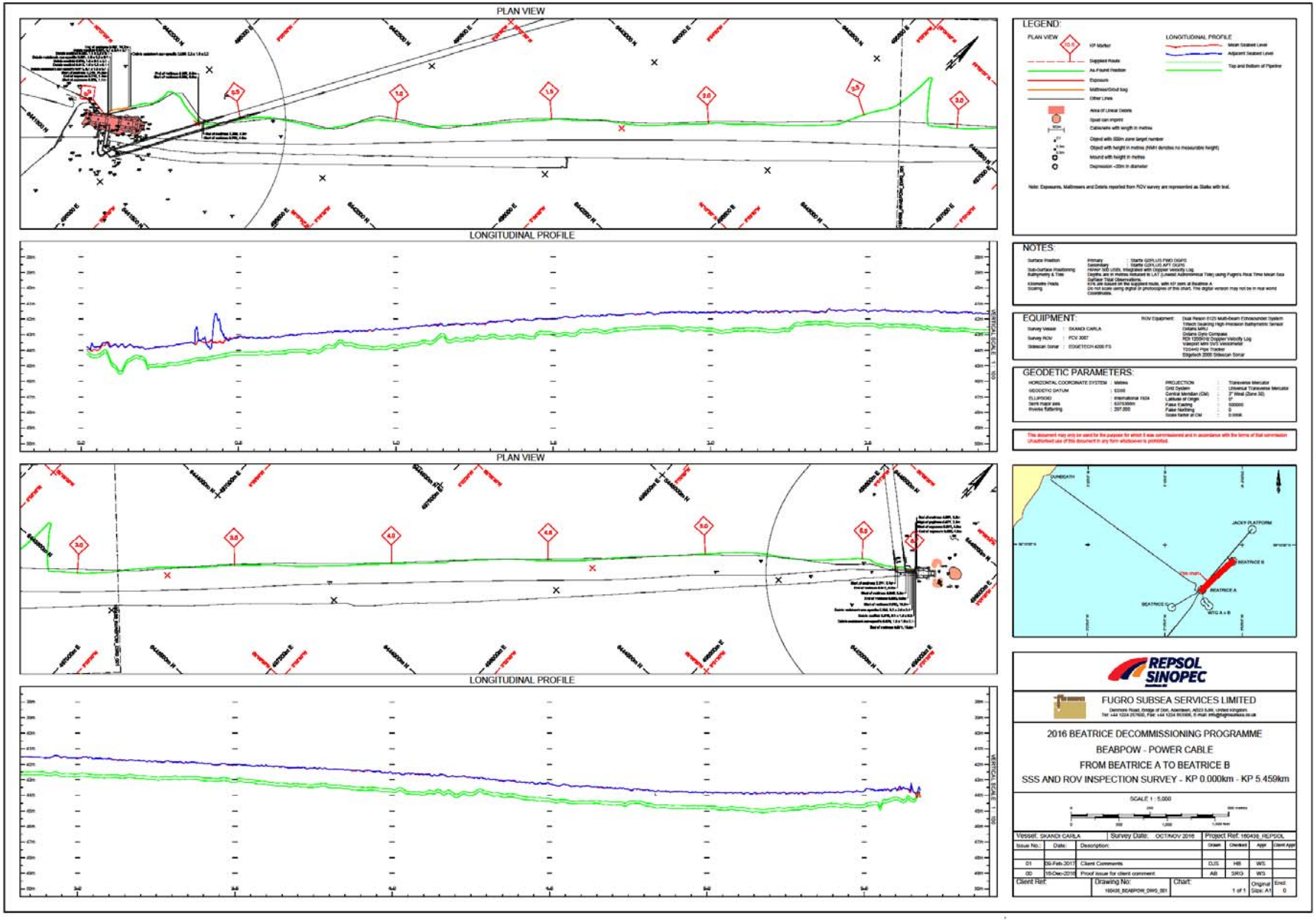
We confirm that we support the proposals detailed in the Beatrice Decommissioning Programmes dated October 2018, which is to be submitted by Repsol Sinopec Resources UK Limited in so far as it relates to those facilities in respect of which we are required to submit an abandonment programme under section 29 of the Petroleum Act 1998.

Yours faithfully

Director
For and on behalf of SSE Generation Limited

APPENDIX 1

Longitudinal Reference Files (see Section 7.0)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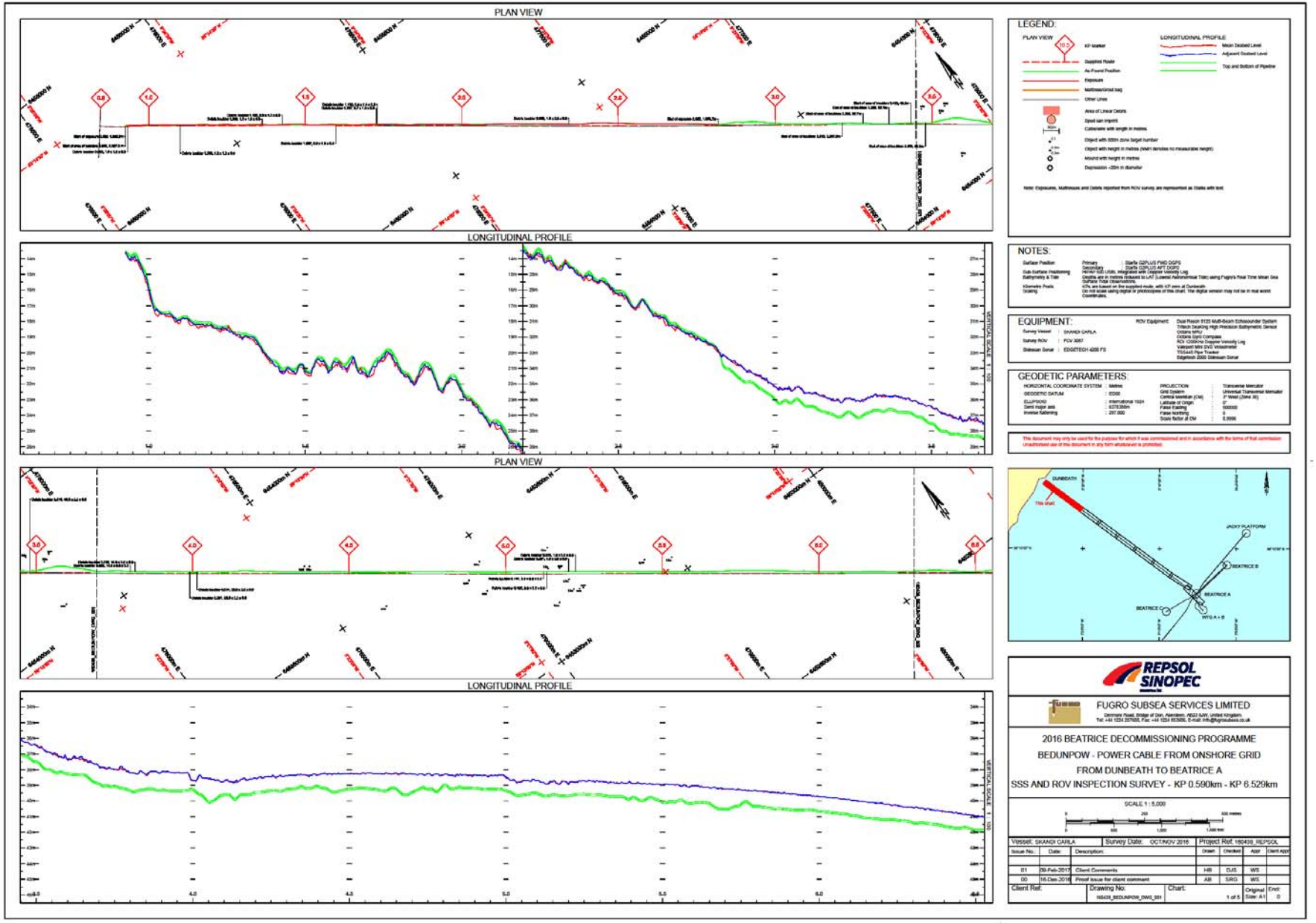
