TERN AREA
HUDSON SUBSEA FACILITIES DECOMMISSIONING PROGRAMMES

March 2025 – Consultation Draft

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Approvals

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Distribution List

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ABBREVIATIONS

Abbreviation	Explanation
AWMP	Active Waste Management Plan
CA	Comparative Assessment
CoP	Cessation of Production
EA	Environmental Appraisal
EUNIS	European Nature Information System
FPAL	First Point Assessment Limited
FSM	Field Signature Method (corrosion monitoring spool)
HSE	Health and Safety Executive
GMS	Global Marine Systems Limited
ICES	International Council for the Exploration of the Sea
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
MDAC	Methane Derived Authigenic Carbonate
MM	Million
MODU	Mobile Offshore Drilling Unit
NCMPA	Nature Conservation Marine Protected Area
NFFO	The National Federation of Fishermen's Organisations
NIFPO	Northern Irish Fish Producers' Organisation
NNS	Northern North Sea
NORM	Naturally Occurring Radioactive Material
NSTA	North Sea Transition Authority
ODU	Offshore Decommissioning Unit
OEUK	Offshore Energies UK
OPEX	Operational Expenditure
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
P&A	Plug and Abandon
PL	Pipeline (as in pipeline number)
PLU	Umbilical (as in umbilical number)
PMF	Priority Marine Feature
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Authority
SFF	Scottish Fishermen's Federation
SPA	Special Protection Area
TAQA	TAQA Bratani Limited
Te	Tonnes
THC	Total Hydrocarbon Content
UKCS	United Kingdom Continental Shelf
UKOOA	United Kingdom Offshore Operators Association
UMC	Universal Manifold Centre

1 Executive Summary

1.1 Combined Decommissioning Programmes

This document contains four Decommissioning Programmes for the Hudson Field pipelines (three pipeline groups) and installations.

There is a separate Decommissioning Programme for each set of associated notices served under Section 29 of the Petroleum Act 1998. The Decommissioning Programmes are for:

1. Hudson Manifold Structure, nine Xmas Trees, a Crossover Skid, and a Field Signature Method (FSM) Protection Structure
2. Hudson pipelines: PL3090, PL3091, PL3092, PL3093, PL4339, PL4340
3. Hudson umbilicals and pipelines: PLU6238, PLU6239, PL6240 and PL6246
4. All remaining Hudson pipelines detailed in Table 2.2

1.2 Requirement for Decommissioning Programmes

1.2.1 Installations:

In accordance with the Petroleum Act 1998, as amended, TAQA Bratani Limited (TAQA), as operator of the Hudson Field, and on behalf of the Section 29 Notice Holders (see Table 1.2), is applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the Hudson subsea installations as detailed in Section 2.1 of this document. (See also Section 8 – Section 29 Holders' Letters of Support).

1.2.2 Pipelines:

In accordance with the Petroleum Act 1998, as amended, TAQA Bratani Limited (TAQA), as operator of the Hudson Subsea Pipelines, and on behalf of the Section 29 Notice Holders (see Table 1.4), is applying to the OPRED to obtain approval for decommissioning the Hudson pipelines as detailed in Section 2.2 of this document. (See also Section 8 – Section 29 Holders' Letters of Support).

In conjunction with public, stakeholder and regulatory consultation the Decommissioning Programmes are submitted in compliance with national and international regulations, and OPRED guidance [1].

The estimated schedule outlined for the decommissioning project spans a nine-year period, commencing in 2023.

1.3 Introduction

The Hudson Field is located in UK Blocks 210/24a and 210/24b, in a water depth of approximately 158 m, 93.6 km to the north-east of the Shetland Islands. The field was produced via the Tern platform, which is located approximately 10 km to the east of the Hudson Field. Hydrocarbons were exported from Tern platform via the North Cormorant platform to the south and onwards through the Brent Pipeline System to the Sullom Voe Terminal in the Shetlands.

The facilities comprise:

- seven production and two water injection wells and their Xmas trees, wellheads and flowbases;
- a manifold, a cross-over skid, an FSM protection structure;
- fifteen pipelines;
- eight umbilicals, each with multiple cores; and
- tie-in spools, and jumpers for each of the Xmas trees, as noted in Table 2.2.

The Hudson Field started production in July 1993, via the Petrojarl-1 Floating Production Storage and Offloading vessel prior to utilising subsea tie-backs to the Tern platform from early 1995.

Hudson production was routed to the Tern platform and was combined with production from other subsea assets and platform production before export to Sullom Voe via the Brent pipeline system. The Hudson Field has come to the end of its productive life, and TAQA will therefore decommission the Hudson facilities.

The Hudson Field cannot produce after Tern platform Cessation of Production (CoP), as the asset depended on the Tern platform as its control point and export route. The North Sea Transition Authority (NSTA) accepted a proposed CoP date for Tern platform of no earlier than Q4 2023, and the same CoP date for Hudson. The Tern platform and the associated subsea installations, including Hudson, ceased production in Q1 2024.

The decommissioning programmes contained in this document cover the Hudson subsea facilities, from the L1, L2, L3,L4, U1,U2, W1 and W2 well locations to the Hudson pipelines and umbilical risers at the Tern platform. At Tern, if derogation to leave the platform footings in place is granted, the Hudson pipeline and umbilicals will be removed to a point in close proximity (within approximately 75 m) of the base of the Tern jacket/sub-structure. This approach represents a reasonable balance between the level of risk associated with removing the facilities, the degree of disturbance of the seabed, the use of resources during decommissioning, and, following decommissioning, the loss of amenity for other sea users. If derogation to leave Tern platform footings in place is not granted, the surface laid portions and concrete mattresses of the pipelines at Tern will be removed, unless they are rock covered. Notwithstanding, final decommissioning solutions for the Hudson pipelines and umbilicals at Tern will be discussed and agreed with OPRED to align with decommissioning arrangements for the platform and associated infrastructure. The precise limit of “close proximity” will be agreed with OPRED on a case by case basis for each pipeline and umbilical.

Hudson decommissioning activities may be integrated with the overall Tern Area and wider Northern North Sea (NNS) scope of multiple decommissioning projects to maximise synergies, optimise the use of resources and minimise disturbance of the environment.

Following public, stakeholder and regulatory consultation, the Decommissioning Programmes are submitted without derogation and in full compliance with OPRED [1] and Offshore Energies UK (OEUK)

[2] guidelines. The Decommissioning Programmes explain the principles of the decommissioning activities and are supported by a Comparative Assessment (CA) [3] of decommissioning options and an Environmental Appraisal (EA) [4].

1.4 Overview of Facilities Being Decommissioned

1.4.1 Installations

Table 1-1: Installations Being Decommissioned

Field	Hudson	**Production Type**	Oil
Water Depth	158 m	**UKCS Block**	210/24a and 210/24b
Distance to Median	57.5 km	**Distance to UK Coastline**	93.6 km

Subsea Installations

Number	Type	Total Weight (Te)
1	Manifold Structure	333.9
1	Crossover Skid	37.5
1	FSM Protection Structure	5
9	Wellheads	367.2

Subsea Wells

Number	Type
7	Oil Production
2	Water Injection

Drill Cuttings Piles

Number	Location	Total Estimated Volume (m^3)
2	Hudson Manifold	6,819
	L1/ L2 Satellite Wells	1,156

Table 1-2: Hudson Installations Section 29 Notice Holders		
Company	**Registration Number**	**Equity Interest (%)**
TAQA Bratani Limited	05975475	26.73
TAQA Bratani LNS Limited	06230540	73.27
Dana Petroleum (E&P) Limited	02294746	0
Neo Energy (UKCS) Limited	02669936	0
Apache Beryl I Limited	FC005975	0
Enterprise Oil U.K. Limited	02290358	0
Esso Exploration and Production UK Limited	00207426	0
Shell U.K. Limited	00140141	0

1.4.2 Pipelines

Table 1-3: Hudson Pipelines Being Decommissioned	
Number of pipelines and umbilicals (details given in Table 2.2)	84

Notes:
The 84 pipelines recorded in the table heading represents the number of PWA pipeline numbers associated with Hudson. Thirty-nine of these pipeline numbers are under the parent number PL1023. These 39 numbers represent the individual cores that make up seven actual umbilicals. Therefore, the total number of Hudson Pipelines is 52 (84 – [39 – 7]).

Table 1-4: Hudson Pipelines Section 29 Notice Holders		
Company	**Registration Number**	**Equity Interest (%)**
PL3090, PL3091, PL3092, PL3093, PL4339 and PL4340		
TAQA Bratani Limited	05975475	26.73
TAQA Bratani LNS Limited	06230540	73.27
Dana Petroleum (E&P) Limited	02294746	0
Neo Energy (UKCS) Limited	02669936	0
PLU6238, PLU6239, PL6240 and PL6246		
TAQA Bratani Limited	05975475	26.73
TAQA Bratani LNS Limited	06230540	73.27
PL1018, PL1018/A, PL1019, PL1019/A, PL1020, PL1020/A, PL1021, PL1021/A, PL1021.1, PL1021.2, PL1021AJM, PL1022, PL1022.1, PL1022.2, PL1022.3, PL1022.4, PL1022.5, PL1022.6, PL1023.1, PL1023.2, PL1023.3, PL1023.4, PL1023.5, PL1023.6, PL1023.7, PL1023.8, PL1023.9, PL1023.10, PL1023.11, PL1023.12, PL1023.13, PL1023.14, PL1023.15, PL1023.16, PL1023.17, PL1023.18, PL1023.19, PL1023.20, PL1023.21, PL1023.22, PL1023.23, PL1023.24, PL1023.25, PL1023.26, PL1023.26.1, PL1023.26.2, PL1023.27, PL1023.27.1, PL1023.27.2, PL1023.28,		

Table 1-4: Hudson Pipelines Section 29 Notice Holders		
Company	**Registration Number**	**Equity Interest (%)**
PL1023.28.1, PL1023.29, PL1023.29.1, PL1023.30, PL1023.30.1, PL1023.31, PL1023.31.1, PL1024, PL1024/A, PL1025, PL1025/A, PL1026, PL1027, PL1028, PL1029, PL1783, PL1784, PL1785, PL1786, PL1787, PL1788, PL1789, PL1790, PL1791		
TAQA Bratani Limited	05975475	26.731
TAQA Bratani LNS Limited	06230540	73.27
Dana Petroleum (E&P) Limited	02294746	0
Neo Energy (UKCS) Limited	02669936	0
Apache Beryl I Limited	FC005975	0
Enterprise Oil U.K. Limited	02290358	0
Esso Exploration And Production UK Limited	00207426	0
Shell U.K. Limited	00140141	0

Notes:
PL1023 consists of umbilical cores and sub-cores numbered from PL1023.1 to PL1023.31 with some additional suffixes. In total, the parent PL1023 pipeline number covered 39 cores. These cores were originally laid in the form of seven umbilicals. The PWA for PL1023 was updated to reflect the physical configuration of the cores. Following the PWA update, the seven umbilicals have been renumbered as follows:

1. PLU6447 Umbilical from Hudson Manifold to Well U2 – This comprises the cores previously numbered as PL1023.6, PL1023.12, PL1023.31, and PL1023.31.1
2. PLU6448 Umbilical from Hudson Manifold to Well U1 – This comprises the cores previously numbered as PL1023.5, PL1023.11, PL1023.30, and PL1023.30.1
3. PLU6449 Umbilical from Hudson Manifold to Well L4 – This comprises the cores previously numbered as PL1023. 4, PL1023. 10, PL1023. 29, and PL1023. 29.1
4. PLU6450 Umbilical from Tern to Hudson Manifold – This comprises the cores previously numbered as PL1023.15, PL1023.16, PL1023.17, PL1023.20, PL1023.21, PL1023.22, PL1023.23, PL1023.24, and PL1023.25
5. PLU6451 Umbilical from Hudson Manifold to Well L1 – This comprises the cores previously numbered as PL1023.1, PL1023.7, PL1023.13, PL1023.18, PL1023.26, PL1023.26.1, and PL1023.26.2
6. PLU6452 Umbilical from Hudson Manifold to Well L2 – This comprises the cores previously numbered as PL1023.2, PL1023.8, PL1023.14, PL1023.19, PL1023.27, PL1023.27.1, and PL1023.27.2
7. PLU6453 Umbilical from Hudson Manifold to Well L3 – This comprises the cores previously numbered as PL1023.3, PL1023.9, PL1023.28, and PL1023.28.1.

1.5 Summary of Proposed Decommissioning Programmes

The selected decommissioning options for the Hudson infrastructure are shown in Table 1.5.

Table 1-5: Summary of Decommissioning Programme

Proposed Decommissioning Solution	Reason For Selection
Subsea Installations	
Full Removal: All materials, structures and equipment will be removed at end of field life. All recovered materials will be transported to shore for re-use, recycling, or disposal.	To leave a safe, clear seabed and in compliance with regulatory requirements.
Pipelines, Flowlines And Umbilicals	
All pipelines and umbilicals were flushed to appropriate standard. TAQA has assessed the likelihood of wax being present in the Hudson production pipelines. The presence of wax is considered unlikely taking into account the fluid composition, operational history, process conditions and pipeline design. Environmental assessment, considering the chemical composition and properties of the wax concluded that there is no significant risk to the marine environment in the unlikely event that wax is present. Further information on this assessment can be found in section 3.2.3 of the Tern Area Environmental Appraisal [4].	
Flexible Flowlines and Umbilicals Surface Laid. Surface laid portions of pipelines and umbilicals that are not in close proximity[1] to the Tern platform jacket footings will be removed together with protection features. The recovered items will be transported to shore for re-use, recycling, or disposal. Limited sections of surface laid pipelines and umbilicals in close proximity[1] to the Tern platform jacket/sub-structure footings may be left in place, subject to derogation to leave the footings in place, and agreement with OPRED.	This is the lowest risk, least seabed disturbance option.

