TERN AREA
CLADHAN SUBSEA FACILITIES DECOMMISSIONING PROGRAMMES

March 2025 – Consultation Draft
77IFS-188861-H99-0001-000

DOCUMENT CONTROL

Approvals

	Name	Date
Prepared by	Louisa Dunn Decommissioning Stakeholder & Compliance Lead Gosia Baranowska and Lilla Onodi Xodus Group	March 2025
Reviewed by	Louisa Dunn Decommissioning Stakeholder & Compliance Lead Chris Wick NNS Decommissioning Programme Manager	March 2025
Approved by	David Wilson Decommissioning Director	March 2025

Revision Control

Revision No	Reference	Changes/Comments	Issue Date
1	First Draft		December 2022
2	Pre-Consultation Draft	OPRED comments incorporated	September 2023
3	Consultation Draft	OPRED comments incorporated	February 2025
4	Consultation Draft	Issued for Consultation	March 2025

Distribution List

Name	Company
Robert Willison	Offshore Petroleum Regulator for Environment and Decommissioning (OPRED)

TABLE OF CONTENTS

	Installation	Pipeline
DOCUMENT CONTROL 2		
Approvals 2		
Revision Control 2		
Distribution List 2		
FIGURES 5		
TABLES 5		
ABBREVIATIONS 6		
1 Executive Summary 8		
1.1 Combined Decommissioning Programmes 8	✓	✓
1.2 Requirement for Decommissioning Programmes 8	✓	✓
1.3 Introduction 9	✓	✓
1.4 Overview of Facilities Being Decommissioned 10	✓	✓
1.5 Summary of Proposed Decommissioning Programmes 12	✓	✓
1.6 Field Locations Including Field Layouts and Adjacent Facilities 15	✓	✓
1.7 Industrial Implications 19	✓	✓
2 Description of Items to be Decommissioned 20		
2.1 Subsea Installations 20	✓	
2.2 Pipelines including Stabilisation Features 21		✓
2.3 Wells 25		
2.4 Drill Cuttings Piles 25	✓	✓
2.5 Inventory Estimates 25		
3 Removal and Disposal Methods 28		
3.1 Subsea Installations 28	✓	
3.2 Pipelines 28		✓
3.3 Pipeline Stabilisation Features 30		✓
3.4 Wells 31	✓	✓
3.5 Waste Streams 31		
4 Environmental Appraisal Overview 33	✓	✓
4.1 Environmental Sensitivities 33	✓	✓
4.2 Potential Environmental Impacts and their Management 36	✓	✓
5 Interested Party Consultations 39		

		Installation	Pipeline
6	Programme Management 40	✓	✓
6.1	Project Management and Verification 40	✓	✓
6.2	Post-decommissioning Debris Clearance and Verification 40	✓	✓
6.3	Schedule 40	✓	✓
6.4	Costs 41	✓	✓
6.5	Close Out 41	✓	✓
6.6	Post-Decommissioning Monitoring and Evaluations 42	✓	✓
6.7	Management of Residual Liability 42	✓	✓
7	Supporting Documents 43	✓	✓
8	Section 29 Holders' Letters of Support 44	✓	✓

FIGURES

Figure 1-1: Cladhan Field Location Within The UKCS 15
Figure 1-2: Cladhan Adjacent Facilities 16
Figure 1-3: Cladhan Facilities Layout 17
Figure 2-1: Subsea Installations Inventory 26
Figure 2-2: Pipelines Inventory 27
Figure 6-1: Cladhan Decommissioning Schedule 41

TABLES

Table 1-1: Installations Being Decommissioned 10
Table 1-2: Cladhan Installation Section 29 Notice Holders 10
Table 1-3: Cladhan Pipelines Being Decommissioned 11
Table 1-4: Cladhan Pipeline Section 29 Notice Holders 11
Table 1-5: Summary of Decommissioning Programme 12
Table 1-6: Adjacent Facilities 18
Table 2-1: Subsea Installations 20
Table 2-2: Pipeline / Flowline / Umbilical Information 21
Table 2-3: Subsea Pipeline / Flowline / Umbilical Stabilisation Features 23
Table 2-4: Well Information 25
Table 2-5: Cladhan Subsea Facilities and Stabilisation Materials Inventory Estimate 26
Table 2-6: Cladhan Pipelines Inventory and Stabilisation Materials Inventory Estimate 27
Table 3-1: Subsea Installations 28
Table 3-2: Pipeline Decommissioning Options 28
Table 3-3: Pipeline / Pipeline Group Decommissioning Options Considered 29
Table 3-4: Outcome of Comparative Assessment 30
Table 3-5: Pipeline Stabilisation Features Disposal Route 31
Table 3-6: Wells Decommissioning Options 31
Table 3-7: Materials and Waste Streams 31
Table 3-8: Inventory Disposition 32
Table 4-1: Environmental Sensitivities 33
Table 4-2: Environmental Impacts and Management 37
Table 5-1: Summary of Stakeholder Comments 39
Table 6-1: Provisional Decommissioning Programme Costs 41

ABBREVIATIONS

Abbreviation	Explanation
AWMP	Active Waste Management Plan
CA	Comparative Assessment
CO_2	Carbon Dioxide
CoP	Cessation of Production
EA	Environmental Appraisal
EUNIS	European Nature Information System
FFS	Fishing Friendly Structure
FPAL	First Point Assessment Limited
FPSO	Floating Production Storage and Offloading (installation)
GBS	Gravity-Based Structure
GMS	Global Marine Systems Limited
HSE	Health and Safety Executive
ICES	International Council for Exploration of the Sea
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
MDAC	Methane-Derived Authigenic Carbonate
ML	Marine Licence
MM	Million
MODU	Mobile Offshore Drilling Unit
NCMPA	Nature Conservation Marine Protected Areas
NFFO	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
P&A	Plug and Abandon
PL	Pipeline (as in pipeline number)
PLU	Umbilical (as in umbilical number)
PMF	Priority Marine Feature
SAC	Special Areas of Conservation
SAM	Subsea Accumulator Module
SCM	Subsea Control Module
SEPA	Scottish Environment Protection Agency
SFF	Scottish Fishermen's Federation
SPA	Special Protection Areas
SSIV	Subsea Isolation Valve
TAQA	TAQA Bratani Limited
Te	Tonnes
TUTU	Topside Umbilical Termination Units

Abbreviation	Explanation
UKCS	United Kingdom Continental Shelf

1 Executive Summary

1.1 Combined Decommissioning Programmes

This document contains two Decommissioning Programmes for the Cladhan Field subsea pipelines 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. The Cladhan Manifold, Cladhan Subsea Isolation Valve (SSIV) Structures, Xmas Trees and wellheads.
2. The Cladhan Field pipelines, and umbilicals: PL3572, PL3572JWP1, PL3572JWP2, PL3573, PL3573JWP1, PL3573JWP2, PL3574, PL3574JWP1, PLU3575, PLU3575JWP1, PLU3575JWP2, PLU3576 and, PLU3577.