BEATRICE B
BEATRICE A
BEATRICE C
DUNBEATH
FUGRO SUBSEA SERVICES LIMITED
2016 BEATRICE DECOMMISSIONING PROGRAMME
BEABPOW - POWER CABLE
FROM BEATRICE A TO BEATRICE B
SSS AND ROV INSPECTION SURVEY - KP 0.000km - KP 5.459km
SCALE 1 : 5,000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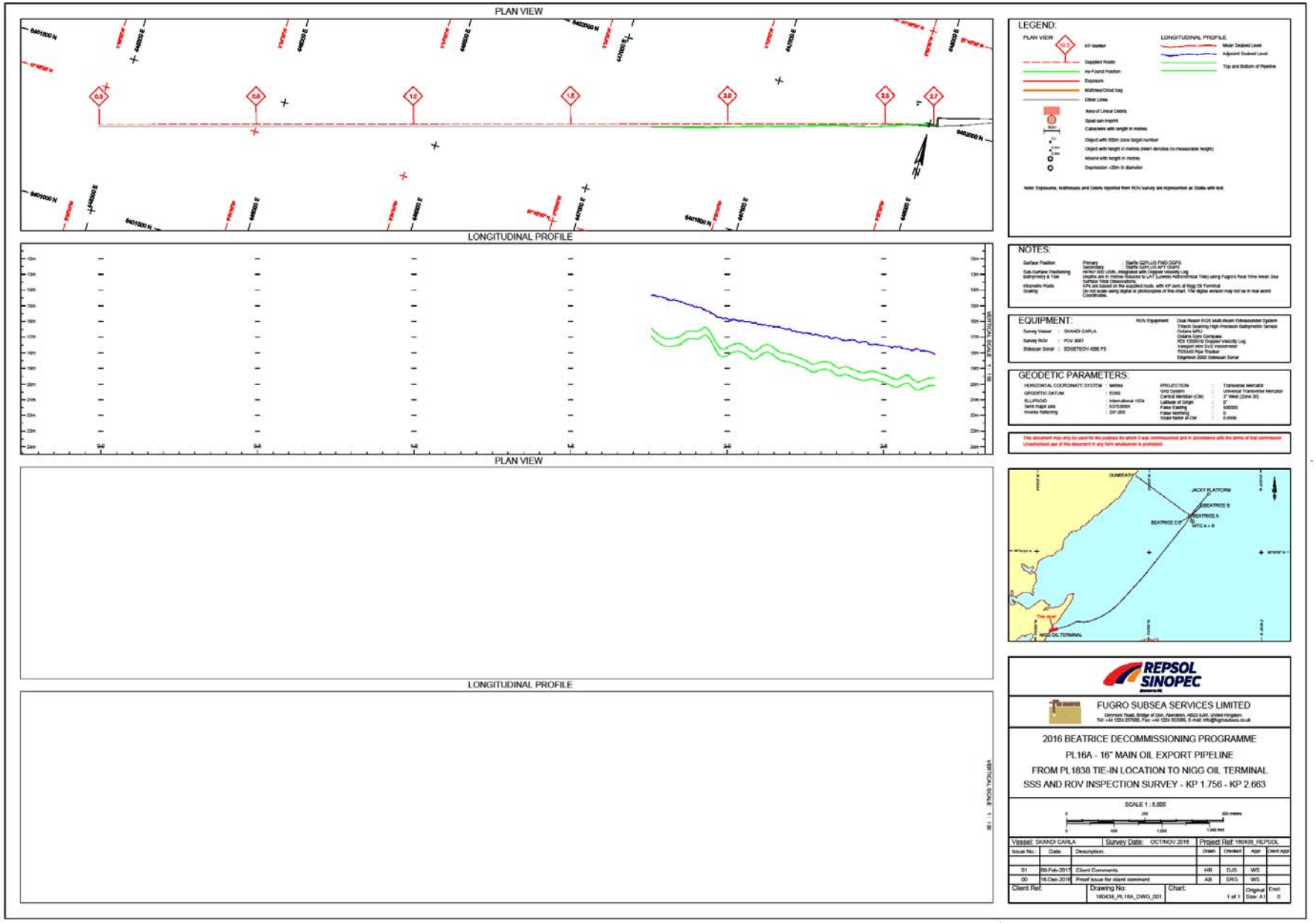
BEATRICE C
REPSOL SINOPEC
FUGRO SUBSEA SERVICES LIMITED
2016 BEATRICE DECOMMISSIONING PROGRAMME
BEDUNPOW - POWER CABLE FROM ONSHORE GRID
FROM DUNBEATH TO BEATRICE A