[1] "Close proximity" is considered within approximately 75 m of the platform footings. Logical break points between portions left *in situ* and portions removed will be selected, e.g., pipeline crossings, etc. This option represents a reasonable balance between the level of risk associated with removing the facilities, the degree of disturbance of the seabed, the use of resources during decommissioning, and, following decommissioning, the loss of amenity for other sea users. If derogation to leave the jacket/sub-structure footings in place is not granted, all surface laid pipelines and umbilicals will be recovered and taken to shore for appropriate re-use, recycling, or disposal. The precise limit of "close proximity will be agreed with OPRED on a case by case basis for each pipeline and umbilical.

Table 1-5: Summary of Decommissioning Programme	
Proposed Decommissioning Solution	**Reason For Selection**
Flexible Flowlines and Umbilicals Trenched and Buried. *Leave In situ (minimal intervention):* Remove line ends and remediate snag risk. Rock placement to remediate snag risk from cut ends. Recovered ends return to shore for reuse, recycling or appropriate treatment and disposal.	The flowlines and umbilicals are considered to be sufficiently trenched and buried with no areas of spans, exposure, or shallow burial, posing no risk to marine users. If following pre-decommissioning surveys, exposures of less than 20 m long are identified, the full length of the exposure would be covered with rock, otherwise it would be removed. Minimal seabed disturbance, lower energy use, reduced risk to personnel engaged in the activity.
Rigid Pipelines, Trenched and Buried. *Remove Areas of Spans / Exposure / Shallow Burial:* Recovery of surface laid sections out with existing trench (including transitions), removal to shore for recycling or appropriate treatment and disposal. Rock placement to remediate snag risk from cut ends, removal of areas of spans, exposure, and shallow burial depth (<0.6 m) using cut and lift techniques. Depth of burial can be found in Appendix A of the Tern Area EA [4].	The midline section is sufficiently trenched and buried with no areas of spans, exposure or shallow burial, posing no risk to marine users. If following pre-decommissioning surveys, exposures of less than 20 m long are identified, the full length of the exposure would be covered with rock, otherwise it would be removed. Minimal seabed disturbance, lower energy use, reduced risk to personnel engaged in the activity.
Flexible Risers and Umbilical Risers, Rigid risers, Spools and Jumpers, Protection and Stabilisation. *Full Removal:* Risers will be dealt with within the Tern Platform Upper Jacket and Footings DPs. Lower portion of risers will be decommissioned *in situ* if derogation is granted to leave the Tern footings in place. If derogation is not granted for the footings, then these risers' portions will be removed. Spools and jumpers and the associated protection and stabilisation features will be returned to shore for reuse, recycling, or appropriate disposal.	To leave a safe, clear seabed and in compliance with regulatory requirements.
Blocked Rigid Pipeline, Trenched and Buried. *Remove line ends & remediate snag risk:* Recovery of surface laid sections out with existing trench (including transitions), return to shore for recycling or appropriate treatment and disposal. Rock placement to remediate snag risk from cut ends.	The flowline is sufficiently trenched and buried with no areas of spans, exposure, or shallow burial, posing no risk to marine users. If following pre-decommissioning surveys, exposures of less than 20 m long are identified, the full length of the exposure would be covered with rock, otherwise it would be removed. Minimal seabed disturbance, lower energy use, reduced risk to personnel engaged in the activity.

Table 1-5: Summary of Decommissioning Programme	
Proposed Decommissioning Solution	**Reason For Selection**
In-use[2] Rigid Pipelines, Trenched and Partially Buried *Re-trench and bury entire line:* Re-trench and backfill full length of pipeline (to a minimum of 0.6m depth) to remove areas of spans, exposure and shallow burial depth. Depth of burial can be found in Appendix A of the Tern Area EA [4].	Comparatively assessed as preferred option. As most of the lines fail to meet the required depth of cover, trench and bury along the entire length of the lines is a justifiable solution. This is the most preferred option overall as no pipelines will be recovered and no new materials will be introduced to the seabed.
Concrete Coated Rigid Pipelines, Trenched, and Buried. Remove line ends & remediate snag risk: Recovery of surface laid sections out with existing trench (including transitions), return to shore for recycling or appropriate treatment and disposal. Rock placement to remediate snag risk from cut ends. Exposures and spans are listed in Appendix B of the Tern Area EA [4]. The total length of exposures and spans is approximately 2.9 km over a total pipeline length of around 48.6 km.	Comparatively assessed as preferred option. Minimal seabed disturbance, lower energy use, reduced risk to personnel engaged in the activity. Following pre-decommissioning surveys, where exposures are less than 20 m long, the full length of the exposure will be covered with rock, otherwise it will be removed. Degradation will occur over a long period within seabed sediment, with no anticipated hazard to other users of the sea.
Wells	
Hudson wells will be Plugged and Abandoned (P&A'd) using a Mobile Offshore Drilling Unit (MODU) or well servicing vessel in alignment with the TAQA 'Well Barrier Standard TUK-11-B-009', and with reference to OEUK Well Decommissioning Guidelines [2] and other governing standards at the time of abandonment. If compliance with standards cannot be achieved, TAQA will adopt a risk-based approach in consultation with the relevant authorities. Xmas trees, flowbases, wellheads and well conductors to a depth of at least 3 m below seabed will be removed to shore for appropriate reuse, recycling, or disposal. Following removal of the wells, the seabed will be surveyed for debris and depressions, etc., and any necessary remediation will be performed.	Meets TAQA standards and NSTA and Health and Safety Executive (HSE) regulatory requirements.
Drill Cuttings	
Leave in place to degrade naturally.	Compliance with Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) Recommendation 2006/5 requirements [5].

[2] Reflects original CA grouping, pipelines are currently out of use.

Table 1-5: Summary of Decommissioning Programme	
Proposed Decommissioning Solution	**Reason For Selection**
Interdependencies	
The Hudson pipelines and umbilicals terminate on the Tern platform. Decommissioning of the Hudson pipeline and umbilical risers attached to the Tern jacket, and the pipelines and umbilicals on the seabed near the Tern platform will be managed in conjunction with Tern Jacket and Jacket Footings decommissioning. This will minimise risk, impacts on the environment and use of resources. The upper portions of Hudson risers will be removed with the Tern upper jacket, as described in the Tern Upper Jacket Decommissioning Programme [6].	

1.6 Field Locations Including Field Layouts and Adjacent Facilities

The location of the Hudson Field within the UK Continental Shelf (UKCS) and its adjacent facilities are shown in Figure 1.1and Figure 1.2. Figure 1.3 shows the Hudson facilities layout in more detail. The Hudson Field is located in Block 210/24a in 158 m of water, approximately 96.3 km northeast of the Shetland Islands. There are 7 wells clustered within around 50 m of the Hudson manifold, and two wells (L1 and L2) approximately 1.7 km from the manifold. Hudson production was exported to the Tern platform, in Block 210/25 which stands in 167 m of water approximately 104 km northeast of the Shetland Islands.