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 Cladhan subsea field, and on behalf of the Section 29 Notice Holders (Table 1-2) is applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the Cladhan subsea installations as detailed in Section 1.4 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, as operator of the Cladhan 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 Cladhan subsea 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 twelve-year period, commencing in 2023.

1.3 Introduction

The Cladhan Field straddles Blocks 210/29a and 210/30a in a water depth of approximately 153 m around 91.3 km northeast of the Shetland Isles. The Cladhan Field was discovered in 2008 and first production was achieved in 2015. Cladhan production was exported to Tern and thence to Sullom Voe via the Brent pipeline system. The Cladhan Field has come to the end of its productive life, and TAQA will therefore decommission these facilities. Decommissioning the Cladhan facilities is planned as part of the wider Tern Area overall decommissioning project. TAQA will continue to explore resource and cost saving synergies with the wider project and other operators.

The facilities comprise of:

- The production wells 210/29a-8 (P1) and 210/29a-7z (P2) and water injection well 210/29a-6z (W1) including wellheads and Xmas trees;
- The Cladhan manifold;
- Umbilicals and pipelines connecting the P1, P2 and W1 wells to the manifold. The pipelines and umbilicals are protected by concrete mattresses;
- A 10" production pipeline, 4" gas lift pipeline, 10" water injection pipeline and umbilical connecting the Cladhan manifold and the Tern platform. These lines are trenched and backfilled over most of their length with spot rock placement where required. These pipelines and umbilical run via Blocks 210/25a and 210/25c;
- The SSIV structure at the Tern platform end of the production and gas lift pipelines; and
- The SSIV control umbilical running from the Tern platform to the SSIV structure. The umbilical is fully covered by mattresses.

The Cladhan Field started production in 2015. The Cladhan 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 Cessation of Production (CoP) date for Cladhan and its host platform Tern of no earlier than Q4 2023. The Tern platform and the associated subsea installations, including Cladhan, ceased production in Q1 2024.

The decommissioning programmes contained in this document cover the Cladhan subsea facilities, from the P1, P2 and W1 well locations to the Cladhan pipelines and umbilical risers at the Tern platform. At Tern, if derogation to leave the platform footings in place is granted, the facilities will be removed to a point on the pipelines and umbilicals in close proximity (within approximately 75 m) of the base of the Tern jacket/sub-structure, as this 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 Cladhan pipelines and umbilical 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.

Cladhan 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	Cladhan	**Production Type**	Oil
Water Depth	161 m	**UKCS Block**	210/29a, 210/30a, 210/25a and 210/25c
Distance to Median	56 km	**Distance to UK Coastline**	91.3 km

Subsea Installations		
Number	**Type**	**Total Weight (Te)**
1	Manifold	111
1	SSIV Structure	97.2
3	Wellhead / Xmas tree	213.9

Subsea Wells	
Number	**Type**
2	Oil Production
1	Water Injection

Table 1-2: Cladhan Installation Section 29 Notice Holders

Company	Registration Number	Equity Interest (%)
TAQA Bratani Limited	05975475	100.00
Waldorf CNS (I) Limited	SC278868	0.0
ONE-DYAS UK Limited	03531783	0.0
MOL MAGYAR OLAJ-ES GAZIPARI RESZVENYTARSASAG	HU10625790	0.0
Petrotal Corp.	CA35359NC	0.0
ONE-Dyas B.V.	NL33211110	0.0
TAQA International B.V.	NL34260937	0.0
Waldorf Energy Partners Limited	11957078	0.0

1.4.2 Pipelines

Table 1-3: Cladhan Pipelines Being Decommissioned	
Number of pipelines and umbilicals (Details given in Table 2-3)	13

Table 1-4: Cladhan Pipeline Section 29 Notice Holders

Company	Registration Number	Equity Interest (%)
TAQA Bratani Limited	05975475	100.00
Waldorf CNS (I) Limited	SC278868	0.0
ONE-DYAS UK Limited	03531783	0.0
MOL MAGYAR OLAJ-ES GAZIPARI RESZVENYTARSASAG	HU10625790	0.0
Petrotal Corp.	CA35359NC	0.0
ONE-Dyas B.V.	NL33211110	0.0
TAQA International B.V.	NL34260937	0.0
Waldorf Energy Partners Limited	11957078	0.0

1.5 Summary of Proposed Decommissioning Programmes

The selected decommissioning options for the Cladhan infrastructure are shown in Table 1-5 below.

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 remove all seabed structures and leave a clear seabed
Pipelines, Flowlines and Umbilicals	
All pipelines and umbilicals will be flushed and cleaned to an appropriate standard. TAQA has assessed the likelihood of wax being present in the Cladhan 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; and to remove of areas of spans, exposure, and shallow burial depth (<0.6 m).	There are limited areas of spans / exposure or shallow burial hence removal of these areas is justified. Following pre-decommissioning surveys, where 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. Degradation will occur over a long period within seabed sediment, with no anticipated hazard to other users of the sea.
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 features will be returned to shore for reuse, recycling, or appropriate disposal.	To leave a safe, clear seabed and in compliance with regulatory requirements.

Table 1-5: Summary of Decommissioning Programme	
Proposed Decommissioning Solution	**Reason for Selection**
Wells	
Cladhan wells will be Plugged and Abandoned (Pad) 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, wellheads and the top section of the well conductors to a depth of at least 3 m 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 the Health and Safety Executive (HSE) regulatory requirements.
Drill Cuttings	
There are no drill cuttings in the scope of this decommissioning programme.	
Interdependencies	
Three pipelines (PL3572, PL3573 and PL3574) and two umbilicals (PLU3575 and PLU3577) terminate on the Tern platform. Decommissioning of the Cladhan rigid risers and J tubes attached to the Tern jacket, and the pipelines and umbilicals on the seabed near the Tern platform will be managed in conjunction with Tern Area decommissioning. This will minimise risk, impacts on the environment and use of resources. The upper sections of the rigid risers and J tubes will be cut at 132 m below LAT and will be removed with the Tern upper jacket as described in the Tern Upper Jacket Decommissioning Programme [5]. Please refer to Section 2.2.1 for more details.	

1.6 Field Locations Including Field Layouts and Adjacent Facilities

The location of the Cladhan Field within the UK Continental Shelf (UKCS) and the adjacent facilities are shown in Figure 1-1 and Figure 1-2. The facilities adjacent to Cladhan are listed in Table 1-6. Cladhan lies in a water depth of approximately 153 m around 91.3 km northeast of the Shetland Islands. Figure 1-3 shows the Cladhan facilities layout in more detail. There are three wells at Cladhan within a radius of 45 m around the Cladhan Manifold. 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.