SSS AND ROV INSPECTION SURVEY - KP 0.590km - KP 6.529km
SCALE 1 : 5,000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BEATRICE C/T
WTG A + B
NIGG OIL TERMINAL
FUGRO SUBSEA SERVICES LIMITED
2016 BEATRICE DECOMMISSIONING PROGRAMME
PL16A - 16" MAIN OIL EXPORT PIPELINE
FROM PL1838 TIE-IN LOCATION TO NIGG OIL TERMINAL
SSS AND ROV INSPECTION SURVEY - KP 1.756 - KP 2.663
SCALE 1 : 5,000
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Survey Date: OCT/NOV 2016
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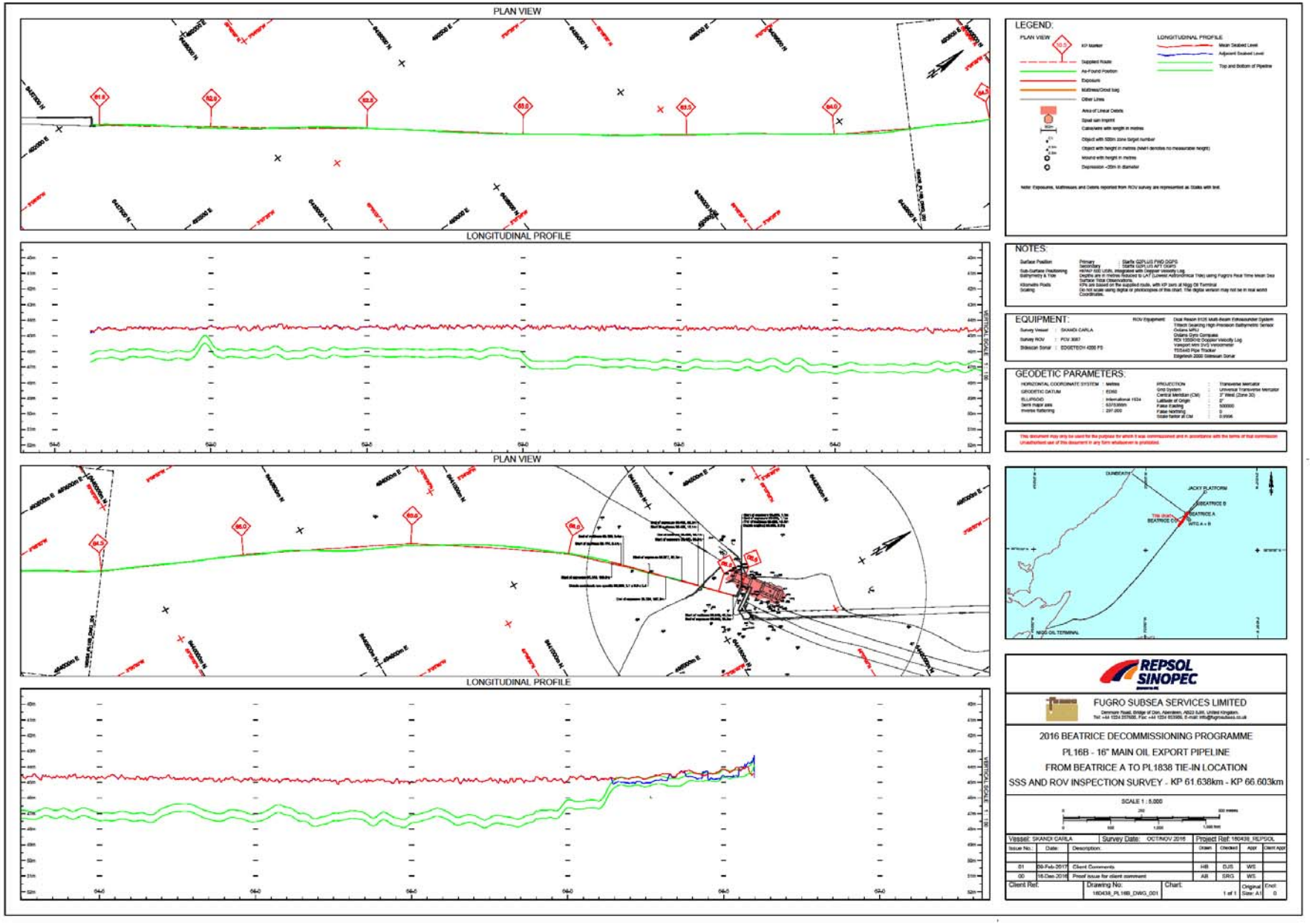