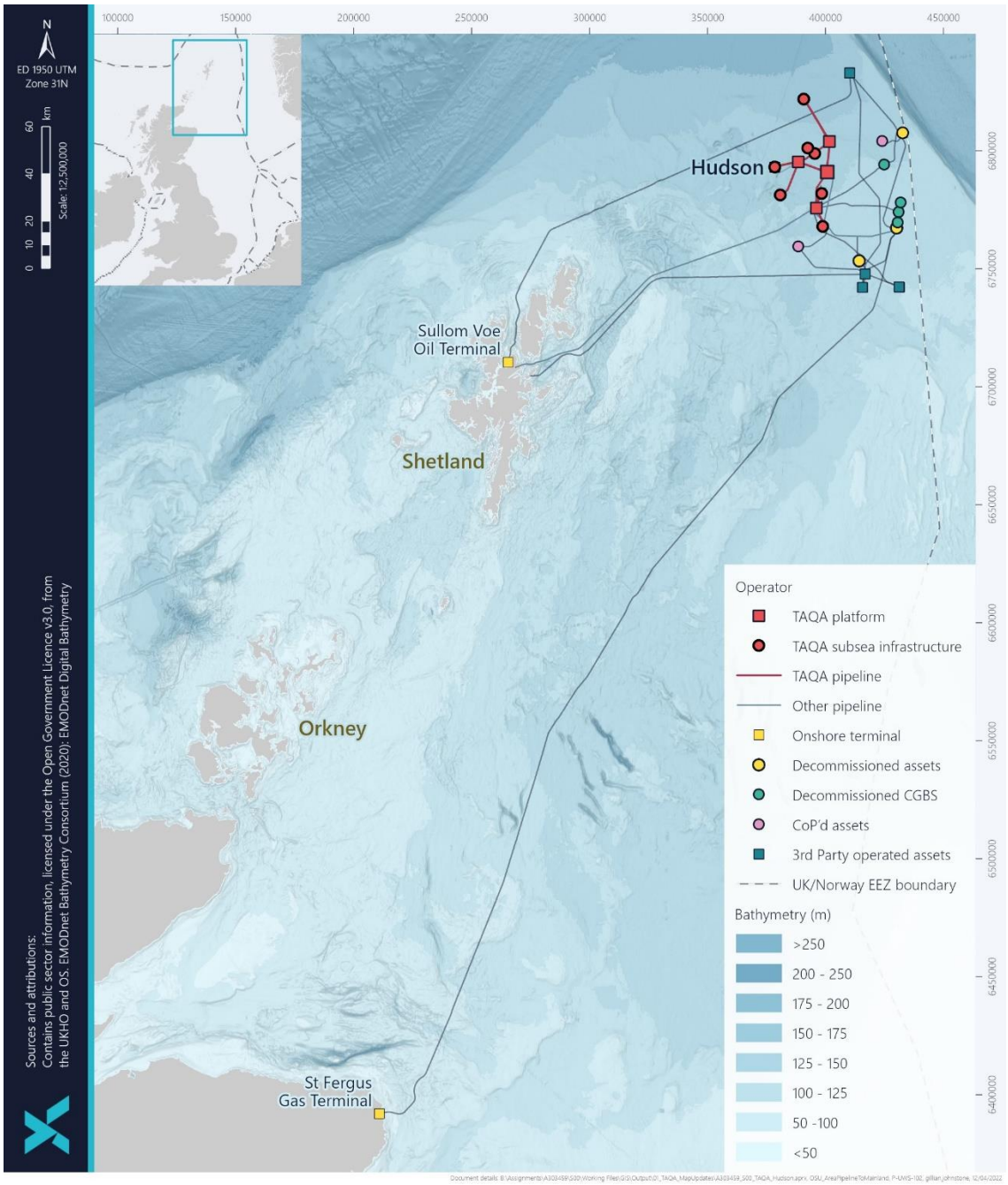

Figure 1.1: Hudson Field Location

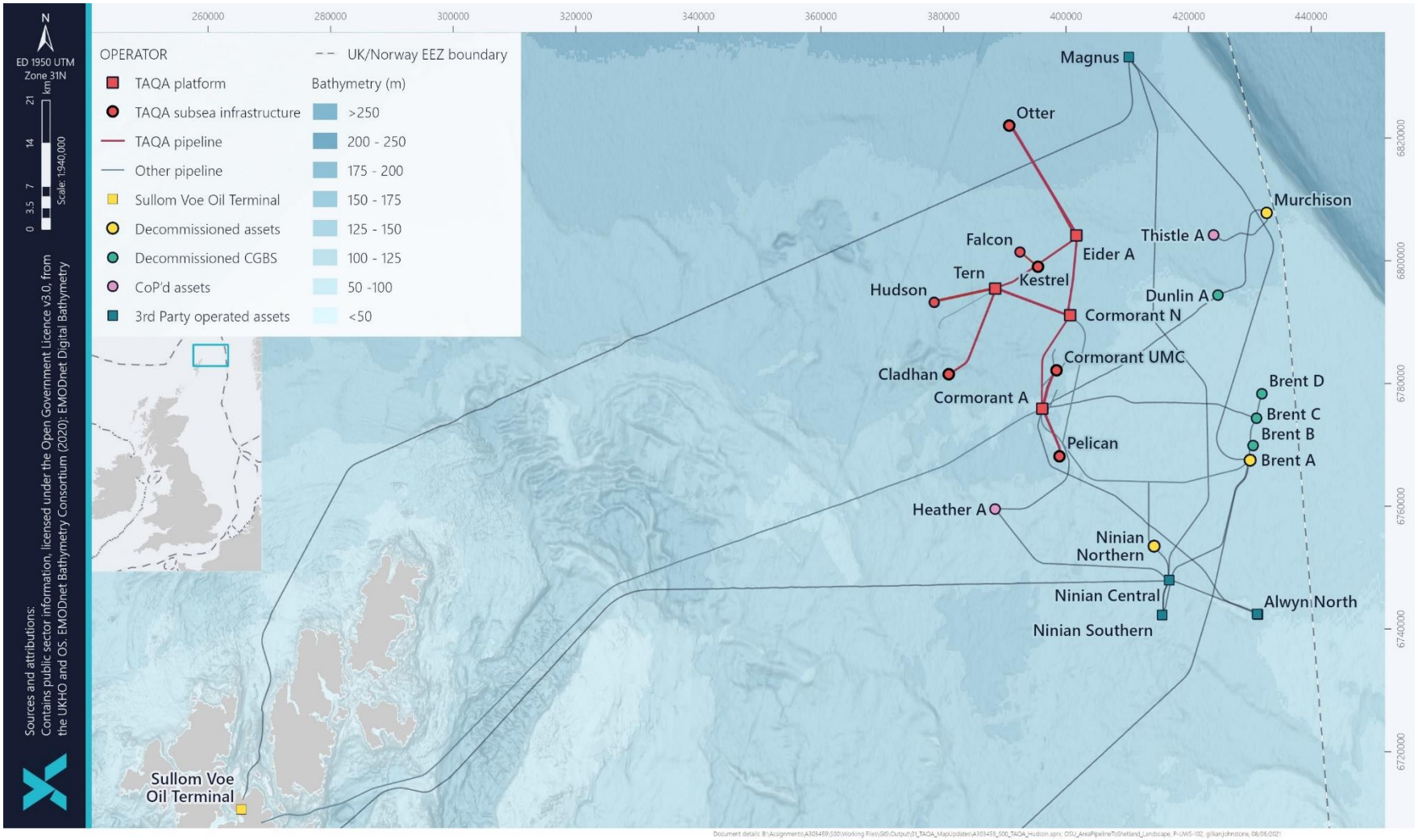

Figure 1.2: Hudson Adjacent Facilities

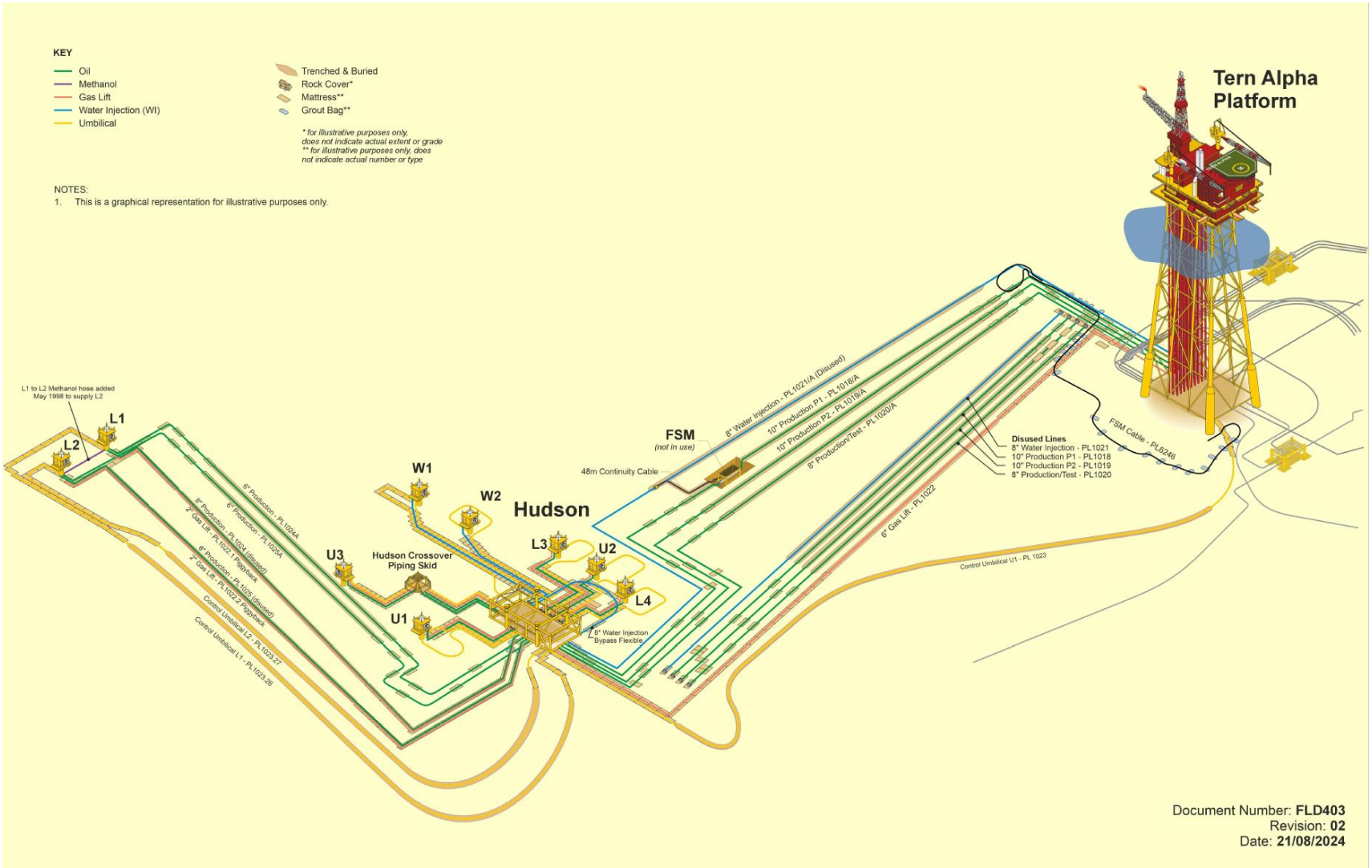

Figure 1.3: Hudson Facilities Layout

Table 1-6: Adjacent Facilities					
Operator	**Name**	**Type**	**Distance/ Direction from Hudson**	**Information**	**Status**
TAQA	Tern	Platform	10.3 km East Northeast	Oil and Gas Development	Non-Operational
TAQA	Cladhan	Field	12 km South	Oil and Gas Development	Non-Operational
TAQA	Kestrel	Field	17.6 km Northeast	Oil and Gas Development	Non-Operational
TAQA	Falcon	Field	16.2 km North Northeast	Oil and Gas Development	Non-Operational
TAQA	Cormorant Alpha	Platform	24.7 km Southeast	Oil and Gas Development	Non-Operational
TAQA	North Cormorant	Platform	22.4 km East	Oil and Gas Development	Non-Operational
TAQA	Eider	Platform	25.6 km Northeast	Oil and Gas Development	Non-Operational
TAQA	Otter	Field	31.5 km North Northeast	Oil and Gas Development	Non-Operational
TAQA	Pelican	Field	32.4 km Southeast	Oil and Gas Development	Non-Operational
TAQA	PL4	Pipeline	From Cormorant Alpha to Sullom Voe (13.6 km Southeast)	Oil Pipeline	Non-Operational
TAQA	Central UMC	Field	22.7 km Southeast	Oil and Gas Development	Non-Operational
Impacts of Decommissioning Proposals					
TAQA has been, and will continue to be, in contact with operators and owners of adjacent facilities. There are no known interactions between the adjacent facilities and the proposed Hudson decommissioning programmes, other than the Tern platform and other subsea fields associated with Tern Area: Cladhan, Kestrel and Falcon. Decommissioning of Hudson and Tern are inextricably linked as Tern provided the only export route for Hudson production via Cormorant North and Cormorant Alpha to the Sullom Voe Terminal. A number of the Hudson pipelines are crossed by pipelines connecting the Kestrel Field to the Tern platform, in close proximity to the Tern platform. The removal of these crossings will be managed as part of the execution of Tern Area decommissioning. The infrastructure associated with the crossing is part of the Kestrel infrastructure.					

1.7 Industrial Implications

TAQA is developing the decommissioning contract and procurement strategy for these works, on behalf of the Section 29 Notice Holders. TAQA envisages that this strategy may include using incumbent contractors for recurring items / services covered by Master Services Agreements held by TAQA.

Notwithstanding, TAQA has, and will continue to:

- Publish Hudson decommissioning project information, including the project schedule, on the TAQA decommissioning website;
- Publish project information and contact details on the NSTA Pathfinder website;
- Engage with the NSTA and the decommissioning supply chain on any relevant issues relating to the Hudson decommissioning programme and schedule; and
- Where appropriate use the FPAL / SEQual database as the sources for establishing tender lists for supply chain items.

2 Description of Items to be Decommissioned

2.1 Subsea Installations

Key information regarding the Hudson subsea installations is presented in Table 2.1 and Figure 1.3.

Table 2-1: Subsea Installations

Item	Number	Size (m) [LxWxH]	Weight (Te)	Location		Comments / Status
Xmas Trees, Flowbases Wellheads	9	3.6x3.2x3.1	43.68	WGS84 Decimal	61.2603 N 00.7075 E	L1 Weight includes Xmas Tree, flowbase and wellhead
				WGS84 Decimal Minute	61° 15' 37.15 " N 00° 42' 26.83 " E	
		3.6x3.2x3.1	43.68	WGS84 Decimal	61.2602 N 00.7075 E	L2 Weight includes Xmas Tree, flowbase and wellhead.
				WGS84 Decimal Minute	61° 15' 36.73 " N 00° 42' 26.38 " E	
		3.7x3.7x3.1	39.98	WGS84 Decimal	61.2526 N 00.7342 E	L3 Weight includes Xmas Tree, flowbase and wellhead.
				WGS84 Decimal Minute	61° 15' 09.23 " N 00° 44' 03.03 " E	
		3.7x3.7x3.1	39.98	WGS84 Decimal	61.2523 N 00.7344 E	L4 Weight includes Xmas Tree, flowbase and wellhead.
				WGS84 Decimal Minute	61° 15' 08.44 " N 00° 44' 03.72 " E	
		3.7x3.7x3.1	39.98	WGS84 Decimal	61.2531 N 00.7342 E	U1 Weight includes Xmas Tree, flowbase and wellhead.
				WGS84 Decimal Minute	61° 15' 11.09 " N 00° 44' 03.24 " E	
		3.7x3.7x3.1	39.98	WGS84 Decimal	61.2524 N 00.7332 E	U2 Weight includes Xmas Tree, flowbase and wellhead.
				WGS84 Decimal Minute	61° 15' 08.51 " N 00° 43' 59.20 " E	
		3.7x3.7x3.1	39.98	WGS84 Decimal	61.2531 N 00.7349 E	U3 Weight includes Xmas Tree, flowbase and wellhead.
				WGS84 Decimal Minute	61° 15' 11.08 " N 00° 44' 05.51 " E	
		3.7x3.7x3.1	39.98	WGS84 Decimal	61.2533 N 00.7358 E	W1 Weight includes Xmas Tree, flowbase and wellhead.
				WGS84 Decimal Minute	61° 15’ 12.00 “ N 00° 44’ 09.00 “ E	

Table 2-1: Subsea Installations

Item	Number	Size (m) [LxWxH]	Weight (Te)	Location		Comments / Status
		3.7x3.7x3.1	39.98	WGS84 Decimal	61.2526 N 00.7339 E	W2 Weight includes Xmas Tree, flowbase and wellhead.
				WGS84 Decimal Minute	61° 15’ 09.32 “ N 00° 44’ 02.07 “ E	
Manifold	1	25x13.5x7.8	333.9	WGS84 Decimal	61.2523 N 00.7337 E	The Manifold Structure is secured to the seabed by 4 piles which will be cut at -3 m. Weight includes total weight of piping and piles.
				WGS84 Decimal Minute	61° 15’ 08.28 “ N 00° 44’ 01.59 “ E	
Crossover Skid	1	4x3.4x4.6	37.5	WGS84 Decimal	61.2530 N 00.7352 E	The crossover skid structure is piled with a single pile. Weight includes pile.
				WGS84 Decimal Minute	61° 15' 10.75 " N 00° 44' 06.67 " E	
FSM protection structure	1	8x3.8x0.3	5	WGS84 Decimal	61.2560 N 00.7447 E	The FSM protection structure is gravity based.
				WGS84 Decimal Minute	61°15'21.74"N 0°44'40.97"E	

2.2 Pipelines including Stabilisation Features

Table 2-2: Pipeline / Flowline / Umbilical Information

Description	Pipeline Number	Diameter	Length (km)	Description of Component Parts	Product Conveyed	From – To	Burial Status	Pipeline Status	Current Contents
Oil Production Flowline	PL1018	10”	10.141	Steel	Hydrocarbons	Adjacent to Hudson Manifold – Adjacent to Tern Platform	Trenched and Buried	Interim Pipeline Regime (IPR)	Seawater
Oil Production Flowline	PL1019	10”	10.142	Steel	Hydrocarbons	Adjacent to Hudson Manifold – Adjacent to Tern Platform	Trenched and Buried	Interim Pipeline Regime (IPR)	Seawater
Oil Production/ Test Flowline	PL1020	8”	10.15	Steel	Hydrocarbons	Adjacent to Hudson Manifold – Adjacent to Tern Platform	Trenched and Buried	Interim Pipeline Regime (IPR)	Seawater
Water Injection Flowline	PL1021	8”	10.65	Steel	Hydrocarbons	Tern Platform – Hudson Manifold	Trenched and Buried	Interim Pipeline Regime (IPR)	Seawater
Water Injection Spool	PL1021.1	6.6”	0.043	Steel	Injection Water	Hudson Manifold – W1 Well	Surface Laid	Interim Pipeline Regime (IPR)	Seawater
Water Injection Jumper Line	PL1021.2	6.6”	0.029	Steel	Injection Seawater	Hudson Manifold – W2 Well	Surface Laid	Interim Pipeline Regime (IPR)	Seawater
Water Injection Header Bypass	PL1021AJM	11.3”	0.045	Flexible	Injection Water	Hudson Manifold – Hudson Manifold	Surface Laid	Interim Pipeline Regime (IPR)	Seawater
Gas Lift Flowline	PL1022	6”	10.571	Steel	Hydrocarbons	Tern Platform – Hudson Manifold	Trenched and Partially Buried	Out of Use	Seawater
Gas Lift Flowline	PL1022.1	2”	1.764	Steel	Hydrocarbons	Hudson Manifold – L1 Well	Trenched and Buried	Out of Use	Seawater

Table 2-2: Pipeline / Flowline / Umbilical Information

Description	Pipeline Number	Diameter	Length (km)	Description of Component Parts	Product Conveyed	From – To	Burial Status	Pipeline Status	Current Contents
Gas Lift Flowline	PL1022.2	2.37”	1.762	Steel	Hydrocarbons	Hudson Manifold – L2 Well	Trenched and Buried	Out of Use	Seawater
Gas Lift Jumper Line	PL1022.3	2.37”	0.035	Steel	Hydrocarbons	Hudson Manifold – L3 Well	Surface Laid	Out of Use	Seawater
Gas Lift Jumper Line	PL1022.4	2.37”	0.025	Steel	Hydrocarbons	Hudson Manifold – L4 Well	Surface Laid	Out of Use	Seawater
Gas Lift Jumper Line	PL1022.5	2.37”	0.035	Steel	Hydrocarbons	Hudson Manifold – U1 Well	Surface Laid	Out of Use	Seawater
Gas Lift Jumper Line	PL1022.6	2.37”	0.025	Steel	Hydrocarbons	Hudson Manifold – U2 Well	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6451 (Previously PL1023.1)	5.8”	12.664	Umbilical	Chemicals	Tern Platform – Well L1	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6452 (Previously PL1023.2)	5.8”	15.589	Umbilical	Chemicals	Tern Platform – Well L2	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6453 (Previously PL1023.3)	5.8”	10.807	Umbilical	Chemicals	Tern Platform – Well L3	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6449 (Previously PL1023.4)	5.8”	10.802	Umbilical	Chemicals	Tern Platform – Well L4	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6448 (Previously PL1023.5)	5.8”	10.802	Umbilical	Chemicals	Tern Platform – Well U1	Trenched and Buried	Out of Use	Seawater