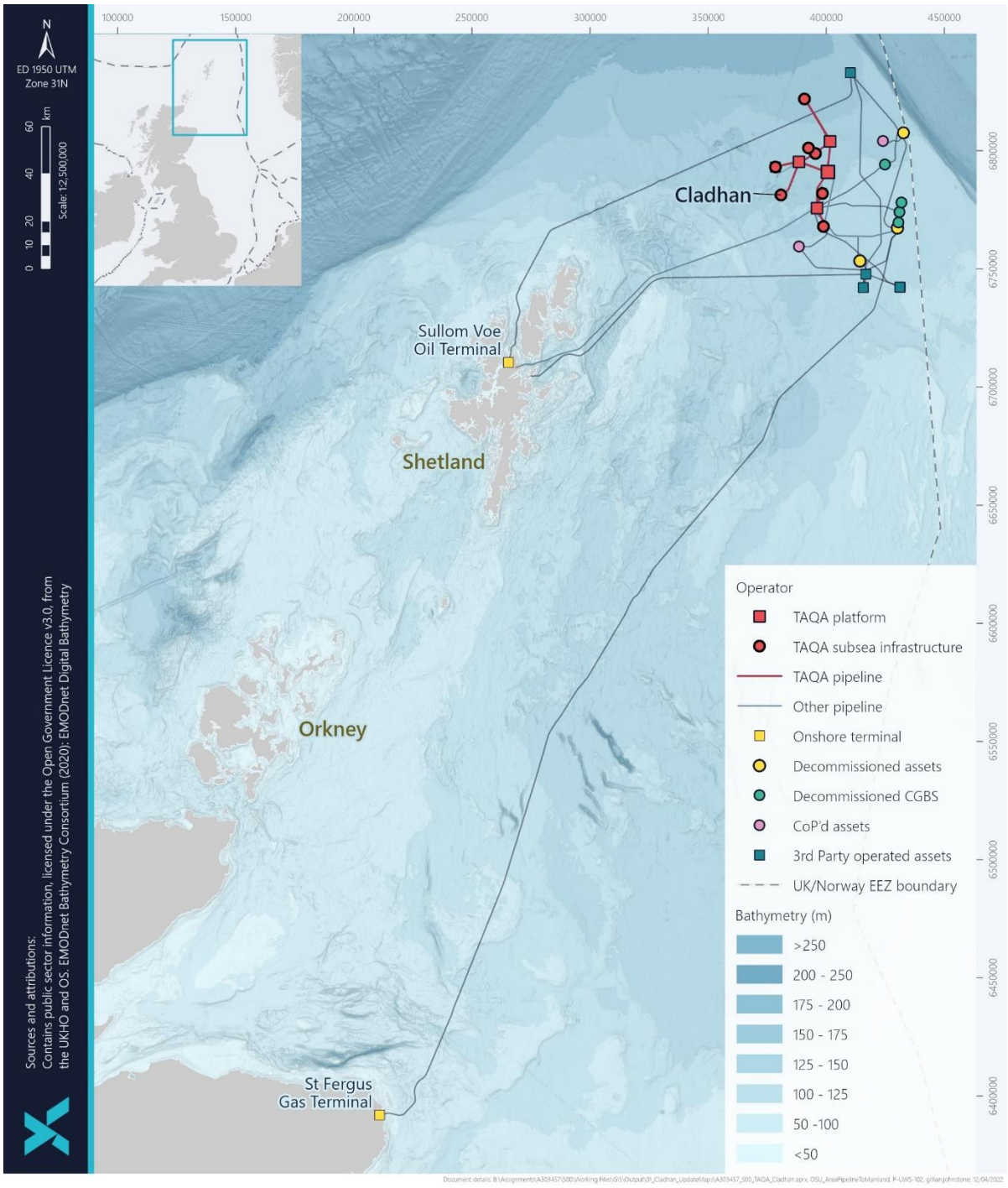

Figure 1-1: Cladhan Field Location Within The UKCS

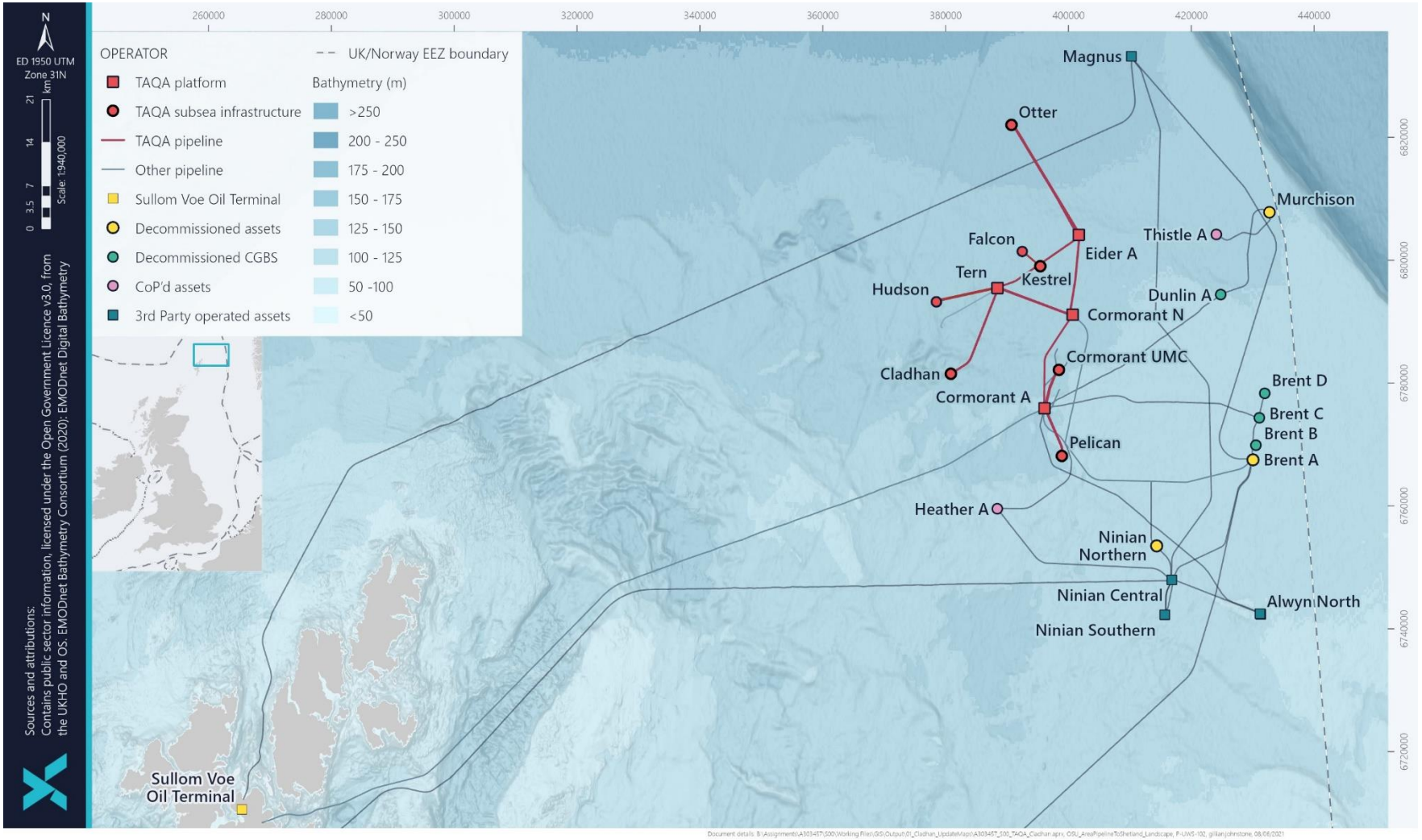

Figure 1-2: Cladhan Adjacent Facilities

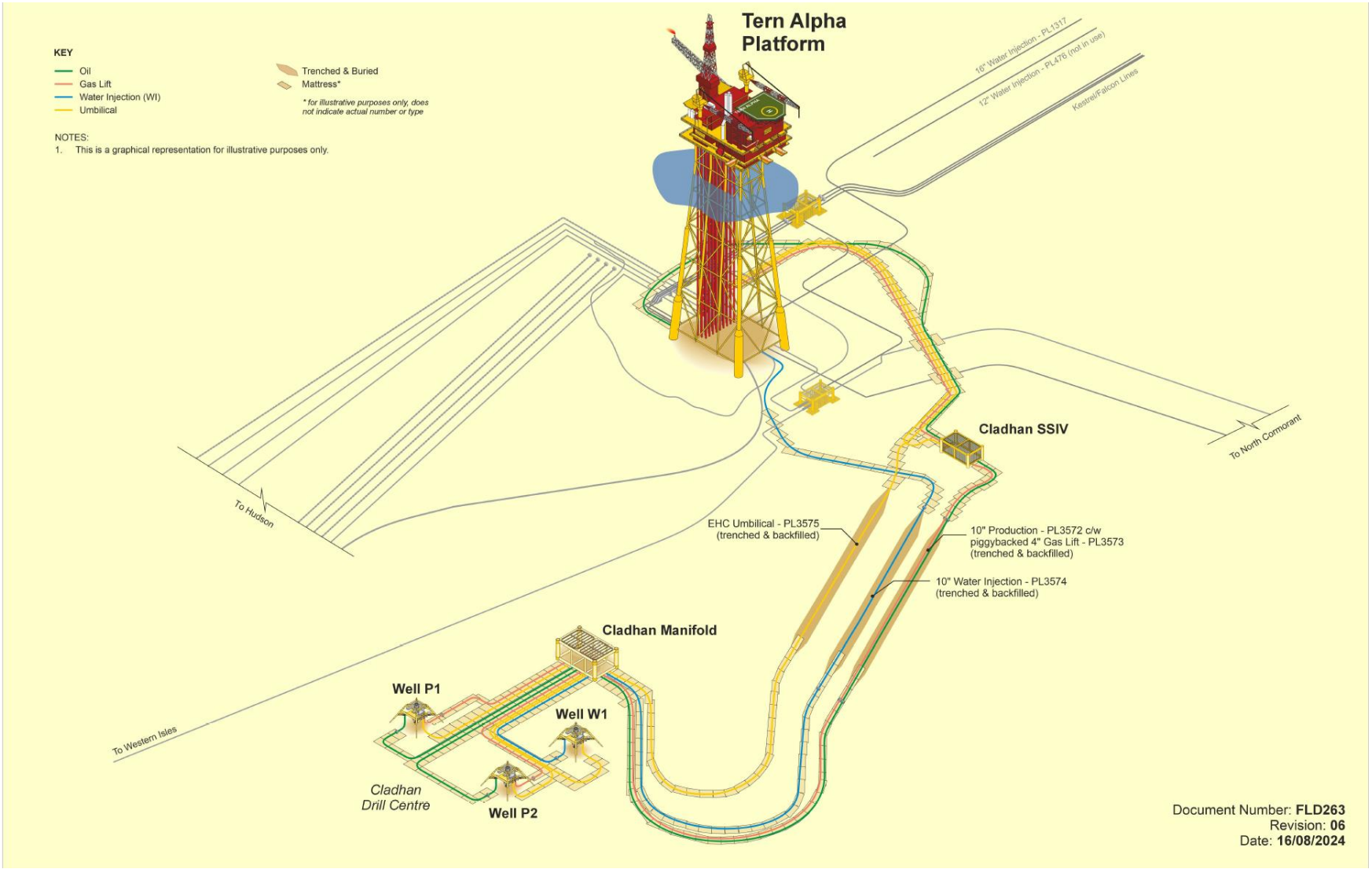

Figure 1-3: Cladhan Facilities Layout

Table 1-6: Adjacent Facilities					
Operator	**Name**	**Type**	**Distance/ Direction from Cladhan**	**Information**	**Status**
TAQA	Tern	Platform	15.6 km North Northeast	Oil and Gas Development	Non-Operational
TAQA	Hudson	Field	12 km North	Oil and Gas Development	Non-Operational
TAQA	Kestrel	Field	22.7 km North Northeast	Oil and Gas Development	Non-Operational
TAQA	Falcon	Field	23.3 km North Northeast	Oil and Gas Development	Non-Operational
TAQA	Cormorant Alpha	Platform	16.1 km East	Oil and Gas Development	Non-Operational
TAQA	North Cormorant	Platform	22 km Northeast	Oil and Gas Development	Non-Operational
TAQA	Eider	Platform	30.8 km Northeast	Oil and Gas Development	Non-Operational
TAQA	Otter	Field	41.6 km North Northeast	Oil and Gas Development	Non-Operational
TAQA	Pelican	Field	22.4 km Southeast	Oil and Gas Development	Non-Operational
TAQA	PL4	Pipeline	From Cormorant Alpha to Sullom Voe (12.2 km Southeast)	Oil Pipeline	Non-Operational
TAQA	Central UMC	Field	17.5 km East	Oil and Gas Development	Non-Operational
Dana Petroleum	PL3186	Pipeline	Crosses beneath Cladhan Water Injection Pipeline PL3574	Gas Export / Import Pipeline	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 Cladhan decommissioning programmes, other than the Tern platform and other subsea fields associated with Tern: Hudson, Falcon, and Kestrel. Decommissioning of Cladhan and Tern are inextricably linked as Tern provided the only export route for Cladhan production via North Cormorant and Cormorant Alpha to the Sullom Voe Terminal. The Cladhan pipelines and umbilical all cross over other existing infrastructure within the Tern 500m zone, including the control jumper between Kestrel SSIV and Cladhan SSIV, control umbilical to Kestrel, gas pipelines from North Cormorant, oil pipeline to North Cormorant and the gas export pipeline from Western Isles. There is currently no impact foreseen to any of the other infrastructure from the removal of Cladhan infrastructure. The removal of these crossings will be managed as part of the execution of Tern Area decommissioning, the mattresses will be removed and returned to shore, and the surface laid lines will be removed.					