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FUGRO SUBSEA SERVICES LIMITED
2016 BEATRICE DECOMMISSIONING PROGRAMME
PL16B - 16" MAIN OIL EXPORT PIPELINE
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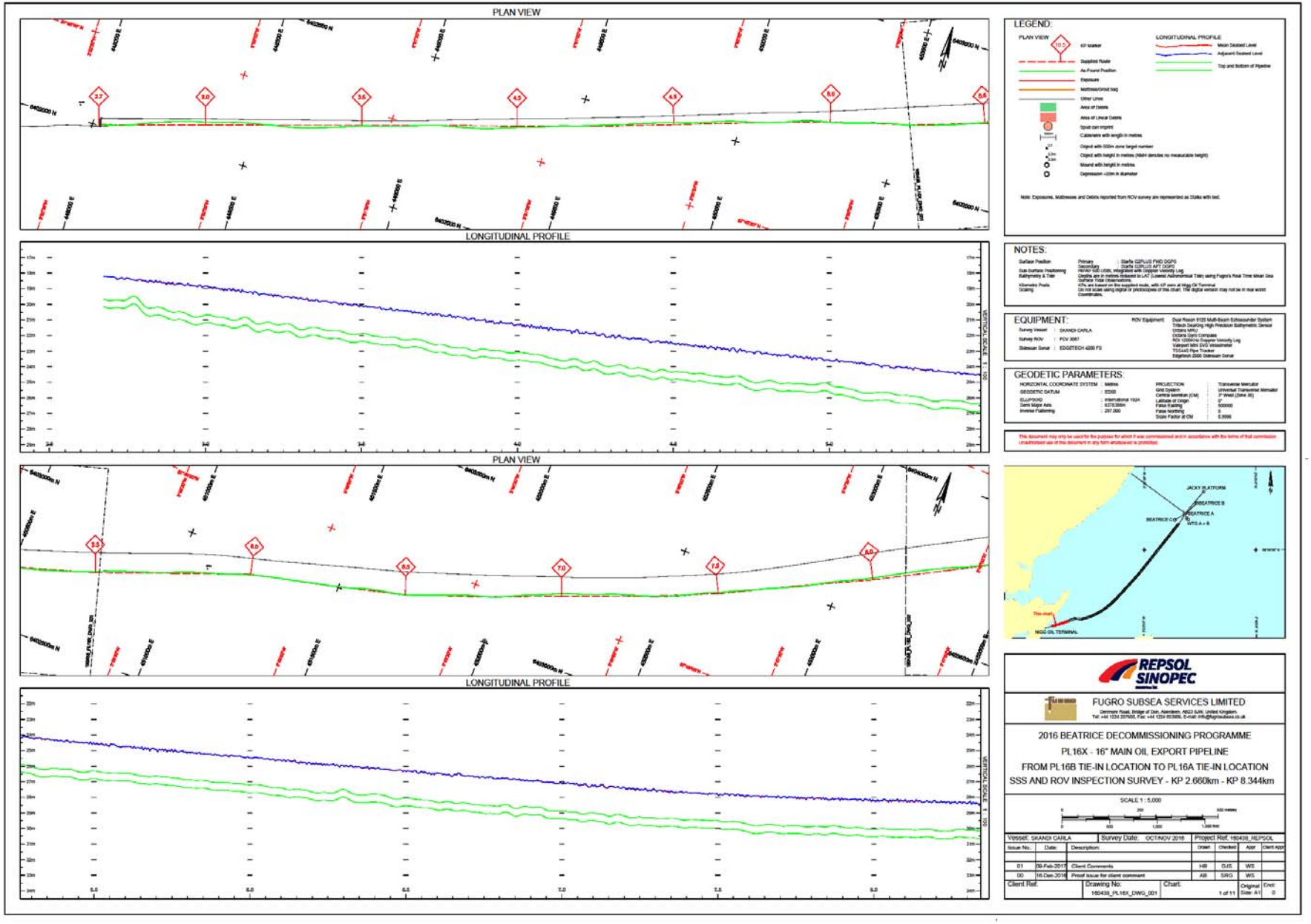
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NIGG OIL TERMINAL
REPSOL SINOPEC
FUGRO SUBSEA SERVICES LIMITED
2016 BEATRICE DECOMMISSIONING PROGRAMME
PL16X - 16" MAIN OIL EXPORT PIPELINE
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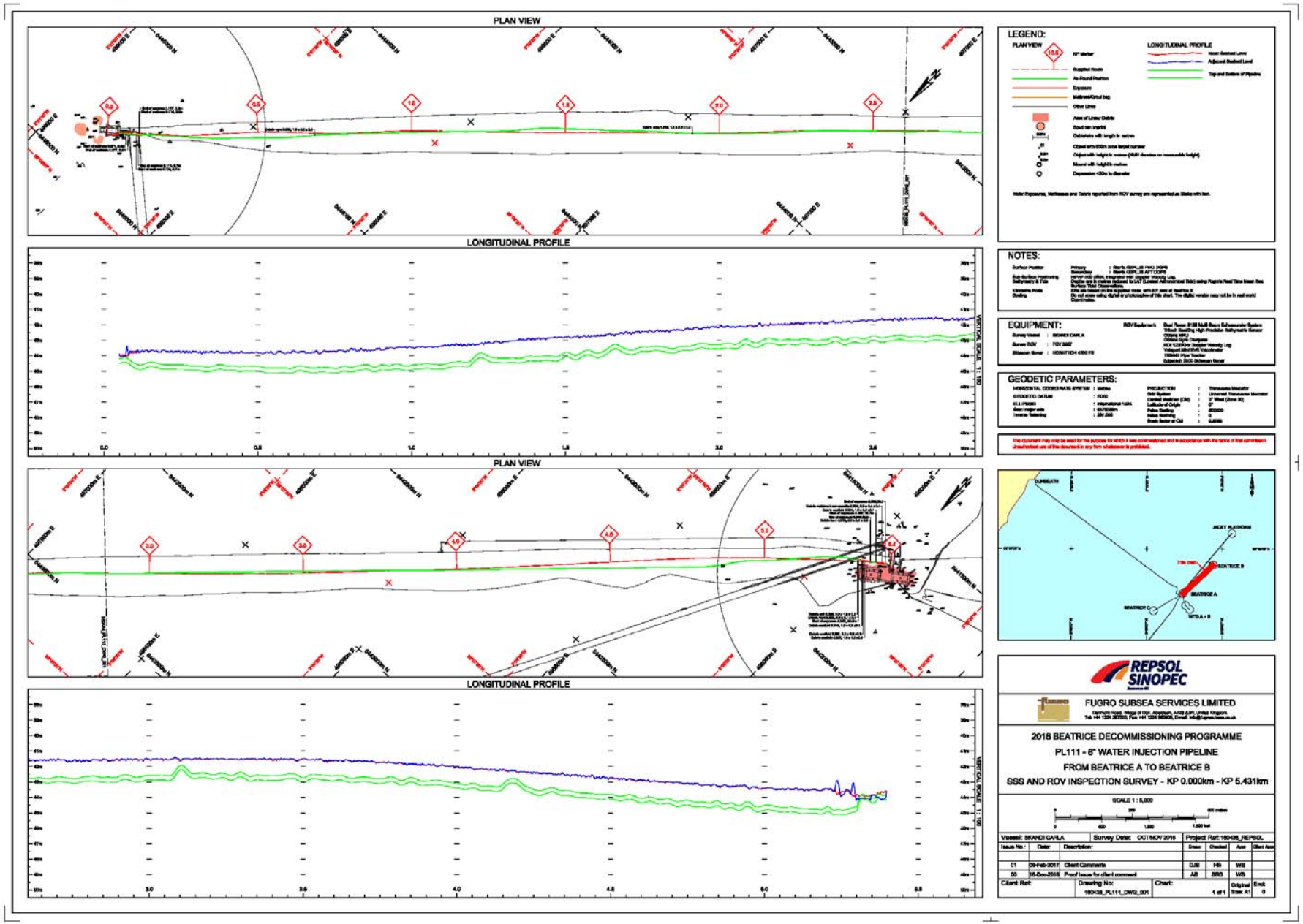