Table 2-2: Pipeline / Flowline / Umbilical Information

Description	Pipeline Number	Diameter	Length (km)	Description of Component Parts	Product Conveyed	From – To	Burial Status	Pipeline Status	Current Contents
Chemical Injection Line	PLU6447 (Previously PL1023.6)	5.8”	10.802	Umbilical	Chemicals	Tern Platform – Well U2	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6451 (Previously PL1023.7)	5.8”	12.664	Umbilical	Chemicals	Tern Platform – Well L1	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6452 (Previously PL1023.8)	5.8”	12.589	Umbilical	Chemicals	Tern Platform – Well L2	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6453 (Previously PL1023.9)	5.8”	10.807	Umbilical	Chemicals	Tern Platform – Well L3	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6449 (Previously PL1023.10)	5.8”	10.802	Umbilical	Chemicals	Tern Platform – Well L4	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6448 (Previously PL1023.11)	5.8”	10.802	Umbilical	Chemicals	Tern Platform – Well U1	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6447 (Previously PL1023.12)	5.8”	10.802	Umbilical	Chemicals	Tern Platform – Well U2	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6451 (Previously PL1023.13)	5.8”	12.664	Umbilical	Chemicals	Tern Platform – Well L1	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6452 (Previously PL1023.14)	5.8”	12.589	Umbilical	Chemicals	Tern Platform – Well L2	Trenched and Buried	Out of Use	Seawater

Table 2-2: Pipeline / Flowline / Umbilical Information

Description	Pipeline Number	Diameter	Length (km)	Description of Component Parts	Product Conveyed	From – To	Burial Status	Pipeline Status	Current Contents
Chemical Injection Line	PLU6450 (Previously PL1023.15)	5.8”	10.73	Umbilical	Chemicals	Tern Platform – Hudson Manifold	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6450 (Previously PL1023.16)	5.8”	10.73	Umbilical	Chemicals	Tern Platform – Hudson Manifold	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6450 (Previously PL1023.17)	5.8”	10.73	Umbilical	Chemicals	Tern Platform – Hudson Manifold	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6451 (Previously PL1023.18)	5.8”	12.664	Umbilical	Chemicals	Tern Platform – Well L1	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6452 (Previously PL1023.19)	5.8”	12.589	Umbilical	Chemicals	Tern Platform – Well L2	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6450 (Previously PL1023.20)	5.8”	10.73	Umbilical	Chemicals	Tern Platform – Hudson Manifold	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6450 (Previously PL1023.21)	5.8”	10.73	Umbilical	Chemicals	Tern Platform – Hudson Manifold	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6450 (Previously PL1023.22)	5.8”	10.73	Umbilical	Chemicals	Tern Platform – Hudson Manifold	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6450 (Previously PL1023.23)	5.8”	10.724	Umbilical	Chemicals	Tern Platform – Hudson Manifold	Trenched and Buried	Out of Use	Seawater

Table 2-2: Pipeline / Flowline / Umbilical Information

Description	Pipeline Number	Diameter	Length (km)	Description of Component Parts	Product Conveyed	From – To	Burial Status	Pipeline Status	Current Contents
Chemical Injection Line	PLU6450 (Previously PL1023.24)	5.8”	10.724	Umbilical	Chemicals	Tern Platform – Hudson Manifold	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6450 (Previously PL1023.25)	5.8”	0.001	Umbilical	Chemicals	SUT inlet Hudson Manifold – SUT outlet Hudson Manifold	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6451 (Previously PL1023.26)	4.1”	1.941	Umbilical	Chemicals	Hudson Manifold – Well L1	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6451 (Previously PL1023.26.1)	5.8”	0.006	Umbilical	Chemicals	Hudson Manifold – Hudson Manifold	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6451 (Previously PL1023.26.2)	4.1”	0.002	Umbilical	Chemicals	Well L1 – W O Rig connection	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6452 (Previously PL1023.27)	4.1”	1.866	Umbilical	Chemicals	Hudson Manifold – L2 Well	Trenched and Buried	Out of Use	Seawater
Chemical Injection Line	PLU6452 (Previously PL1023.27.1)	5.8”	0.006	Umbilical	Chemicals	Hudson Manifold – Hudson Manifold	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6452 (Previously PL1023.27.2)	4.1”	0.006	Umbilical	Chemicals	Well L2 – W O Rig connection	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6453 (Previously PL1023.28)	3.9”	0.065	Umbilical	Chemicals	Hudson Manifold – L3 Well	Surface Laid	Out of Use	Seawater

Table 2-2: Pipeline / Flowline / Umbilical Information

Description	Pipeline Number	Diameter	Length (km)	Description of Component Parts	Product Conveyed	From – To	Burial Status	Pipeline Status	Current Contents
Chemical Injection Line	PLU6453 (Previously PL1023.28.1)	4.1”	0.002	Umbilical	Chemicals	Well L3 – W O Rig connection	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6449 (Previously PL1023.29)	3.9”	0.06	Umbilical	Chemicals	Hudson Manifold – L4 Well	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6449 (Previously PL1023.29.1)	4.1”	0.002	Umbilical	Chemicals	Well L4 – W O Rig connection	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6448 (Previously PL1023.30)	3.9”	0.08	Umbilical	Chemicals	Hudson Manifold – U1 Well	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6448 (Previously PL1023.30.1)	4.1”	0.002	Umbilical	Chemicals	Well U1 – W O Rig connection	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6447 (Previously PL1023.31)	3.9”	0.06	Umbilical	Chemicals	Hudson Manifold – U2 Well	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PLU6447 (Previously PL1023.31.1)	4.1”	0.002	Umbilical	Chemicals	Well U2 – W O Rig connection	Surface Laid	Out of Use	Seawater
Production/ Test Flowline	PL1024	8”	1.640	Steel	Hydrocarbons	L1 Well – Hudson Manifold	Trenched and Buried	Interim Pipeline Regime (IPR)	Seawater
Production/ Test Flowline	PL1025	8”	1.639	Steel	Hydrocarbons	L2 Well – Hudson Manifold	Trenched and Buried	Interim Pipeline Regime (IPR)	Seawater
Production Jumper	PL1026	6.6”	0.031	Steel	Hydrocarbons	L3 Well – Hudson Manifold	Surface Laid	Interim Pipeline Regime (IPR)	Seawater

Table 2-2: Pipeline / Flowline / Umbilical Information

Description	Pipeline Number	Diameter	Length (km)	Description of Component Parts	Product Conveyed	From – To	Burial Status	Pipeline Status	Current Contents
Production Jumper Line	PL1027	6.6”	0.025	Steel	Hydrocarbons	L4 Well – Hudson Manifold	Surface Laid	Out of Use	Seawater
Production Jumper Line	PL1028	6”	0.035	Steel	Hydrocarbons	U1 Well – Hudson Manifold	Surface Laid	Out of Use	Seawater
Production Jumper Line	PL1029	6”	0.025	Steel	Hydrocarbons	U2 Well – Hudson Manifold	Surface Laid	Out of Use	Seawater
Production Flowline	PL1018A	10”	10.973	Steel	Hydrocarbons	Hudson Manifold – Tern Platform Pig Launcher/ Receiver	Trenched and Buried	Out of Use	Flushed
Production Flowline	PL1019A	10.”	10.656	Steel	Hydrocarbons	Hudson Manifold – Tern Platform Pig Launcher/ Receiver	Trenched and Buried	Out of Use	Flushed
Production Flowline	PL1020A	10”	10.472	Steel	Hydrocarbons	Hudson Manifold – Tern Platform Pig Launcher/ Receiver	Trenched and Buried	Out of Use	Flushed
Water Injection Pipeline	PL1021A	8.63”	10.211	Steel	Produced Water	Tern Platform – Hudson Manifold	Trenched and Partially Buried	Interim Pipeline Regime (IPR)	Seawater
L1 Jumper	PL1024A	6.63”	1.624	Steel	Hydrocarbons	L1 Well – Hudson Manifold	Trenched and Buried	Out of Use	Inhibited Seawater
L2 Jumper	PL1025A	6.63”	1.787	Steel	Hydrocarbons	L2 Well – Hudson Manifold	Trenched and Buried	Out of Use	Seawater
Production Pipeline	PL1783	6.63”	0.03	Steel	Hydrocarbons	U3 well – Crossover Skid	Surface Laid	Out of Use	Seawater
Gas Lift Pipeline	PL1784	2.37”	0.028	Steel	Hydrocarbons	Crossover Skid – U3 Well	Surface Laid	Out of Use	Seawater

Table 2-2: Pipeline / Flowline / Umbilical Information

Description	Pipeline Number	Diameter	Length (km)	Description of Component Parts	Product Conveyed	From – To	Burial Status	Pipeline Status	Current Contents
Production Pipeline	PL1785	8.63”	0.03	Steel	Hydrocarbons	Crossover Skid – Hudson Manifold	Surface Laid	Out of Use	Seawater
Production/ Test Pipeline	PL1786	8.63”	0.03	Steel	Hydrocarbons	Crossover Skid – Hudson Manifold	Surface Laid	Out of Use	Seawater
Gas Lift Pipeline	PL1787	6.63”	0.03	Steel	Hydrocarbons	Hudson Manifold - Crossover Skid	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PL1788	0.37”	0.1	Umbilical	Chemicals	Hudson Manifold – U3 Well	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PL1789	0.37”	0.1	Umbilical	Chemicals	Hudson Manifold – U3 Well	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PL1790	0.37”	0.1	Umbilical	Chemicals	Hudson Manifold – U3 Well	Surface Laid	Out of Use	Seawater
Chemical Injection Line	PL1791	0.37”	0.1	Umbilical	Chemicals	Hudson Manifold – U3 Well	Surface Laid	Out of Use	Seawater
Sensor Jumper	PL3090	n/a	0.065	Electrical Cable	Signal	Hudson Manifold – U1 Well	Surface Laid	Out of Use	Disconnected - Signal
Sensor Jumper	PL3091	n/a	0.065	Electrical Cable	Signal	Hudson Manifold – U2 Well	Surface Laid	Out of Use	Disconnected - Signal
Sensor Jumper	PL3092	n/a	0.065	Electrical Cable	Signal	Hudson Manifold – U3 Well	Surface Laid	Out of Use	Disconnected - Signal
Sensor Jumper	PL3093	n/a	0.065	Electrical Cable	Signal	Hudson Manifold – U3 Well	Surface Laid	Out of Use	Disconnected - Signal
Production Jumper	PL4339	6.63”	0.041	Steel	Hydrocarbons	L3 Well – Hudson Manifold	Surface Laid	Out of Use	Seawater
Hydraulic Jumper	PL4340	0.6”	0.039	Umbilical	Hydraulic fluid	Hudson Manifold - Crossover Skid	Surface Laid	Out of Use	Seawater

Table 2-2: Pipeline / Flowline / Umbilical Information

Description	Pipeline Number	Diameter	Length (km)	Description of Component Parts	Product Conveyed	From – To	Burial Status	Pipeline Status	Current Contents
Services Umbilical	PLU6238	3.9”	0.07	Umbilical	Chemicals, Water, Power	Hudson Manifold – Well W1	Surface Laid	Out of Use	Seawater
Services Umbilical	PLU6239	3.9”	0.07	Umbilical	Chemicals, Water, Power	Hudson Manifold – Well W2	Surface Laid	Out of Use	Seawater
MEOH Jumper	PL6240	1.2”	0.02	Methanol pipeline	Methanol	Well L1 to Well L2	Surface Laid	Out of Use	Methanol
FSM Cable	PL6246	0.77”	0.506	FSM Cable	Signal	Disconnected adjacent to Tern Platform - PL1018A Insulation Flange	Surface Laid	Interim Pipeline Regime (IPR)	Disconnected - Signal

Table 2-3: Subsea Pipeline / Flowline / Umbilical Stabilisation Features				
Stabilisation Feature	**Total Number**	**Weight (Te)**	**Locations**	**Exposed/Buried/Condition**
Concrete Mattresses	170	651.5	Hudson Manifold Area	Exposed
Concrete Mattresses	59	212.4	Tern Platform Area	Exposed
Concrete Mattresses	125	366.7	L1/L2 Drill Centre	Exposed
Grout Bags	11,305	282.6	Hudson Manifold Area	Exposed
Grout Bags	10,734	268.4	Tern Platform Area and FSM Cable	Exposed
Grout Bags	2,000	50	L1/L2 Drill Centre	Exposed
Grouted Support	6	56.3	Hudson risers	Exposed
Rock	n/a	3,600	PL1018 and PL1019	Partially covered in sediment
Rock	n/a	12,000	PL1018/A, PL1019/A, PL1020/A, PL1024/A and PL1025/A	Partially covered in sediment
Rock	n/a	12,822	PL1018	Spot rock placement at 15 locations along whole length of line between manifold and Tern platform
Rock	n/a	2,840	PL1019	Spot rock placement at 2 locations relatively close to Hudson manifold
Rock	n/a	16,600	PL1020	Spot rock placement at 9 locations between manifold and Tern platform, all within 60m of the platform
Rock	n/a	5,366	PL1024	Spot rock placement at 6 locations between manifold and well, all within 60m of the platform

The total quantities of pipeline stabilisation features are:

- Mattresses: Total number = 354. Total weight = c.1,231 Te
- Grout Bags: Total number = 24,039. Total weight = 601 Te
- Grouted Supports: Total number = 6. Total weight = 56.3 Te
- Rock Cover: Total weight = 53,228 Te

2.2.1 Pipeline and Umbilical Risers

There are twelve Hudson lines that terminate at the Tern platform:

- PL1018A 10” Oil Production Flowline
- PL1019A 10” Oil Production Flowline
- PL1020A 8” Oil Production Flowline / Test Flowline
- PL1021 8” Water Injection Flowline
- PL1022 6” Gas Lift Flowline
- PLU6447 Umbilical (previously PL1023.6, PL1023.12, PL1023.31, and PL1023.31.1)
- PLU6448 Umbilical (previously PL1023.5, PL1023.11, PL1023.30, and PL1023.30.1)
- PLU6449 Umbilical (previously PL1023. 4, PL1023. 10, PL1023. 29, and PL1023. 29.1)
- PLU6450 Umbilical (previously PL1023.15, PL1023.16, PL1023.17, PL1023.20, PL1023.21, PL1023.22, PL1023.23, PL1023.24, and PL1023.25)
- PLU6451 Umbilical (previously PL1023.1, PL1023.7, PL1023.13, PL1023.18, PL1023.26, PL1023.26.1, and PL1023.26.2)
- PLU6452 Umbilical (previously PL1023.2, PL1023.8, PL1023.14, PL1023.19, PL1023.27, PL1023.27.1, and PL1023.27.2)
- PLU6453 Umbilical (previously numbered as PL1023.3, PL1023.9, PL1023.28, and PL1023.28.1)

The pipelines run up the side of the Tern jacket as “risers” in J-tubes and terminate on the platform topsides. Similarly, the umbilical runs up the jacket in a caisson and terminates on the platform topsides.