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 Cladhan 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 Cladhan 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 Cladhan subsea facilities is presented in Table 2-1. Refer to Figure 1-3 for an illustration of the subsea facilities listed.

Table 2-1: Subsea Installations

Item	Number	Size (m) [LxWxH]	Weight (Te)	Location		Comments / Status
Wellheads / Xmas Trees	3	7.6 x 7.6 x 5.6	71.3	WGS84 Decimal	61.1478 N 00.7853 E	Weight includes P1 wellhead, over-trawlable Xmas tree, Subsea Control Module (SCM) and Subsea Accumulator Module (SAM).
				WGS84 Decimal Minute	61° 08'52.076" 00° 47'07.281"	
		7.6 x 7.6 x 5.6	71.3	WGS84 Decimal	61.1476 N 00.7859 E	Weight includes P2 wellhead, over-trawlable Xmas tree, SCM and SAM.
				WGS84 Decimal Minute	61° 08'51.194" 00° 47'09.237"	
		7.6 x 7.6 x 5.6	71.3	WGS84 Decimal	61.1476 N 00.7861 E	Weight includes W1 wellhead, over-trawlable Xmas tree SCM and SAM.
				WGS84 Decimal Minute	61° 08'51.638" 00° 47'10.074"	
Manifold	1	10 x 6.5 x 4	111.0	WGS84 Decimal	61.1479 N 00.7859 E	The Manifold Structure including piping spools and valves. The Manifold Structure is secured to the seabed by four steel piles which will be cut at -3 m.
				WGS84 Decimal Minute	61° 08'52.592" 00° 47'09.300"	
SSIV Structure	1	13 x 6 x 4	97.2	WGS84 Decimal	61.2741 N 00.9193 E	The SSIV structure is located within the Tern platform 500 m zone. The SSIV structure is a gravity based structure .
				WGS84 Decimal Minute	61° 16'26.934" 00° 55'09.547"	

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 Content
Production Pipeline	PL3572	10”	16.859	Steel	Hydrocarbons	Manifold Tie-In Flange – Tern Platform Production ESDV	Trenched and Buried	Out of Use	Seawater
P1 Production Jumper	PL3572JWP1	6”	0.064	Flexible	Hydrocarbons	Production Well P1 – Manifold Tie-In Flange	Surface Laid	Out of Use	Dyed MEG
P2 Production Jumper	PL3572JWP2	6”	0.077	Flexible	Hydrocarbons	Production Well P2 – Manifold Tie-In Flange	Surface Laid	Out of Use	Dyed MEG
Gas Lift Pipeline[1]	PL3573	4”	16.866	Steel	Lift Gas	Tern Platform Gas Lift ESDV – Manifold Tie-In Flange	Trenched and Buried	Out of Use	Seawater
P1 Gas Lift Jumper	PL3573JWP1	4”	0.038	Flexible	Lift Gas	Manifold Tie-In Flange – Production well P1	Surface Laid	Out of Use	Seawater
P2 Gas Lift Jumper	PL3573JWP2	4”	0.052	Flexible	Lift Gas	Manifold Tie-In Flange – Production well P2	Surface Laid	Out of Use	Seawater
Water Injection Pipeline	PL3574	10”	16.648	Steel	Water	Tern Platform Water Injection Piping – Manifold Tie-In Flange	Trenched and Buried	Out of Use	Seawater

[1] PL3573 is piggybacked to PL3572

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 Content**
W1 Water Injection Jumper	PL3574JWP1	7”	0.048	Flexible	Water	Manifold Tie-In Flange – Water Injection Well W1	Surface Laid	Out of Use	Seawater
Control Umbilical	PLU3575	144 mm	16.844	Umbilical	Chemicals & Power	Tern Platform Cladhan Topside Umbilical Termination Units (TUTU) – Manifold	Trenched and Buried	Out of Use	Seawater
P1 Control Jumper	PLU3575JWP1	N/A	0.067	Umbilical	Chemicals & Power	Manifold – Production Well P1	Surface Laid	Out of Use	Methanol, Wax Inhibitor, Scale Inhibitor, Demulsifier, Hydraulic fluid
P2 Control Jumper	PLU3575JWP2	N/A	0.082	Umbilical	Chemicals & Power	Manifold – Production Well P2	Surface Laid	Out of Use	Methanol, Wax Inhibitor, Scale Inhibitor, Demulsifier, Hydraulic fluid
W1 Control Jumper	PLU3576	N/A	0.079	Flexible	Chemicals & Power	Manifold – Water Injection Well W1	Surface Laid	Out of Use	Hydraulic Fluid
SSIV Control Umbilical	PLU3577	118.1 mm	0.534	Flexible	Electrical, Hydraulic & Chemical	Tern – Cladhan SSIV	Surface Laid, Covered with Mattresses	Out of Use	Hydraulic Fluid, Methanol

Table 2-3: Subsea Pipeline / Flowline / Umbilical Stabilisation Features				
Stabilisation Feature	**Total Number**	**Weight (Te)**	**Locations**	**Exposed/Buried/Condition**
Grout Bags	840	21	From P1 well to Cladhan Manifold	Exposed
Concrete Mattresses	21	98.7 (4.7 Te each)	From P1 well to Cladhan Manifold	Exposed
Grout Bags	840	21	From P2 well to Cladhan Manifold	Exposed
Concrete Mattresses	18	84.6 (4.7 Te each)	From P2 well to Cladhan Manifold	Exposed
Grout Bags	480	12	On PL3572/PL3573 from Cladhan Manifold to full trench depth	Exposed
Concrete Mattresses	55	258.5	On PL3572/PL3573 from Cladhan Manifold to full trench depth	Exposed
Rock		12,000	On PL3572/PL3573 between Cladhan and Tern Platform	Exposed
Grout Bags	560	14	On PL3572/PL3573 from Cladhan SSIV to full trench depth	Exposed
Concrete Mattresses	41	192.7 (4.7 Te each)	On PL3572/PL3573 from Cladhan SSIV to full trench depth	Exposed
Concrete Mattresses	6	37.8 (6.3 Te each)	On PL3572/PL3573/PLU3577 from Cladhan SSIV to full trench depth	Exposed
Grout Bags	680	17	On PL3572/PL3573/PLU3577/PLU3575 from Cladhan SSIV to riser touch down points	Exposed
Concrete Mattresses	87	408.9 (4.7 Te each)	On PL3572/PL3573/PLU3577/PLU3575 from umbilical crossing to riser touch down point	Exposed
Concrete Mattresses	38	178.6 (4.7 Te each)	On PL3572/PL3573/PLU3577/PLU3575 from umbilical crossing to riser touch down point	Exposed