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2018 BEATRICE DECOMMISSIONING PROGRAMME
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FROM BEATRICE A TO BEATRICE B
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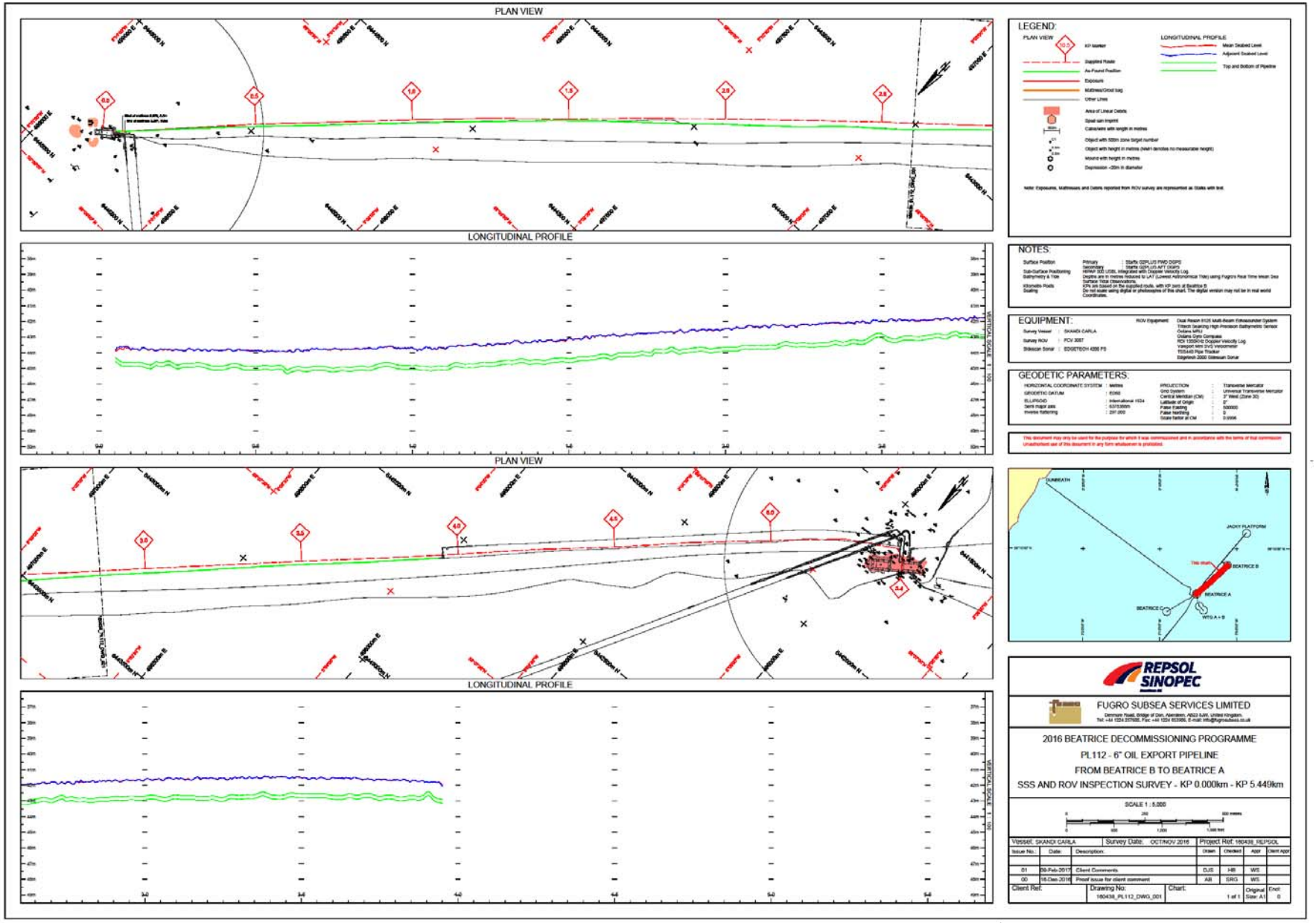
SCALE 1 : 5,000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PL112 - 6" OIL EXPORT PIPELINE
FROM BEATRICE B TO BEATRICE A
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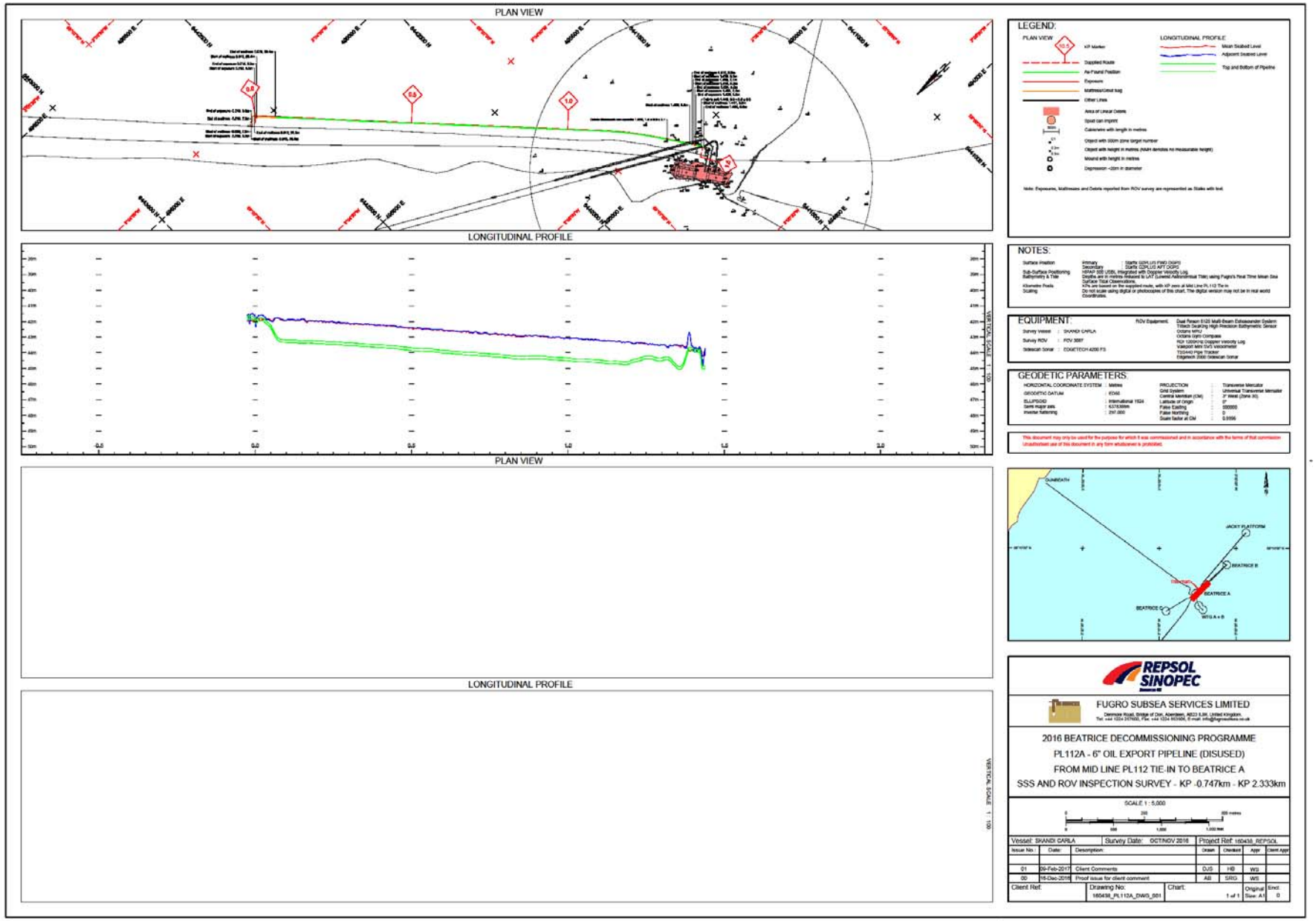