The Hudson pipeline and umbilical risers will be cut at the proposed Upper Jacket cut depth at -132 m LAT. The riser sections between the Tern Topsides and the cut depth at -132 m LAT will be removed with the Tern Upper Jacket. The remaining sections of the Hudson risers attached to the Tern footings will be decommissioned as part of the Tern Footings Decommissioning Programme.

2.3 Wells

Table 2.4 lists the well information pertinent to the nine wells covered by this decommissioning programme. The wells will be Phase 3 plugged and abandoned in accordance with OEUK Well Decommissioning Guidelines [2]. Operations will be supported by appropriate regulatory applications and submissions.

Table 2-4: Well Information			
Subsea Wells	**Designation**	**Status**	**Category of Well**
210/24a-A1 (L1)	Oil Producer	Shut-In	SS 3-3-3
210/24a-A2 (L2)	Oil Producer	Suspended	SS 3-3-3
210/24a-B1 (L3)	Oil Producer	Suspended	SS 3-3-3
210/24a-B2 (L4)	Oil Producer	Shut-In	SS 3-3-3
210/24a-B3 (W2)	Water Injector	Shut-In	SS 4-4-3
210/24a-B4 (W1)	Water Injector	Shut-In	SS 4-4-3
210/24a-B5Z (U2)	Oil Producer	Shut-In	SS 3-3-3
210/24a-B6Z (U1)	Oil Producer	Shut-In	SS 3-3-3
210/24a-B7Z (U3)	Oil Producer	Suspended	SS 3-3-3

2.4 Drill Cuttings Piles

Table 2.5 describes the cuttings piles' locations and areas of coverage. Figure 2.1 and 2.2 depict the cuttings piles' bathymetry, i.e., the elevation across the piles and the piles' lateral extent. See Section 3.5 for further information.

Table 2-5: Drill Cuttings Piles Information		
Location of Pile Centre (Latitude/Longitude)	**Cuttings Pile Area (m^2)**	**Estimated Volume of Cuttings Pile (m^3)**
Hudson Manifold 61° 15' 08.28 " N 00° 44' 01.59 " E	8,957	6,819
L1/L2 Satellite Wells 61° 15' 36.73 " N 00° 42' 26.38 " E	2,314	1,156

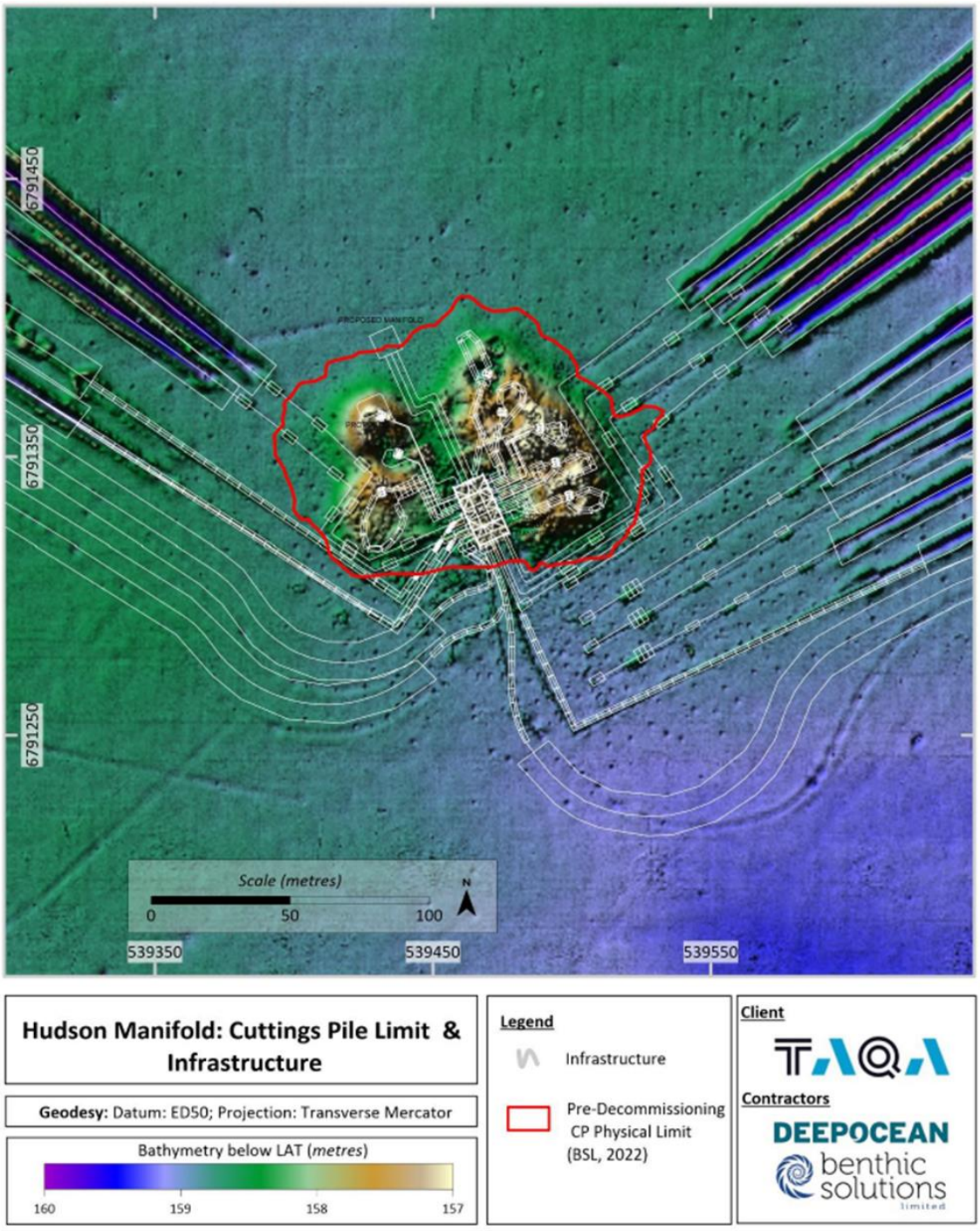

Figure 2.1: Hudson Manifold Cuttings Pile

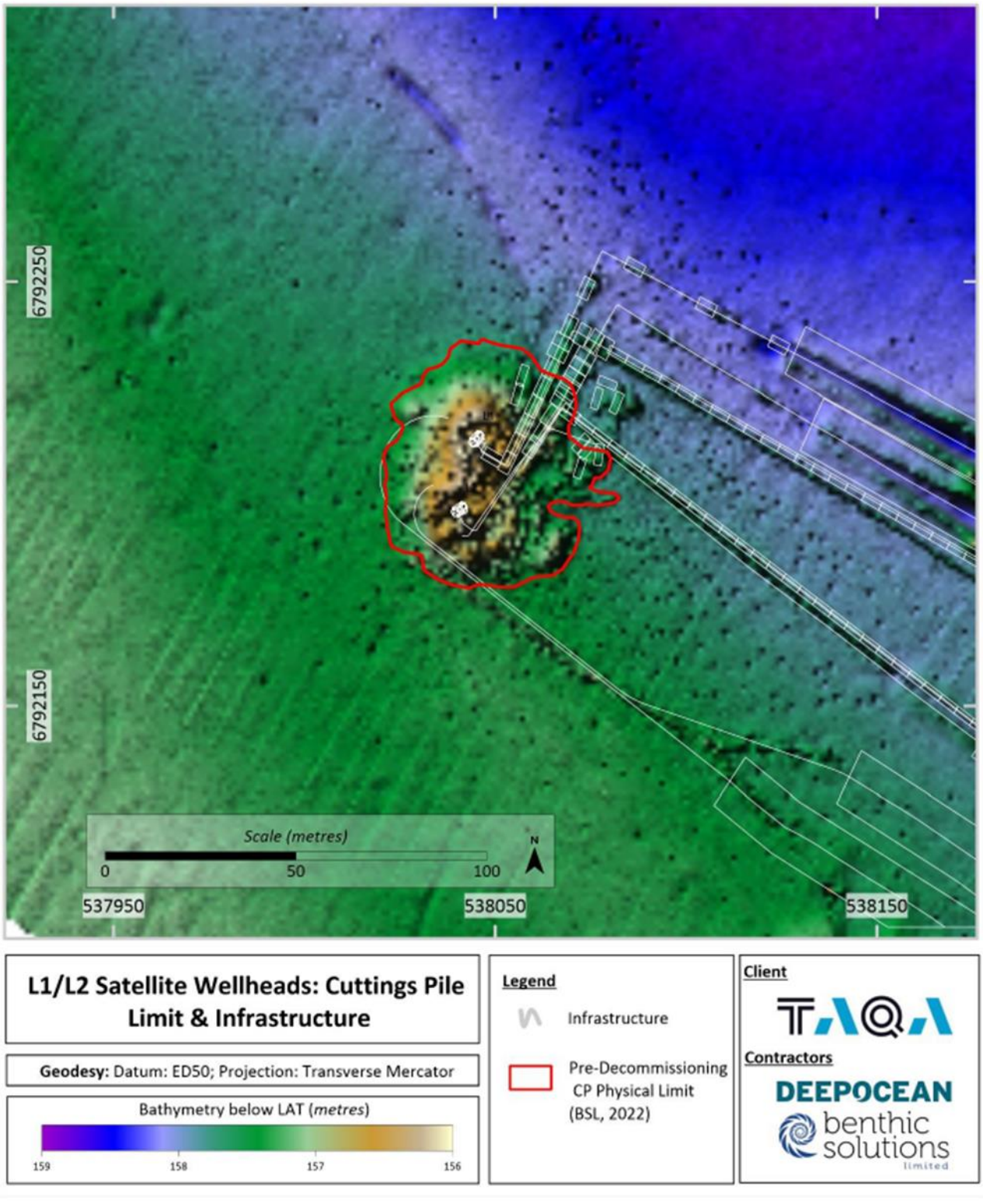

Figure 2.2: L1/L2 Satellite Wells Cuttings Pile

2.5 Inventory Estimates

Estimates of the material inventories for the Hudson installations and pipelines are presented in Table 2.6 and Table 2.7 respectively. These inventories are shown graphically and in Figure 2.3 and Figure 2.4.

Table 2-6: Hudson Subsea Installations Inventory

Material	Weight (Te)	% of Total
Ferrous metals (all grades)	734.2	98.7
Non-ferrous metals (aluminium alloys)	9.5	1.3
Total	743.7	100

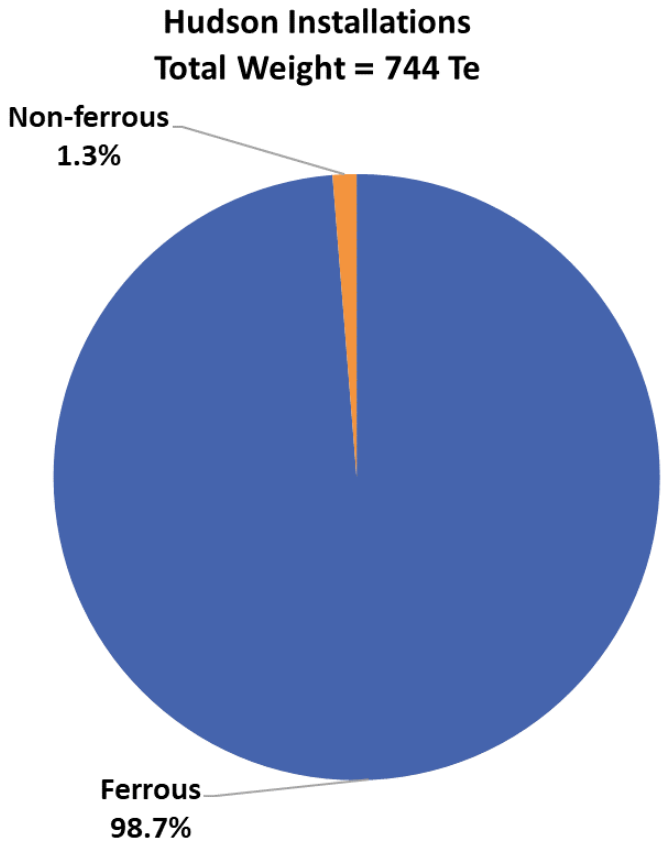

Figure 2.3: Subsea Installations Inventory

Table 2-7: Hudson Pipelines and Stabilisation Materials Inventory		
Material	**Weight (Te)**	**% of Total**
Ferrous metals (all grades)	7,912.4	12.2
Non-ferrous metals (copper, aluminium alloys)	22.1	<0.1
Plastics	1,880.6	2.9
Concrete mattresses	1,230.5	1.9
Grout (bags and grout support)	657.2	1.0
Other Non-hazardous (rock)	53,228.0	81.8
Other Non-hazardous	23.3	<0.1
Hazardous – NORM	25.4	<0.1
Hazardous – Residual fluids	75.2	0.1
Total	65,054.8	100.00