Table 2-3: Subsea Pipeline / Flowline / Umbilical Stabilisation Features				
Stabilisation Feature	**Total Number**	**Weight (Te)**	**Locations**	**Exposed/Buried/Condition**
Grout Bags	200	5	On PL3572/PL3573/PLU3577/PLU3575 adjacent to Cladhan SSIV	Exposed
Concrete Mattresses	63	296.1 (4.7 Te each)	On PL3574	Exposed
Grout Bags	680	17	On PL3574	Exposed
Rock		5,000	On PL3574	
Grout Bags	720	18	On PL3574	Exposed
Concrete Mattresses	54	253.8 (4.7 Te each)	On PL3574	Exposed
Grout Bags	600	15	From W1 well to Cladhan Manifold	Exposed
Concrete Mattresses	36	169.2 (4.7 Te each)	On PLU3575 from umbilical crossing to umbilical full trench depth	Exposed
Rock		5,000	On PLU3575 between Cladhan and Tern Platform	
Grout Bags	520	13	On PLU3575 from Cladhan Manifold to umbilical full trench depth	Exposed
Concrete Mattresses	59	277.3 (4.7 Te each)	On PLU3575 from Cladhan Manifold to umbilical full trench depth	Exposed

The total quantities of pipeline stabilisation features are:

- Mattresses: Total number = 478. Total weight = 2,256 Te
- Grout Bags: Total number = 6,120. Total weight = 153 Te
- Rock Cover: Total weight = 22,000 Te

2.2.1 Pipeline and Umbilical risers

There are three Cladhan pipelines and two umbilicals that terminate at the Tern platform:

- PL3572 10” Production Pipeline
- PL3573 4” Gas Lift Pipeline
- PL3574 10” Water Injection Pipeline
- PLU3575 Umbilical
- PLU3577 SSIV Umbilical

The pipelines run up the side of the Tern jacket as “risers” in a riser J-tube and terminate on the platform topsides. Similarly, the Cladhan umbilicals run up the jacket in a J-tube and terminate on the platform topsides.

The Cladhan pipeline and umbilical risers will be cut at a depth of approximately 132 m below LAT. The sections between the Tern Topsides and this depth will be removed with the Tern Upper Jacket. The remaining sections of the Cladhan risers attached to the Tern footings will be decommissioned as part of the Footings Decommissioning Programme.

2.3 Wells

Table 2-4 lists the well information pertinent to the three 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
210/29a-8	Oil Producer	Shut-In	SS 3-3-3
210/29a-7z	Oil Producer	Shut-In	SS 3-3-3
210/29a-6z	Water Injector	Shut-In	SS 3-3-3

Note: Exploration well 210/30a-4y was removed during a multi operator vessel campaign Q4 2022/Q1 2023.

2.4 Drill Cuttings Piles

There are no drill cuttings piles associated with the Cladhan Field.

2.5 Inventory Estimates

Estimates of the material inventories for the Cladhan installations and pipelines are presented in Table 2-5 and Table 2-6 respectively. These inventories are shown graphically in Figure 2-1 and Figure 2-2.

The anticipated quantities of marine growth associated with the Cladhan facilities are very small as most of the facilities are on the seabed in a water depth of over 100 m. Marine growth may be encountered on the Cladhan risers. However, these will be treated as part of the Tern sub-structure decommissioning.

Table 2-5: Cladhan Subsea Installations and Stabilisation Materials Inventory Estimate		
Material	**Weight (Te)**	**% of Total**
Ferrous (all grades)	412.7	98.0
Non-ferrous	9.5	2.0
Plastics	0.0	0.0
Concrete (mattresses, grout bags)	0.0	0.0
Other non-hazardous (rock)	0.0	0.0
Hazardous – Naturally Occurring Radioactive Material (NORM)	trace	n/a
Hazardous – Residual fluids	trace	n/a
Total	422.2	100.0

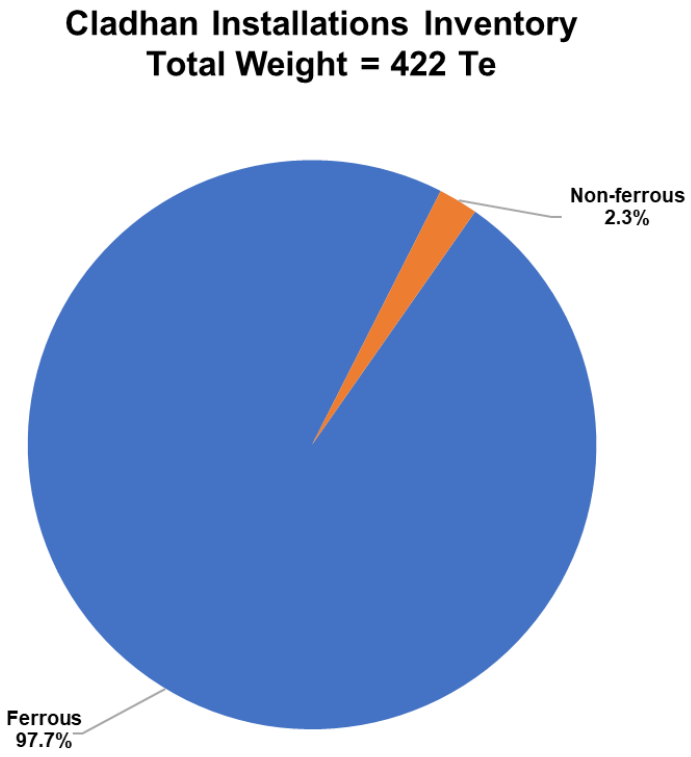

Figure 2-1: Subsea Installations Inventory

Table 2-6: Cladhan Pipelines and Stabilisation Materials Inventory Estimate		
Material	**Weight (Te)**	**% of Total**
Ferrous (all grades)	4,695.2	15.5
Non-ferrous	14.5	<0.1
Plastics	1,108.7	3.7
Concrete (mattresses, grout bags)	2,409.2	8.0
Other non-hazardous (rock)	22,000.0	72.7
Hazardous – NORM	6.4	<0.1
Hazardous – Residual fluids	18.5	0.1
Total	30,252.5	100.0