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BEATRICE C
FUGRO SUBSEA SERVICES LIMITED
2016 BEATRICE DECOMMISSIONING PROGRAMME
PL112A - 6" OIL EXPORT PIPELINE (DISUSED)
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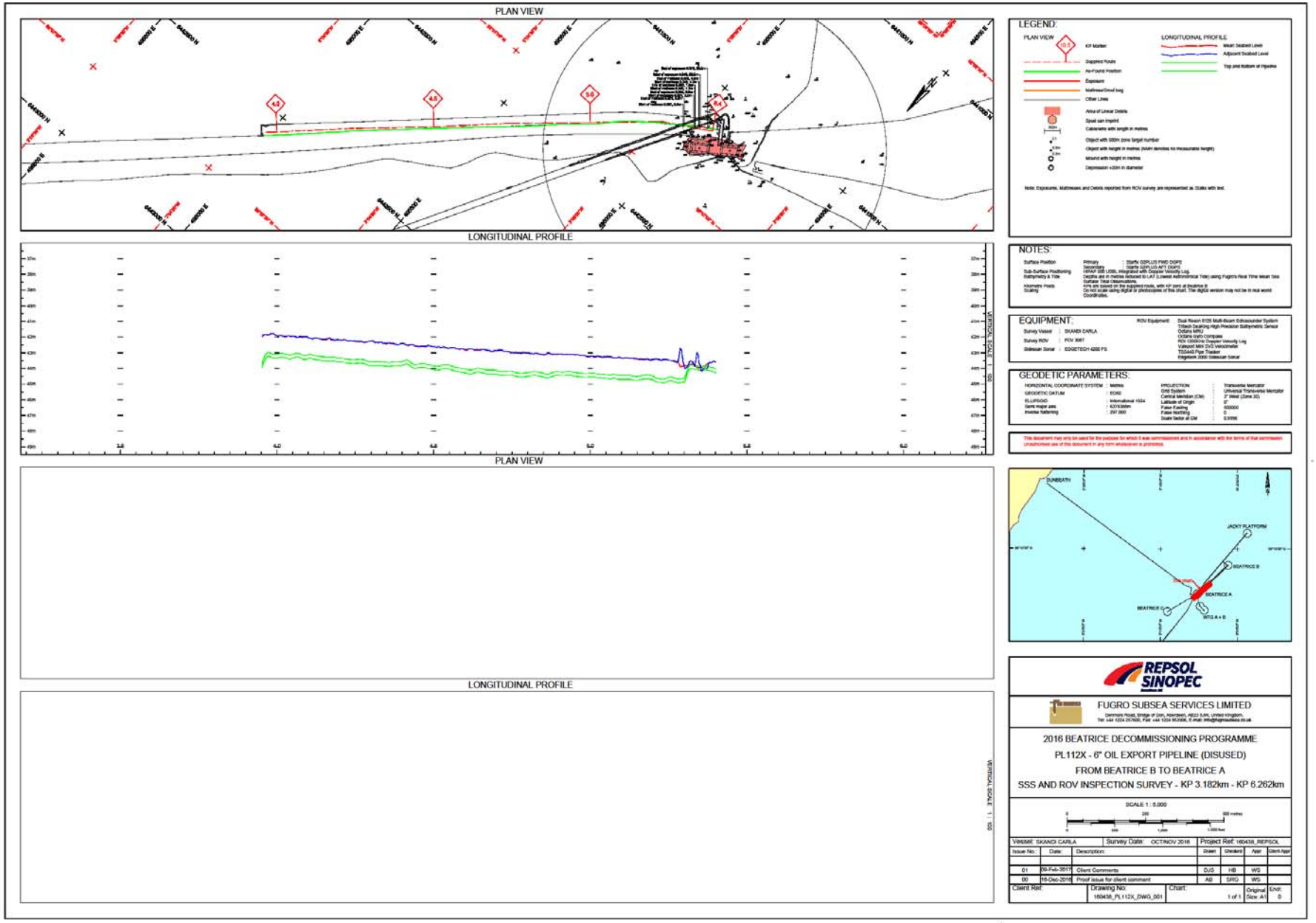
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BEATRICE C
WTG A + B
FUGRO SUBSEA SERVICES LIMITED
2016 BEATRICE DECOMMISSIONING PROGRAMME
PL112X - 6" OIL EXPORT PIPELINE (DISUSED)
FROM BEATRICE B TO BEATRICE A
SSS AND ROV INSPECTION SURVEY - KP 3.182km - KP 6.262km