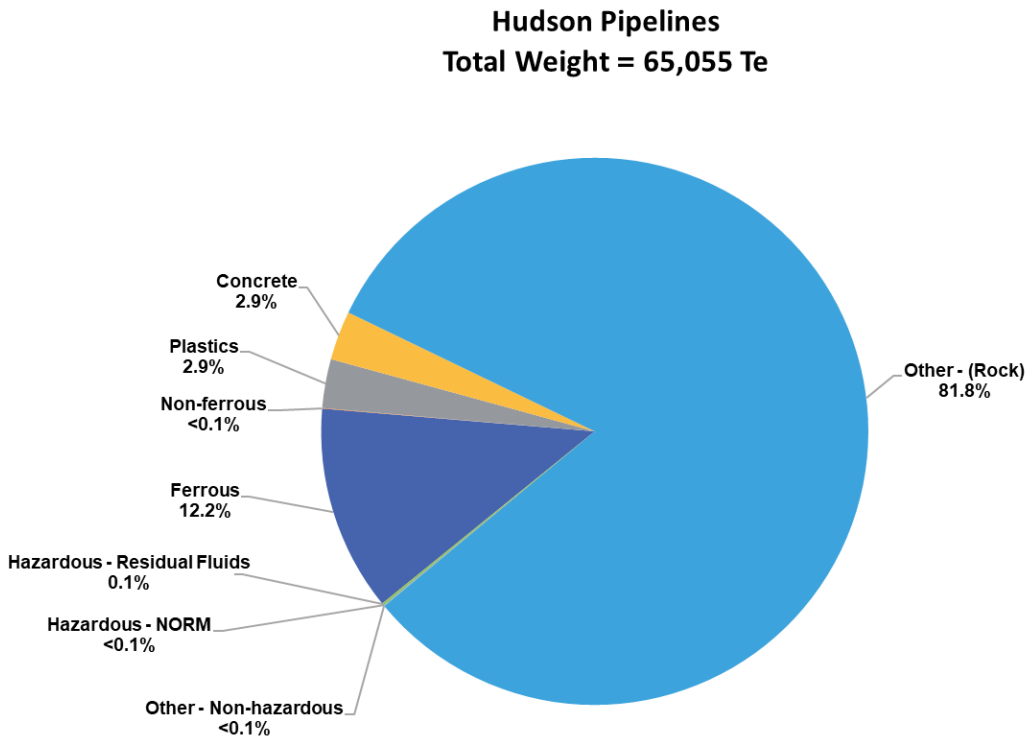

Figure 2.4: Pipelines and Stabilisation Materials Inventory

3 Removal and Disposal Methods

TAQA will implement an Active Waste Management Plan to identify and quantify available disposal options for waste materials resulting from the decommissioning activities. The plan will detail the disposal route for recovered structures and equipment, and their constituent materials and contents.

Recovered infrastructure will be returned to shore for dismantling and sorting before being transferred to suitably licenced waste facilities. It is the intent that, where possible, materials and equipment will be re-used or recycled. Materials management options will take account of the waste hierarchy, with reduction in volume of waste being the preferred option. OPRED will be advised once waste contractors have been selected.

3.1 Subsea Installations

The options considered for the disposal of the subsea installations and the selected disposal route are listed in Table 3.1.

Table 3-1: Subsea Installations

Installation / Feature	No.	Option	Disposal Route
Xmas Trees	9	Full recovery	Return to shore for reuse, recycling, or disposal as appropriate
Wellheads	9	Full recovery	Return to shore for reuse, recycling, or disposal as appropriate
Manifold and associated foundation piles	1	Manifold - Full recovery The four foundation piles will be recovered to 3 m below the seabed	Return to shore for reuse, recycling, or disposal as appropriate
Crossover Skid and foundation pile	1	Crossover Skid - Full recovery The foundation pile will be recovered to 3 m below the seabed	Return to shore for reuse, recycling, or disposal as appropriate
FSM protection structure	1	Full recovery	Return to shore for reuse, recycling, or disposal as appropriate

3.2 Pipelines

Table 3-2: Pipeline Decommissioning Options		
Key to Options		
1 – Re-use	2A – Cut and Lift with De-burial	2B – Reverse Installation (S-lay or Reel) without De-burial
2C – Reverse Installation (S-lay or Reel) with De-burial	2D – Reverse Installation (Buoyancy)	2E – Cut, Float & Transport
3A – Rock Placement over entire line	3B – Retrench and Bury entire line	4A – Rock Placement over areas of Spans / Exposure / Shallow Burial
4B – Trench & Bury areas of Spans / Exposure / Shallow Burial	4C – Remove areas of Spans / Exposure / Shallow Burial	4D – Accelerated Decomposition
5 – Remove Ends & Remediate Snag Risk	6 – Leave As-is	

Table 3-3: Pipeline or Pipeline Group Decommissioning Options Considered			
Pipeline or Group [Note 1]	**Condition of Line / Group**	**Whole or Part of Pipeline/Group**	**Options Considered**
Group 3: PLU447 (previously PL1023.6, PL1023.12, PL1023.31 and PL1023.31.1); PLU6448 (previously PL1023.5, PL1023.11, PL1023.30 and PL1023.30.1); PLU6449 (previously PL1023.4, PL1023.10, PL1023.29); PLU6450 (previously PL1023.15, PL1023.16, PL1023.17, PL1023.20, PL1023.21, PL1023.22, PL1023.23, PL1023.24); PLU6451 (previously PL1023.1, PL1023.7, PL1023.13, PL1023.18, PL1023.26); PLU6452 (previously PL1023.2, PL1023.8, PL1023.14, PL1023.19, PL1023.27); PLU6453 (previously PL1023.3, PL1023.9, PL1023.28)	Flexible flowlines and umbilicals trenched and buried with areas of rock cover	Whole group	2B, 4A, 4B, 4C, 5
Group 9: PL1018A, PL1019A, PL1020A, PL1025A	Rigid pipelines, trenched and buried	Whole group	2C, 4A, 4B, 4C, 5

Table 3-3: Pipeline or Pipeline Group Decommissioning Options Considered			
Pipeline or Group Note 1	**Condition of Line / Group**	**Whole or Part of Pipeline/Group**	**Options Considered**
Group 10: PLU6452 (previously PL1023.2, PL1023.8, PL1023.14, PL1023.19,) PLU6447 (previously PL1023.6, PL1023.12) PLU6448 (previously PL1023.5, PL1023.11, PL1023.30, PL1023.31) PLU6449 (previously PL1023.4, PL1023.10) PLU6451 (previously PL1023.1, PL1023.7, PL1023.13, PL1023.18) PLU6453 (previously PL1023.3, PL1023.9)	Flexible Risers and Umbilical Risers	Whole group	Full removal Notes 2 & 3
Group 11: PL1018A, PL1019A, PL1020A, PL1021, PL1022	Rigid Risers	Whole group	Full removal Note 3
Group 12: PL1018/A, PL1019/A, PL1020/A, PL1024/A, PL1025/A, PL1022, PL1023, PL1022.1, PL1022.2, PL1021/A, PL1026, PL4339, PL1027, PL1028, PL1029, PL1022.3, PL1022.4, PL1022.5, PL1022.6, PL1021.1, PL1021.2, PL1021AJM, PLU6451 (previously PL1023.1, PL1023.7, PL1023.13, PL1023.18, PL1023.26.1, PL1023.26.2) PLU6452 (previously PL1023.2, PL1023.8, PL1023.14, PL1023.19, PL1023.27.1, PL1023.27.2) PLU6449 (previously PL1023.4, PL1023.10, PL1023.29, PL1023.29.1) PLU6447 (previously PL1023.6, PL1023.12, PL1023.31, 1023.31.1) PLU6450 (previously PL1023.25) PLU6448 (previously PL1023.5, PL1023.11, PL1023.30, PL1023.30.1,) PLU6453 (previously PL1023.3, PL1023.9, PL1023.28, PL1023.28.1) PL1783, PL1784, PL1785, PL1786, PL1787, PL1788, PL1789, PL1790, PL1791, PL3090,PL3091, PL3092, PL3093, PLU6238, PLU6239, PL6240, PL6246	Spools and jumpers, surface laid	Whole group	Full removal Note 3
Group 16: PL1024A	Blocked rigid pipeline, trenched, and buried	Whole pipeline	2A, 5
Group 17: PL1022, PL1021A	In-use Note 4 rigid pipelines, trenched and partially buried	Whole group	2A, 3A, 3B, 5

Table 3-3: Pipeline or Pipeline Group Decommissioning Options Considered			
Pipeline or Group Note 1	**Condition of Line / Group**	**Whole or Part of Pipeline/Group**	**Options Considered**
Group 18: PL1018, PL1019, PL1020, PL1021, PL1022.1, PL1022.2, PL1024, PL1025	Uncertain integrity rigid pipeline and concrete coated rigid pipelines, trenched and buried	Whole group	2A, 4A, 4B, 4C, 5

Notes:

1. Pipelines that comprise multiple different sections, for example a surface laid section, a buried section and a riser section will appear in several corresponding groups.
2. The Hudson risers (and riser section of the umbilical) will be cut at a proposed -132 m Lowest Astronomical Tide (LAT) and the sections between the Tern Topsides and -132 m will be removed with the Tern Upper Jacket. The remaining sections of the Hudson risers attached to the Tern footings will be decommissioned as part of the Tern Footings Decommissioning Programme. Lower portion of risers will be decommissioned *in situ* if derogation is granted to leave the Tern footings in place. If derogation is not granted for the footings, then these riser portions will be removed.
3. Sections of surface laid lines in close proximity (within approximately 75 m) to the Tern jacket/sub-structure footings may be left in place if derogation is granted to leave the footings in place. If derogation is not granted for the footings, then these surface laid portions will be removed.
4. Reflects CA grouping, pipelines are currently out of use.

3.2.1 Comparative Assessment Method:

TAQA conducted a CA of the decommissioning options for the Hudson facilities [3]. TAQA's strategy for the CA process is aligned with the OEUK Guidelines for Comparative Assessment in Decommissioning Programmes [2] and OPRED Guidance Notes for the Decommissioning of Offshore Oil & Gas Installations and Pipelines [1].

All the infrastructure has been scoped into logical groupings. All feasible decommissioning options for each of the infrastructure groups have been identified, screened, assessed, and ranked , using five assessment criteria: Safety, Environment, Technical, Societal and Economic (to compare the relative merits of each credible decommissioning option for each group of infrastructure).

The assessment criteria are equally weighted to balance and represent the views of each of the stakeholders.

Table 3-4: Outcome of Comparative Assessment [Note 1]		
Pipeline or Group	**Recommended Option**	**Justification**
Group 3	5 - Remove Line Ends and Remediate Snag Risk	The CA outcome is a significant preference for Option 5. Option 5 is preferred over other options against the Safety, Environment and Technical criteria. It is less preferred against the Societal criterion, however this does not offset the preference against the other criteria. If the Economics criterion is included, the preference for Option 5 remains and hence Option 5 is the recommended decommissioning option for Group 3.
Group 9	4C – Remove Areas of Spans / Exposure / Shallow Burial	The CA outcome shows that the preference for Option 4C (remove problem areas) is small. Option 4C is preferred over the other options against the Technical criteria. Option 4C is marginally less preferred to other options against the Safety, Environmental and Societal criteria however, there remains a preference for Option 4C overall. Once the Economics criterion is included, the preference for Option 4C remains and hence Option 4C is the emerging recommendation for Group 9.
Group 16	5 – Remove Ends and Remediate Snag Risk	The CA outcome shows that the preference for Option 5 (remove line ends only) is small. Option 5 is marginally preferred against the Safety and Environmental criteria and equally preferred against the remaining criteria. Once the Economics criterion is included, the preference for Option 5 remains and hence Option 5 is the emerging recommendation for Group 16.
Group 17	3B – Retrench and Bury Entire Line	The CA outcome shows that the preference for Option 3B (trench entirety of lines) is moderate. Option 3B is preferred against the Safety and Technical criterion and marginally less preferred (to Option 5) against the Environmental criteria. Option 3B is less preferred against the Societal criteria however, there remains a preference for Option 3B overall. Once the Economics criteria is included, the preference for Option 3B remains and hence Option 3B is the emerging recommendation for Group 17.
Group 18	5 – Remove Ends and Remediate Snag Risk	The CA outcome shows that the preference for Option 5 (remove line ends only) is moderate. Option 5 is preferred against the Technical criterion and marginally less preferred (to Option 4B) against the Safety and Environmental criteria. Option 2A is preferred from a Societal perspective however, there remains a preference for Option 5 overall. Once the Economics criteria is included, the preference for Option 5 is strengthened and hence Option 5 is the emerging recommendation for Group 18.

Notes:

1. Following completion of the comparative assessment, further work was undertaken that identified additional remediation may be required on these lines. As such, TAQA propose the following approach to assess the worst case environmental impact for these pipelines: rock placement to remediate spans, exposures and shallow burial < 20 m long and removal of spans, exposures and shallow burial > 20 m long by cut and lift.