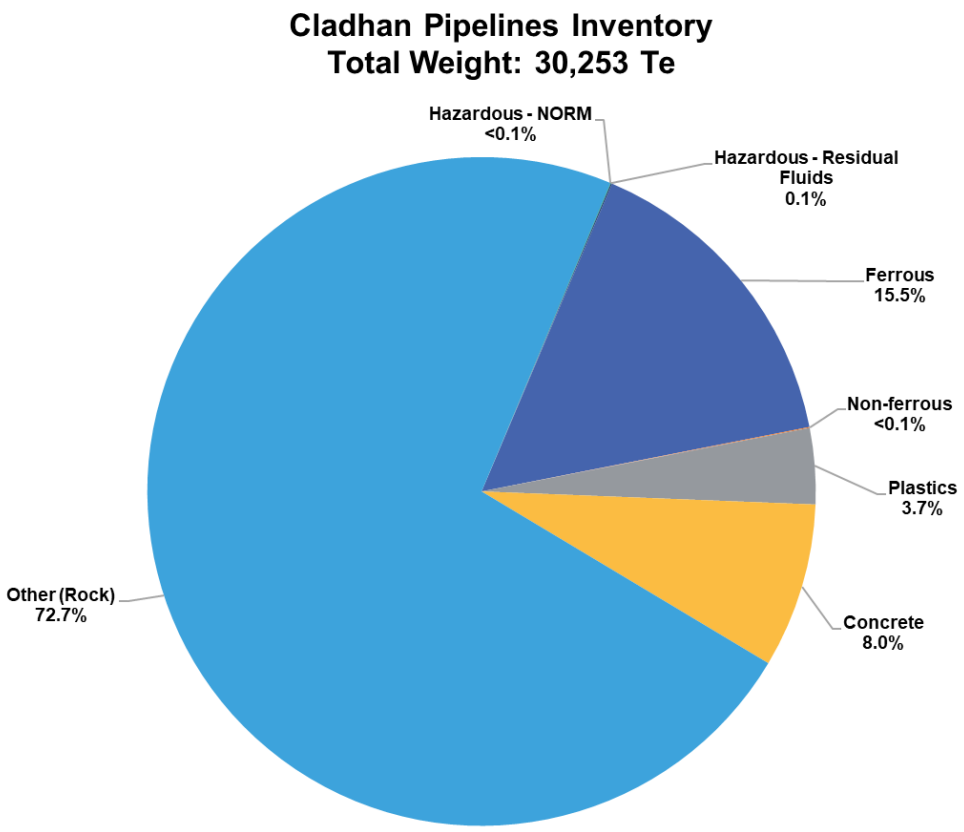

Figure 2-2: Pipelines Inventory

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
Wellhead / Xmas Tree	3	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.
SSIV 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 (Reverse 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: PLU3575	Flexible flowlines and umbilicals trenched and buried with areas of rock cover.	Whole Umbilical	2B, 4A, 4B, 4C, 5
Group 9: PL3572, PL3573, PL3574	Rigid pipelines, trenched and buried.	Whole group	2C, 4A, 4B, 4C, 5
Group 10: PLU3575 Note 1	Flexible Risers and Riser Umbilicals, surface laid	Whole pipeline	Full removal Notes 2 & 3
Group 12: PL3572, PL3573, PL3574, PLU3575Note 1, PLU3576, PLU3577	Spools and jumpers, surface laid	Whole group	Full removal Note 3

Notes:

1. TAQA adopted a comparative assessment methodology that organised the infrastructure into groups with similar characteristics. 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 E.g., PLU3575 includes an umbilical, a riser and umbilical jumpers.
2. The Cladhan pipeline risers, and the umbilical riser sections, will be cut at a depth of approximately 132 m below LAT. The sections between the Tern Topsides and this depth will be removed with the Tern Upper Jacket. The remaining sections of the Cladhan risers attached to the Tern footings will be decommissioned as part of the Footings Decommissioning Programme.
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.

3.2.1 Comparative Assessment Method

TAQA conducted a CA of the decommissioning options for the Cladhan 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 criterion. It is less preferred against the Societal criteria, however this does not offset the preference against the other criteria. If the Economic criteria 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 criterion. 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 criteria is included, the preference for Option 4C remains and hence Option 4C is the emerging recommendation for Group 9.

Note:

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 Note 1	**Number**	**Option**	**Disposal Route**
Concrete Mattresses	440	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	6,120	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	22,000 Te	Ensure over-trawlability and decommission *in situ.*	Decommission *in situ.*

Note:

1. Any stabilisation features associated with crossings will be removed.

3.4 Wells

Table 3-6: Wells Decommissioning Options
The Cladhan Wells, 210/29a-8, 210/29a-7z and 210/29a-6z, will be plugged and abandoned to Phase 3 in alignment with the TAQA 'Well Barrier Standard TUK-11-B-009', and with reference to OEUK Well Decommissioning Guidelines [2]. Operations will be supported by appropriate regulatory applications and submissions.

3.5 Waste Streams

Table 3-7: Materials and Waste Streams	
Materials	**Removal and Disposal Method**
Bulk Liquids	Pipelines and umbilicals will be flushed and cleaned to facilitate abandonment scopes using existing topsides facilities. Discharges offshore 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 PL3572, PL3573, PL3574, PLU3575 and PLU3577 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 Cladhan 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.

Table 3-7: Materials and Waste Streams	
NORM	NORM is assumed to be present within the flowlines. 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.
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 3-8: Inventory Disposition			
	Total Inventory Tonnage (Te)	**Planned Tonnage to Shore (Te)**	**Planned Tonnage Left *In Situ* (Te)**
Subsea Installations	422.2	399.5	22.7
Pipelines / Umbilicals	30,252.5	2,862.1	27,390.4

Total inventory weights noted are approximate and include the P1, P2 and W1 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 Cladhan Field are summarised in Table 4-1 and are based (where relevant) on surveys undertaken at Cladhan and the Tern platform in 2012 and 2019 respectively. 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
Conservation Interests	There are no Nature Conservation Marine Protected Areas (NCMPAs), Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) within 40 km of the Cladhan subsea facility. The closest protected site is the Pobie Bank Reef SAC, approximately 72 km west of the Tern platform. Numerous pockmarks were identified across the wider Tern Area. However, no Methane-Derived Authigenic Carbonate (MDAC) were identified within these pockmarks indicating that these do not qualify as Annex I 'Submarine structures caused by leaking gases' habitat.
Seabed	The water depth within the Cladhan Field ranges from 148 – 170 m LAT. The physical seabed characteristics recorded from survey work show sediments across the Tern Area are mostly sandy, with fine-silty sand reported at the Cladhan Field. Under the European Nature Information System (EUNIS) habitat classification, the predicted broad-scale seabed types around the Cladhan 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 habitat Priority Marine Feature (PMF) "offshore sands and gravels". Hydrocarbon concentrations within the wider area surrounding the Cladhan Field infrastructure are generally within expected background levels for the NNS but increase with proximity to infrastructure. The Cladhan wells were drilled using Water-Based Mud (WBM) and therefore do not have any associated cuttings contamination.
Fish	The Cladhan Field peak spawning for cod occurs between February and March 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 Cladhan 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 Cladhan Field while other species have a lower nursery intensity.
Fisheries	The Cladhan 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 in 2022. Fishing effort is dominated by trawl fishing gears. Annual fishery landings by weight and value are considered low for demersal and low 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 Cladhan Field. The harbour porpoise is by far the most frequently recorded cetacean in the Cladhan 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 Cladhan 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 Cladhan Field is located within or in the vicinity of a wider area of aggregation (or hotspots) 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 Cladhan Field is considered low throughout most of the year, except for January when sensitivity is expected to be extremely high and high May – June.
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.