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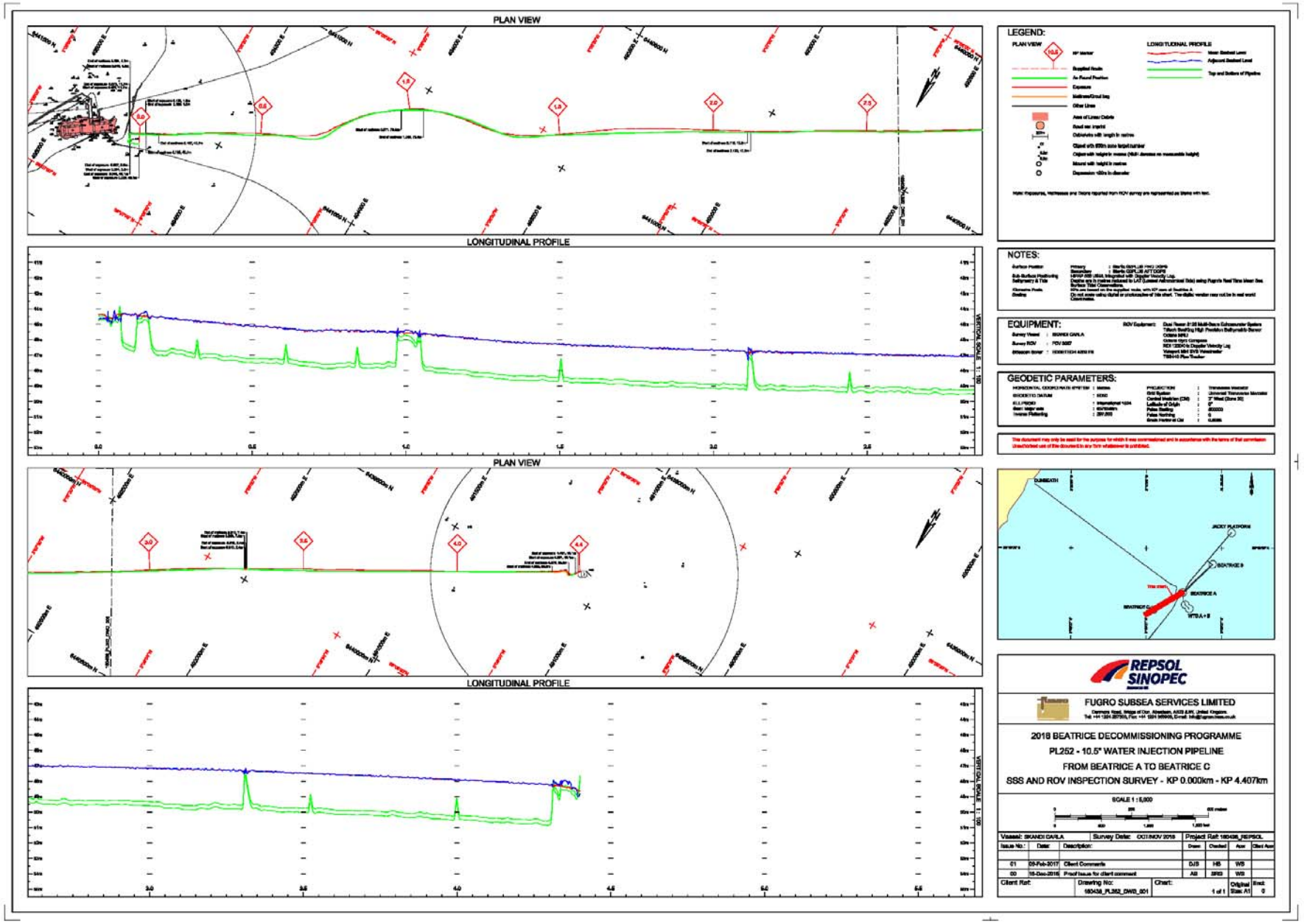
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2018 BEATRICE DECOMMISSIONING PROGRAMME
PL252 - 10.5" WATER INJECTION PIPELINE
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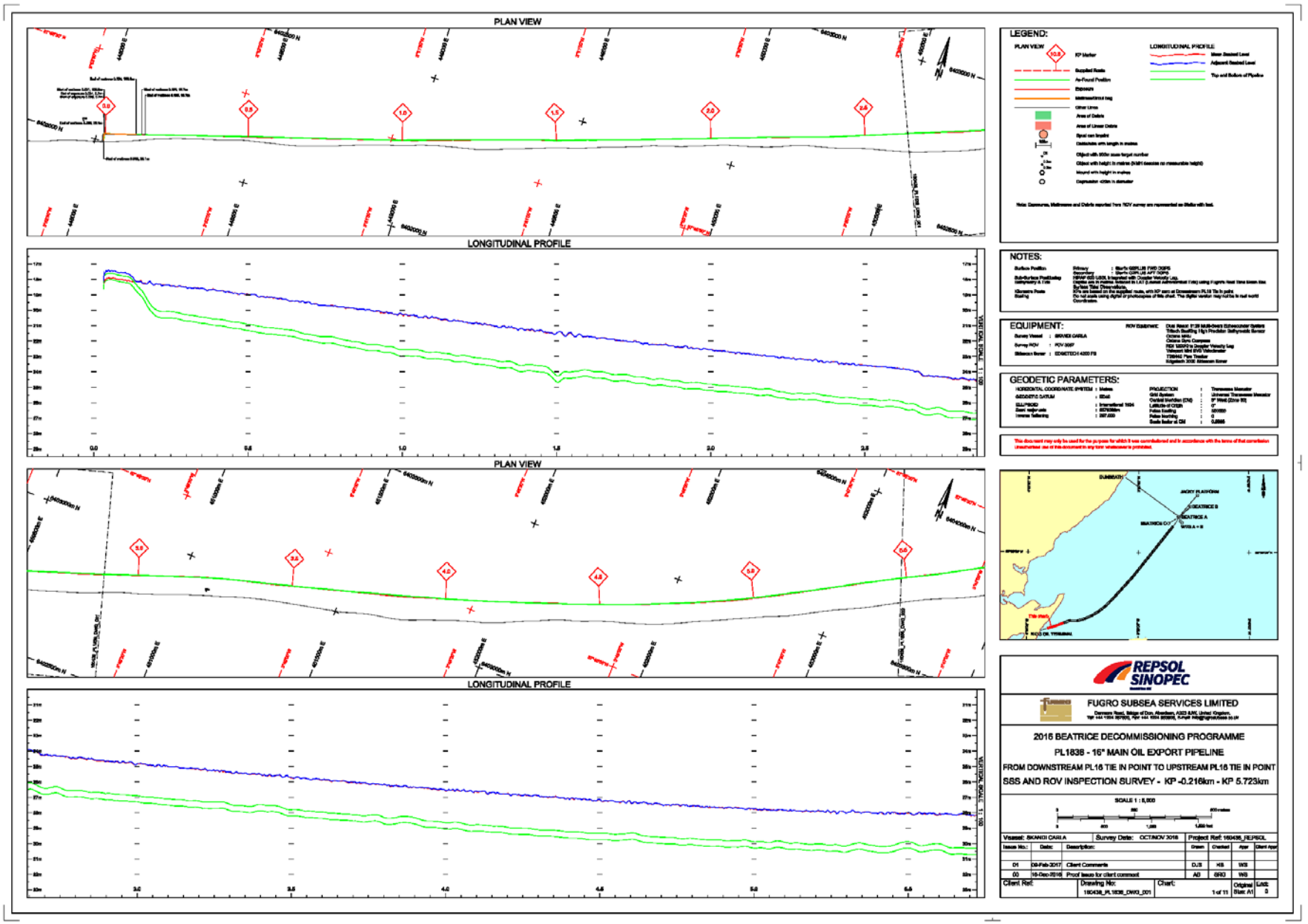
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FUGRO SUBSEA SERVICES LIMITED
2016 BEATRICE DECOMMISSIONING PROGRAMME
PL1838 - 16" MAIN OIL EXPORT PIPELINE
FROM DOWNSTREAM PL16 TIE IN POINT TO UPSTREAM PL16 TIE IN POINT