3.3 Pipeline Stabilisation Features

Table 3-5: Pipeline Stabilisation Features Disposal Route

Stabilisation Features	Number	Option	Disposal Route
Concrete Mattresses	354	Full recovery at end of field life. (If practical difficulties are encountered, TAQA will consult with OPRED to agree an alternative approach).	Returned to shore for recycling or disposal to landfill.
Grout Bags	24,039	Full recovery at end of field life. (If practical difficulties are encountered, TAQA will consult with OPRED to agree an alternative approach)	Returned to shore for recycling or disposal to landfill.
Grout Support	6	Full recovery at end of field life. (If practical difficulties are encountered, TAQA will consult with OPRED to agree an alternative approach).	Returned to shore for recycling or disposal to landfill.
Rock Cover	53,228 Te	Ensure over-trawlability and decommission *in situ.*	Decommission *in situ.*

3.4 Wells

Table 3-6: Wells Decommissioning Options

The Hudson Wells, 210/24a-A1, 210/24a-A2, 210/24a-B1, 210/24a-B2, 210/24a-B3, 210/24a-B4, 210/24a-B5Z, 210/24a-B6Z and 210/24a-B7Z, will be plugged and abandoned to Phase 3 in alignment with the TAQA 'Well Barrier Standard TUK-11-B-009', and reference to OEUK Well Decommissioning Guidelines [2]. Operations will be supported by appropriate regulatory applications and submissions.

3.5 Drill Cuttings

The bathymetry data (Benthic Solutions, 2022) indicates a number of discrete cuttings piles surrounding the seven satellite wellheads around the Hudson manifold. Due to the complexity of the site, the small piles have been analysed and interpreted as one large cuttings pile, encompassing the manifold and the satellite wellheads. The level of expected natural seabed was extrapolated from the surrounds to give an estimated maximum cutting pile hight of 3.6 m.

The Hudson manifold cuttings pile was estimated to cover an area of 8,957 m^2 with a pile volume of 6,819 m^3 which would be categorised as a “medium cuttings pile” (5,000-20,000 m^3 [7]).

At the Hudson L1 and L2 wells, the bathymetry data showed the site consists of accumulations of cuttings at each well, which merge to form an overall cuttings pile area of approximately 56 m in diameter with an estimated maximum hight of 1.7 m at the L1 satellite well and 1.2 m at the L2 satellite well.

The extent of the Hudson L1 and L2 satellite wells area cuttings pile was estimated to cover an area of 2,314 m^2 with a pile volume of 1,156 m^3 which would be categorised as a “small cuttings pile” (<5,000 m^3; [7]).

Further information regarding the cuttings piles is provided in the Tern Area EA [4].

Table 3-7: Drill Cuttings Decommissioning Options

How many drill cuttings piles are present?			2	
Tick options examined:				
Remove and re-inject	Leave in place ✓	Cover		
Relocate on seabed	Remove and treat onshore	Remove and treat offshore		
Other				
Review of Pile characteristics			Pile 1	Pile 2
How has the cuttings pile been screened? (Actual samples taken)			Y	Y
Dates of sampling (if applicable)			2022	2022
Sampling to be included in pre-decommissioning survey?			Y	Y
Does it fall below both OSPAR thresholds?			Y	Y
Will the drill cuttings pile have to be displaced in order to remove the installations?			N	N
What quantity (m^3) would have to be displaced/removed?			n/a	n/a
Will the drill cuttings pile have to be displaced in order to remove any pipelines?			N	N
What quantity (m^3) would have to be displaced/removed?			n/a	n/a
Have you carried out a Comparative Assessment of options for the Cuttings Pile?			See below	

3.5.1 Comparative Assessment Summary

Overall, the environmental data obtained from the Hudson cuttings piles indicated that the sediments are modified compared to the wider field but could be described as typical for cuttings piles at oil and gas installations. The piles' characteristics fall below the criteria contained in OSPAR 2006/5 recommendation, on a management regime for offshore cutting piles [5]. The recommendation states that cuttings piles with an oil loss to the water column of less than $10t.yr^{-1}$ and a persistence seabed area smaller than $500km^2.yr^{-1}$ may be left *in situ* to naturally degrade. As a result, based on the criteria for environmental significance produced by the United Kingdom Offshore Operators Association (UKOOA; 2001) [8] and OSPAR (2006) [5] the potential environmental impact from the cuttings pile of the proposed decommissioning operations would be considered 'insignificant' with 'natural degradation' suggested as the best environmental strategy. Therefore, comparative assessment not required.

3.6 Waste Streams

Table 3-8: Materials and Waste Streams

Materials	Removal and Disposal Method
Bulk Liquids	Pipelines and umbilicals were flushed, as per agreement with OPRED, to facilitate abandonment scopes utilising Tern topsides facilities. Any discharges offshore were/will be managed, and risk assessed under the existing permitting regime. Any effluent shipped to shore will be treated and disposed of according to relevant regulations and guidance.
Marine Growth	Marine growth is only anticipated on the Hudson risers at the Tern platform. These risers will form part of the Tern jacket decommissioning scope. Marine growth is not anticipated on any of the other Hudson equipment. If marine growth is present, it will be disposed of in accordance with relevant regulations and guidance, either offshore under marine licence, or onshore.
NORM	Naturally Occurring Radioactive Material (NORM) is assumed to be present. Monitoring and sampling will be carried out to verify the presence of NORM. If it is identified, it will be contained and treated in accordance with relevant regulations and circumstances.
Asbestos	No asbestos materials are anticipated. However, if asbestos containing materials are found they will be recovered to shore and disposed of appropriately.
Wax	Wax is not anticipated. In the unlikely event that wax is present, it will be disposed of in accordance with relevant regulations and guidance, either offshore under marine licence or permit, or onshore.
Other Hazardous Materials	Any other hazardous materials will be disposed of in accordance with relevant regulations and guidance.

Table 3-8: Materials and Waste Streams	
Onshore Dismantling Sites	The removal contractor will use appropriately licenced dismantling, treatment, recycling, and disposal sites (where applicable). TAQA will ensure that the removal contractor and selected sites have proven abilities to manage waste streams throughout the deconstruction process. An Active Waste Management Plan (AWMP) will follow the "reduce, reuse, recycle" paradigm. OPRED will be informed once a suitable site(s) has been selected. TAQA will conduct assurance activities of the site(s) to confirm that they are compliant with applicable legislation.

Table 3-9: Inventory Disposition

	Total Inventory Tonnage (Te)	Planned Tonnage to Shore (Te)	Planned Tonnage Left *in situ* (Te)
Subsea Installations	743.7	707.5	36.2
Pipelines / Umbilicals	65,054.8	3,625.7	61,429.1

Total inventory weights noted are approximate and include the Xmas trees and all stabilisation features, including rock cover materials. It is TAQA's intention to maximise re-use or recycling of recovered inventory.

4 Environmental Appraisal Overview

4.1 Environmental Sensitivities

The environmental sensitivities in the Hudson Field are summarised in Table 1.1. The impacts of decommissioning operations on these sensitivities are listed in Table 4.2. Further details can be found in the supporting Tern Area Environmental Appraisal [4].

Table 4-1: Environmental Sensitivities

Environmental Receptor	Main Feature
	There are no Nature Conservation Marine Protected Areas (NCMPAs), Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) within 40 km of the Hudson Subsea facility. The closest protected site is the Pobie Bank Reef SAC, approximately 72 km west of the Tern platform.
	With regards to free-swimming fish species, ling, which are a Priority Marine Features (PMF), were observed during recent surveys of the Hudson Field in 2022. Amongst other species observed during the Hudson survey were cod and saithe, which are both PMF species. Additionally, cod is an OSPAR Annex II listed threatened and/or declining species. Other species present, but which were less frequently observed included anglerfish, also a PMF.
Conservation Interests	Ocean quahog are listed on the OSPAR list of threatened and/or declining species and habitats and are designated as a PMF. No adult specimens of ocean quahog were recorded in the entire survey area and juvenile individuals were recorded in macrofauna analysis of only seven of 41 sample stations, indicating the area is not currently important for the species. The habitat 'Seapen and burrowing megafauna communities' is also on the OSPAR list of threatened and/or declining habitats and species and is a PMF. Surveys identified evidence of this habitat at Hudson, but burrowing megafauna burrows were not at a density high enough to be classified as an OSPAR habitat.
	Numerous pockmarks which may be classified as ‘Submarine structures made by leaking gases’ (Annex I Habitat) were identified across the wider Tern Area. However, the lack of Methane-Derived Authigenic Carbonate (MDAC) present in pockmarks identified across the Tern Area indicates that Annex I ‘Submarine structures caused by leaking gases’ are not present.

Table 4-1: Environmental Sensitivities	
Environmental Receptor	**Main Feature**
Seabed	The water depth within the Hudson Field ranges from 158.8 m LAT in the north-west to 160.7 m LAT in the southeast. The physical seabed characteristics recorded from survey work show sediments across the Tern Area are mostly sandy, with muddy sand reported at Hudson. Under the European Nature Information System (EUNIS) habitat classification, the predicted broad-scale seabed type around the Hudson Field is A5.27 “deep circalittoral sand” which represents offshore (deep) circalittoral habitats with fine sands or non-cohesive muddy sands. This habitat type falls within the broad PMF habitat of “offshore sands and gravels”. In addition, localised areas of EUNIS habitat complex A5.45 “Deep circalittoral mixed sediment” are predicted to occur. Numerous pockmarks have been identified around the Hudson manifold. The largest pockmark observed measured 13 m in diameter. Hydrocarbon concentrations in the wider area seabed sediments surrounding the Hudson Field infrastructure are generally within expected background levels for the NNS but increase with proximity to infrastructure. At several stations within 500 m of the Hudson manifold there was evidence of drilling related hydrocarbon contamination (exceeding the UKOOA 95th percentile for the NNS) in the form of barium. There are cuttings piles at the Hudson manifold and the Hudson satellite wells. The Hudson manifold cuttings pile has a pile volume of 6,819 m^3 which would also be categorised as a medium cuttings pile. The extent of the cuttings pile at the Hudson satellite wells has a volume of 1,156 m^3 which would be categorised as a small cuttings pile (<5,000 m^3). Surveys were undertaken of the Hudson cuttings piles to determine their chemical composition. A gradient of Total Hydrocarbon Content (THC) levels decreased with distance from the location suggesting a point source of hydrocarbons most likely related to drilling discharges. The piles’ characteristics fall below the criteria contained in OSPAR 2006/5 recommendation, on a management regime for offshore cutting piles [5]. The recommendation states that cuttings piles with an oil loss to the water column of less than 10$t.yr^{-1}$ and a persistence below 500 $km^2.yr^{-1}$ can be left *in situ* to naturally degrade.
Fish	In the Hudson Field peak spawning for haddock occurs between February and April, Norway pout, between February and March and saithe between January and February. Whiting also spawns in the area at a lower intensity between February and June. The Hudson Field is a potential nursery ground for anglerfish, blue whiting, European hake, haddock, herring, ling, mackerel, spurdog, whiting and Norway pout. Blue whiting is the only species with a high nursery intensity in the Hudson Field while other species have a lower nursery intensity.
Fisheries	The Hudson Field is located in International Council for the Exploration of the Sea (ICES) rectangle 51F0. This region is primarily targeted for demersal species with a negligible contribution from pelagic and shell fisheries. Fishing effort is dominated by trawl fishing gears. Annual fishery landings by weight and value are considered low to moderate for demersal and low for pelagic fisheries in comparison to other areas of the North Sea.

Table 4-1: Environmental Sensitivities	
Environmental Receptor	**Main Feature**
Marine Mammals	Harbour porpoise, Atlantic white-sided dolphin, minke whale and beaked whale are the most abundant species recorded in the Hudson Field. The harbour porpoise is by far the most frequently recorded cetacean in the Hudson Field, which is reflective of these being the most abundant and widely distributed cetaceans in the North Sea. Both grey and harbour seal densities are known to be low in the Hudson Field, densities are predicted to be between 0 and 0.001% of the British Isles at-sea population per 25 km^2 for both species.
Birds	In the NNS, the most numerous species present are likely to be northern fulmar, black-legged kittiwake and common guillemot. The Hudson Field is located within or in the vicinity of a wider areas of aggregation for northern fulmar, northern gannet, European storm petrel, Arctic skua, great skua, black-legged kittiwake, herring gull, Arctic tern, guillemot, razorbill, and Atlantic puffin during their breeding season. Seabird sensitivity to oil pollution in the Hudson Field is considered low throughout most of the year, except for January when sensitivity is expected to be extremely high.
Onshore Communities	Waste generated during decommissioning will be brought to shore and will be managed in line with TAQA's Waste Management Strategy and the Waste Hierarchy, as part of the project AWMP, using approved waste contractors and in liaison with the relevant Regulators. Preventing waste is ultimately the best option, achieved through reducing consumption and using resources more efficiently. However, this is followed by re-use and recycling of goods. If all re-use opportunities have been taken by TAQA, the next preferable option is for recycling of materials. Should NORM be encountered, TAQA will ensure the onshore site(s) are suitably licenced to accept the waste arising from the decommissioning of the subsea infrastructure. All waste will be managed in compliance with relevant waste legislation by a licenced and/or permitted waste management contractor. The selected contractor will be assessed for competence through due diligence and duty of care assurance activities.
Other Users of the sea	The proposed decommissioning operations will be in a well-developed area for oil and gas extraction. The closest piece of surface infrastructure is Tern platform, located 10.3 km east northeast of the Hudson Field. Shipping density in the Hudson Field is very low or low, with a localised increase in vessel activity around surface installations including Tern platform, due to the presence of operational and maintenance vessels. Several the Hudson pipelines are crossed by pipelines connecting the Kestrel Field to Tern platform. The removal of these crossings will be managed as part of the execution of Tern Area decommissioning. There are no other third-party cables or pipelines in the vicinity, no designated military practice and exercise areas, no offshore renewable or wind farm activity and no designated or protected wrecks nearby. Hudson is located in proximity of the Innovation and Targeted Oil and Gas (INTOG) search and exclusion areas, approximately 24 km west of the INTOG NE-b and 25 km east of the NE-a INTOG.