Table 4-1: Environmental Sensitivities	
Environmental Receptor	**Main Feature**
	The proposed decommissioning operations will be located in a well-developed area for oil and gas extraction. The closest piece of surface infrastructure is the Tern platform, 15.6 km north northeast of the Cladhan Field. Shipping density in the Cladhan Field is very low or low, with a localised increase in vessel activity around Tern platform, due to the presence of operational and maintenance vessels.
Other Users of the Sea	There are no designated military practice and exercise areas and no designated or protected wrecks nearby. The are also no offshore renewable or wind farm activity. The Innovation for Targeted Oil and Gas (INTOG) search and exclusion areas are located within close vicinity of the proposed operations. INTOG area Ne-b is located approximately 15 km south-east of the Tern platform and 22 km south-east of the Cladhan manifold. INTOG area Ne-a is located 27 km north-west of the Tern platform and 32 km north-west of the Cladhan manifold. The only pipeline (other than TAQA pipelines) where a crossing is present is water injection pipeline PL3574, which crosses the Western Isles to Tern Gas line, PL3186, operated by Dana Petroleum. There are no planned or operating telecommunication cables in close vicinity (< 40 km) of the Tern Area.
Atmosphere	The cumulative emissions generated by the activities associated with the decommissioning of the Cladhan Field are small relative to life-time production. Estimated Carbon dioxide (CO_2) emissions to be generated by the selected decommissioning options are 24,350 Te, equating to approx. 0.12 % of total UK Continental Shelf (UKCS) emissions (2023). Most of these emissions are related to offshore operation of vessels (12,553 Te CO_2) and new manufacture to replace recyclable materials (8,419 Te CO_2).

4.2 Potential Environmental Impacts and their Management

The EA [4] process has considered the potential for significant environmental effects as a result of the decommissioning activities described within this Decommissioning Programme. The EA has not identified any significant residual environmental impacts, and it is anticipated that any physical, biological, or socio-economic impact 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 bodies.
Decommissioning surface laid flowlines (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: • 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 bodies.

Table 4-2: Environmental Impacts and Management		
Activity	**Main impacts**	**Management**
Decommissioning buried flowlines (including stabilisation materials)	Seabed disturbance impacts from excavation and removal of subsea installations 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 (ML). • 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 undergo rock placement to ensure they are over-trawlable to active fishing gears. • 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 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)
- OPRED's Offshore Decommissioning Unit (ODU; present as an observer)
- HSE
- Joint Nature Conservation Committee (JNCC)
- North Sea Transition Authority (NSTA)
- Scottish Environment Protection Agency (SEPA)
- Shell
- Fairfield

Furthermore, CA workshop invites were issued to Dana Petroleum, ExxonMobil, Neo Energy, ConocoPhillips, Norske Shell, Chrysaor, MOL Energy UK, ONE-Dyas, NFFO, NIFPO, Global Marine Systems and the Marine Directorate, but these organisations were unable to attend.

Given that Cladhan is one of the NNS subsea fields, the recommendations from this CA have been applied to Cladhan [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 Cladhan 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 Cladhan 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 Cladhan decommissioning process were, or are anticipated to be:

- Cladhan cessation of production: Q1 2024
- Well P&A window: 2025 – 2030
- Cladhan subsea installation & pipeline removal: 2028 – 2032
- Post removal survey: 2032 – 2033
- Riser Removal TBC[1]

The envisaged Tern Area decommissioning programme is illustrated in Figure 6-1.

[1] The Cladhan risers (and riser section of the umbilical) are attached to the Tern jacket and will be decommissioned during jacket decommissioning.

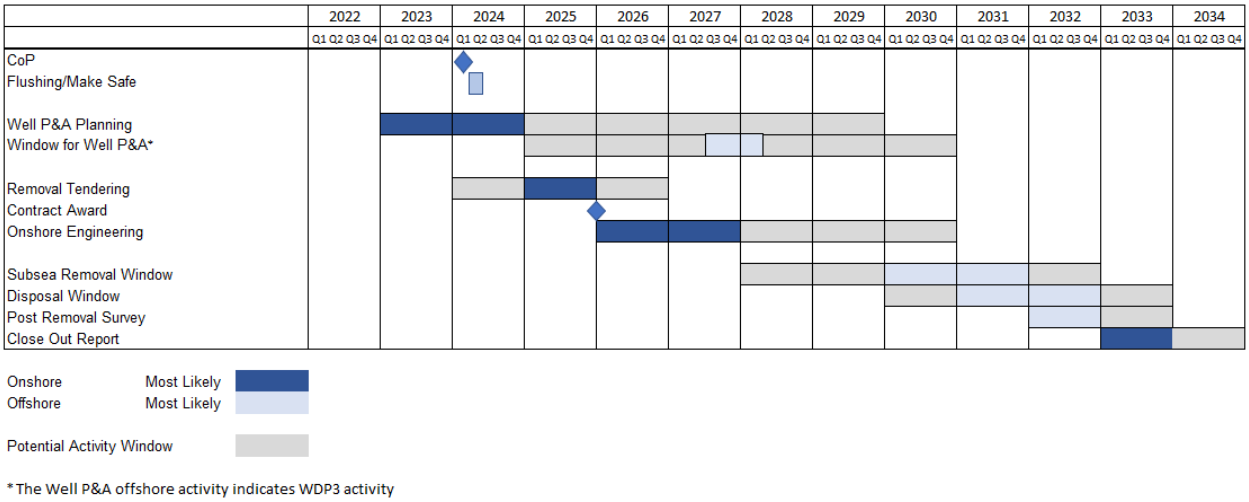

Figure 6-1: Cladhan Decommissioning Schedule

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 Programme Costs

Item	Estimated Cost (£m)
WBS 1 – Operator Project Management	Provided to OPRED in confidence
WBS 2 – Post CoP OPEX	
WBS 3 – Well Abandonment	
WBS 4 – Facilities & Pipelines Permanent Isolation & Cleaning	
WBS 5 – Topsides Preparation	
WBS 6 – Topsides Removal	
WBS 7 – Substructure Removal	
WBS 8 – Onshore Recycling	
WBS 9 – Subsea Infrastructure	
WBS 10 – Site Remediation	
WBS 11 – 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 Cladhan facilities.

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

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.

CONTACT

TAQA Bratani Limited
Brimmond House,
Prime Four Business Park,
Kingswells,
Aberdeen,
AB15 8PU
United Kingdom

Tel: +44 (0)1224 275275