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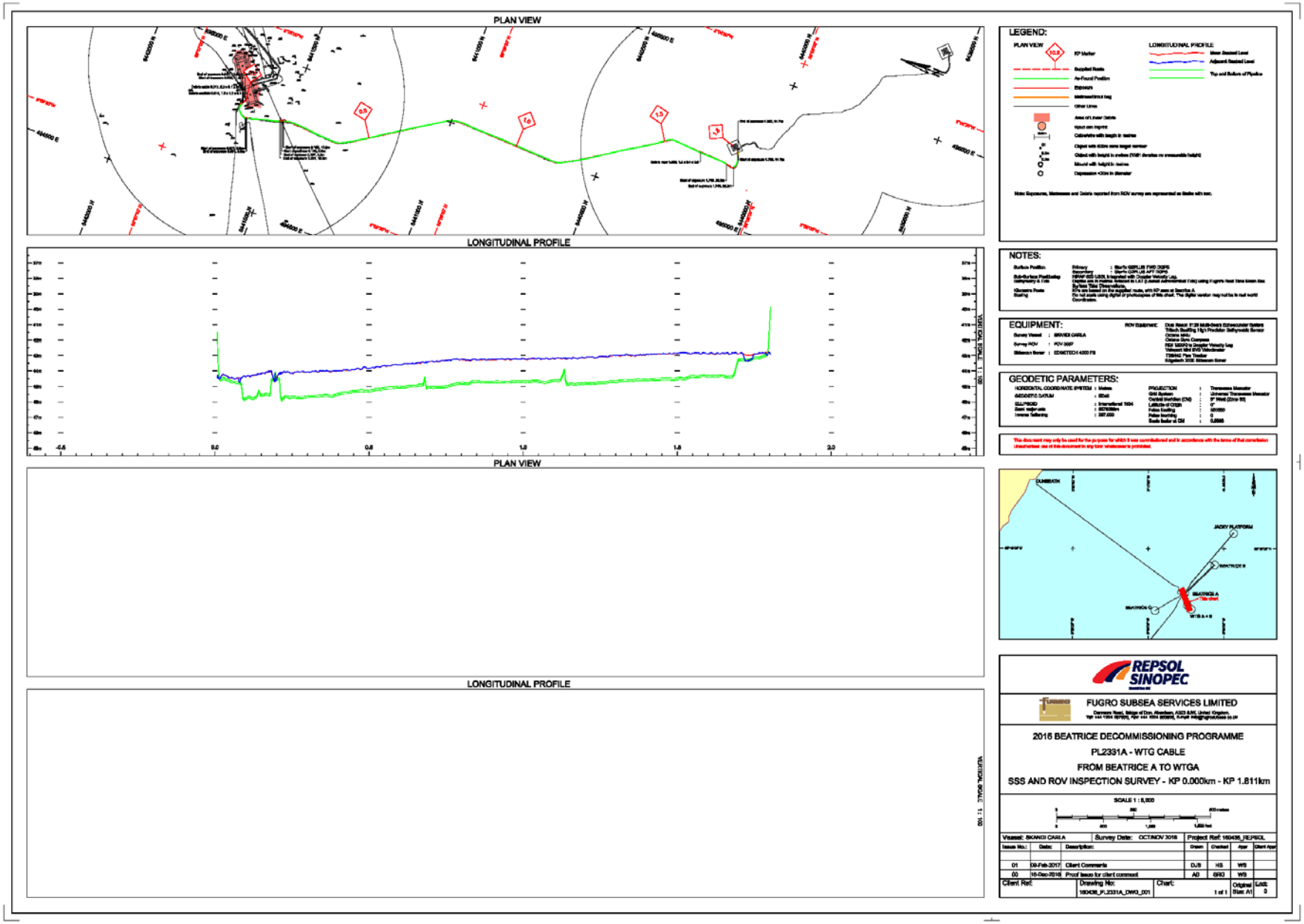
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2016 BEATRICE DECOMMISSIONING PROGRAMME
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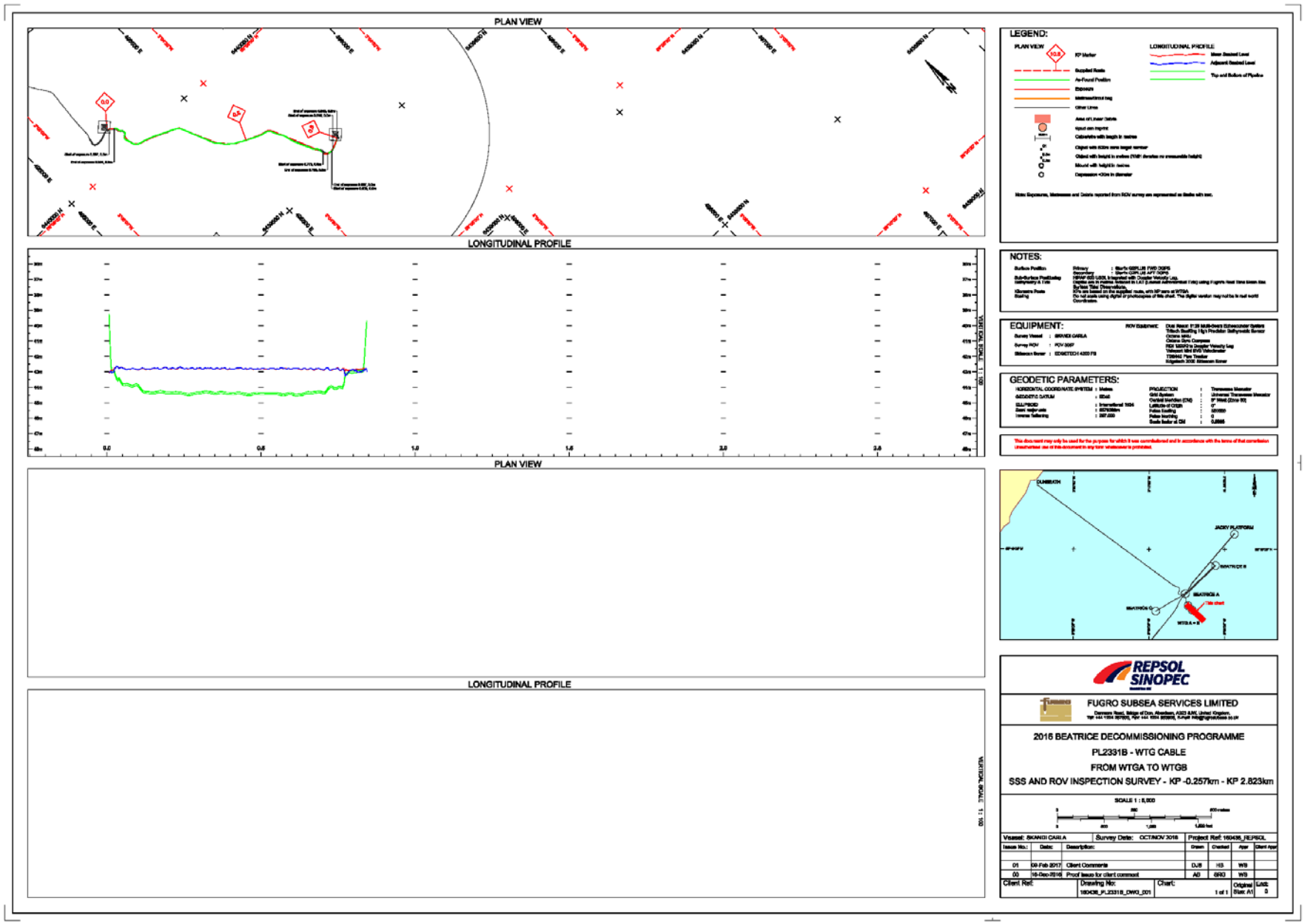
FROM BEATRICE A TO WTGA
SSS AND ROV INSPECTION SURVEY - KP 0.000km - KP 1.811km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FUGRO SUBSEA SERVICES LIMITED
2016 BEATRICE DECOMMISSIONING PROGRAMME
PL2331B - WTG CABLE
FROM WTGA TO WTG8
SSS AND ROV INSPECTION SURVEY - KP -0.257km - KP 2.823km