Table 4-1: Environmental Sensitivities	
Environmental Receptor	**Main Feature**
Atmosphere	The cumulative emissions generated by the activities associated with the decommissioning of the Hudson Field are small relative to life-time production. Estimated carbon dioxide ($CO_{2)}$ emissions from the selected decommissioning options are 42,757 Te, equating to approximately 0.2% of total UKCS emissions (2023). Most of these emissions are related to offshore operation of vessels (26,167 Te CO_2) and manufacturing new materials to replace recyclable materials that are left *in situ* (12,586 Te CO_2).

4.2 Potential Environmental Impacts and their Management

The EA [4] process considered the potential for significant environmental effects as a result of the decommissioning activities described within this DP. The appraisal has not identified any significant residual environmental impacts, and it is anticipated that any physical, biological, or socio-economic impacts during the decommissioning activities will be negligible and short term.

Table 4.2 details the potential environmental impacts and the management and mitigation measures that will be put in place to further reduce the potential for environmental effects.

Table 4-2: Environmental Impacts and Management

Activity	Main impacts	Management
Subsea installation removal (including stabilisation materials)	Seabed disturbance impacts from excavation and removal of subsea installations and associated stabilisation materials.	Impacts to the seabed from project activities have been assessed fully in the EA [4] The following mitigation measures are proposed to minimise impacts: • It is envisaged that all vessels undertaking the decommissioning and removal works would be dynamically positioned vessels. As a result, there will be no direct interaction between vessel positioning and the seabed. • All activities which may lead to seabed disturbance will be planned, managed, and implemented in such a way that disturbance is minimised. • Activities will be risk assessed and permitted under a Marine Licence. • A debris survey will be undertaken at the completion of the decommissioning activities. Any debris identified as resulting from oil and gas activities will be recovered from the seabed where possible. • Any remedial rock armour will be placed to reduce unnecessary spreading of the rock footprint and ensure the minimum safe quantity of rock is used. • Clear seabed verification will ensure there is no residual risk to other sea users. Non-intrusive verification techniques will be considered in the first instance and in agreement with OPRED and fishing industry representative bodies.
Decommissioning surface laid flowlines (including stabilisation materials)	Seabed disturbance impacts from excavation and removal of surface laid flowlines and associated stabilisation materials.	Impacts to the seabed from project activities have been assessed fully in the EA [4] The following mitigation measures are proposed to minimise impacts: • Currently it is envisaged that all vessels undertaking the decommissioning and removal works would be dynamically positioned vessels. As a result, there will be no direct interaction between vessel positioning and the seabed. • All activities which may lead to seabed disturbance will be planned, managed, and implemented in such a way that disturbance is minimised. • Activities will be risk assessed and permitted under a Marine Licence. • Careful planning, selection of equipment, management, and implementation of activities. • A debris survey will be undertaken at the completion of the decommissioning activities. Any debris identified as resulting from oil and gas activities will be recovered from the seabed where possible. • Any remedial rock cover will be placed by a fall pipe vessel equipped with an underwater camera on the fall pipe. This will ensure accurate placement of the rock and reduce unnecessary spreading of the rock footprint and ensure that minimum safe quantity of rock is used. • Clear seabed verification will ensure there is no residual risk to other sea users. Non-intrusive verification techniques will be considered in the first instance and in agreement with OPRED and fishing industry representative bodies.

Table 4-2: Environmental Impacts and Management		
Activity	**Main impacts**	**Management**
Decommissioning buried flowlines (including stabilisation materials)	Seabed disturbance impacts from excavation and re-burial of flowlines and associated stabilisation materials. Snagging risk to commercial fisheries associated with pipelines decommissioned *in situ*.	The following mitigation measures are proposed to minimise impacts: • All activities which may lead to seabed disturbance will be planned, managed and implemented in such a way that disturbance is minimised. • Currently it is envisaged that all vessels undertaking the decommissioning and removal works would be dynamically positioned vessels. As a result, there will be no direct interaction between vessel positioning and the seabed. • Activities will be risk assessed and permitted under a Marine Licence. • A debris survey will be undertaken at the completion of the decommissioning activities. Any debris identified as resulting from oil and gas activities will be recovered from the seabed where possible. • Any exposures less than 20 m in length or cut pipeline ends will be rock covered to ensure they are over-trawlable by fishing gears. • Any remedial rock cover will be placed to reduce unnecessary spreading of the rock footprint and ensure the minimum safe quantity of rock is used. • The Hudson rigid pipelines which are trenched but insufficiently buried, are to be re-trenched and backfilled over the entire length to a minimum of 0.6 m depth. • Clear seabed verification will ensure there is no residual risk to other sea users. Non-intrusive verification techniques will be considered in the first instance and in agreement with OPRED and fishing bodies. • Admiralty charts and the FishSAFE system will be updated. • TAQA will monitor the seabed to assess any seabed depressions or clay berms which may present a snag risk. • Post-decommissioning monitoring will be undertaken at a frequency agreed with OPRED.

5 Interested Party Consultations

TAQA consulted a wide range of interested parties during the planning and preparation stages of the Northern North Sea Fields subsea comparative assessment process. Workshops and individual consultations with stakeholders were held to describe the CA process, to invite feedback and to understand stakeholders' particular interests regarding the impacts of decommissioning. Following this a comparative assessment report [3] was published documenting the findings from the CA process.

The consultees included:

- Scottish Fishermen's Federation (SFF)
- HSE
- Joint Nature Conservation Committee (JNCC)
- North Sea Transition Authority (NSTA)
- Scottish Environment Protection Authority (SEPA)
- TAQA International BV
- Shell
- OPRED Offshore Decommissioning Unit (ODU; Observer)

Given that Hudson is one of the NNS subsea fields, the recommendations from this CA have been applied to Hudson [3].

This Decommissioning Programme is still to be considered by the stakeholders. Following completion of the formal Decommissioning Programme consultation process, TAQA will complete Table 5.1 with comments received from stakeholders, and the company's responses.

Table 5-1: Summary of Stakeholder Comments
UK

Stakeholder	Comment	Response
Statutory Consultees		
The National Federation of Fishermen's Organisations (NFFO)		
SFF		
Northern Irish Fish Producers' Organisation (NIFPO)		
Global Marine Systems Limited (GMS)		
NSTA		
Other Stakeholders		
Public		

6 Programme Management

6.1 Project Management and Verification

TAQA, on behalf of the Section 29 Notice Holders, has appointed a project management team to manage the planning and execution of this decommissioning programme. The team will ensure that decommissioning is conducted in accordance with TAQA health, environmental and safety management principles, and relevant legislation. TAQA's management principles will govern operational controls, hazard identification and risk management. The work will be coordinated with due regard to interfaces with other operators' oil and gas assets and with other users of the sea.

TAQA will control and manage the progress of all permits, licences, authorisations, notices, consents, and consultations required. Any significant changes to the decommissioning programmes will be discussed and agreed with OPRED.

6.2 Post-decommissioning Debris Clearance and Verification

A post-decommissioning site survey will be carried out within a 500m radius of the Hudson subsea installations sites and along corridors defined as 50 m either side of each pipeline route. Any oilfield-related seabed debris that is found will be recovered and returned to shore for recycling or appropriate disposal.

Independent verification of the state of the seabed will be obtained by non-intrusive methods, e.g., side-scan SONAR, in the first instance, or trawling within the area around the Hudson facilities as appropriate. Following verification, TAQA will issue a statement of clearance to all relevant governmental departments and non-governmental organisations.

The post-decommissioning survey results will be notified to the UK Fisheries Offshore Oil and Gas Legacy Trust Fund Ltd for inclusion in their FishSAFE system, and to the United Kingdom Hydrographic Office for notification and marking on Admiralty charts and notices to mariners.

6.3 Schedule

The main milestones in the Hudson decommissioning process were, or are anticipated to be:

- Hudson cessation of production: Q1 2024
- Well P&A window: 2025 – 2030
- Hudson subsea installation & pipeline removal: 2025 – 2030[1]
- Post removal survey: 2029 – 2030
- Riser removal: TBC[2]

The envisaged Hudson decommissioning programme is illustrated in Figure 6.1

[1] During the subsea removal window, a risk based monitoring and inspection strategy will be adopted for all pipelines. Time between surveys would not be expected to exceed 5 to 7 years interval.
[2] The Hudson pipeline and umbilical risers are attached to the Tern jacket and will be decommissioned at a later date, during jacket decommissioning.

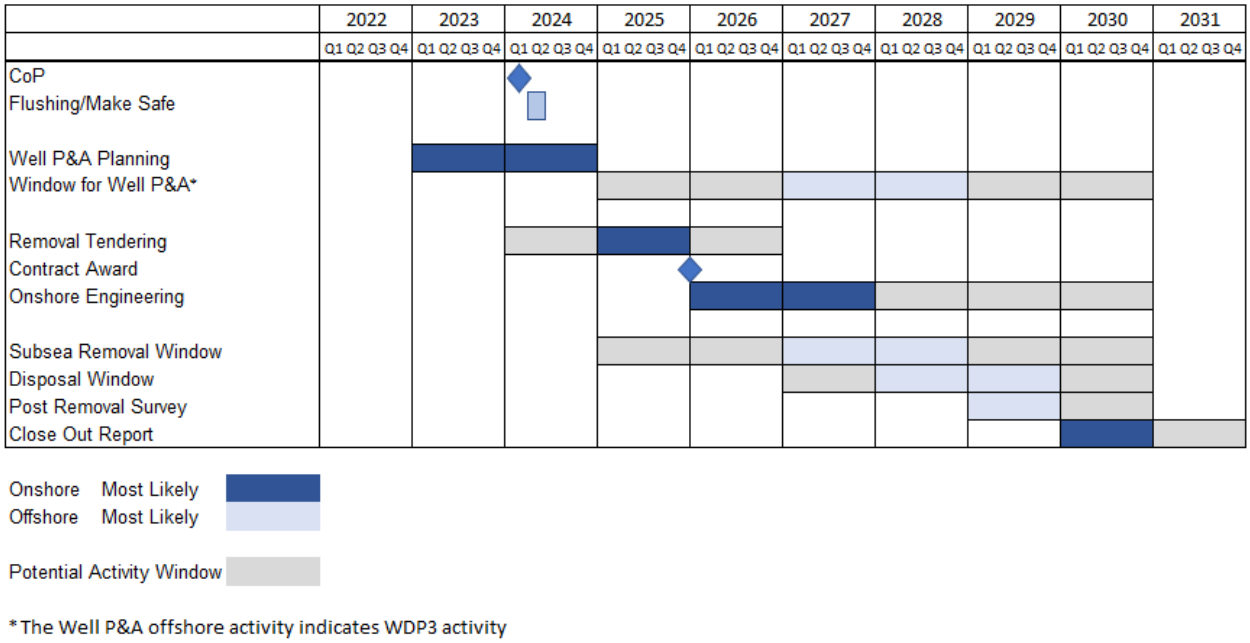

Figure 6.1: Hudson Decommissioning Schedule

6.4 Costs

An overall cost estimate following Offshore Energies UK Guidelines on Decommissioning Cost Estimation (Issue 3, October 2013) will be provided to OPRED in confidence.

Table 6-1: Provisional Decommissioning Costs

Item	Estimated Cost (£MM)
WBS 1 - Project Management	-
WBS 2 - Post CoP Operational Expenditure (OPEX)	-
WBS 3 - Well Abandonment	-
WBS 4 - Pipelines Cleaning	-
WBS 5 – Subsea Infrastructure Removal	-
WBS 6 – Onshore Recycling	-
WBS 7 – Site remediation	-
WBS 8 - Monitoring	-

6.5 Close Out

A close out report will be submitted to OPRED and posted on the TAQA decommissioning website detailing any variations from the Decommissioning Programme within twelve months of the completion of the offshore decommissioning scopes and disposal, including debris removal, verification of seabed clearance (where applicable) and the first post-decommissioning environmental survey.

6.6 Post-Decommissioning Monitoring and Evaluations

TAQA will carry out a post-decommissioning environmental seabed survey, centred around the sites of the Hudson facilities.

All Hudson sites will be the subject of surveys when decommissioning activity has concluded. A survey of the condition of these areas and the adjacent seabed will also be undertaken at the end of the removal activities. The facilities that are proposed to be left in place, e.g., buried pipelines will be subject to a monitoring programme to be agreed between TAQA and OPRED.

A copy of the survey results will be forwarded to OPRED. After the survey results have been sent to OPRED and reviewed, a post decommissioning survey regime will be agreed between TAQA and OPRED taking account of ongoing liability, the findings of previous surveys, and a risk-based approach to the frequency and scope of subsequent surveys.

6.7 Management of Residual Liability

Any equipment that is left in place will remain the responsibility of the Hudson S29 notice holders.

TAQA recognises that the parties to the programmes will continue to retain residual liability for any infrastructure left in place.

TAQA will engage with OPRED on all future legacy and liability matters and requirements relating to the infrastructure left in place.

7 Supporting Documents

[1] Guidance Notes Decommissioning of Offshore Oil and Gas Installations and Pipelines November 2018, BEIS

[2] Well Decommissioning Guidelines, OEUK, 2022

[3] Comparative Assessment Northern North Sea Subsea Assets, Xodus Group, 77IFS-154925-L99-0006-05, Revision A04, July 2024

[4] Tern Area Environmental Appraisal, Xodus Group, 77IFS-188133-H99-0001-06, Revision A04, July 2024

[5] OSPAR,2006. Implementation Report on Recommendation 2006/5 on a Management Regime for Offshore Cutting Piles

[6] Tern Upper Jacket Decommissioning Programme, TB-TEADEC01-X-AD-0002-000, Revision A1, April 2023

[7] NorOG (NORSK) Oil & Gas or OLF., 2016. Guidance Document for Characterization of Offshore Drill Cuttings Piles.33p.

[8] UKOOA, 2001. An Analysis of U.K. Offshore Oil and Gas Environmental Surveys 1975-95.

8 Section 29 Holders' Letters of Support

Letters of Support will be obtained from the Section 29 Holders on final approval of the Decommissioning Programme, in advance of CoP and full field decommissioning, and will be provided within this section of the Programme.

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