Thames Field

Decommissioning Programmes (Installation & Pipeline) Close Out Report

PUK DOCUMENT No: PER-SNS-DECOM-THA-009

DOCUMENT CONTROL TABLE:

Revision	Reason for Issue	Date	Author	Checked	Approved
V01	Initial Draft	14/03/2024	JHS	WS	
V02	OPRED comments included	06/12/2024	JHS	CF	OF
V03	OPRED comments included	19/06/2025	NM	CF	OF
V04	OPRED comments included. Final version approved.	18/07/2025	NM	CF	OF

Revision History			
V01	Initial Draft	14/03/2024	Initial Draft issued to OPRED for review
V02	2nd Draft	06/12/2024	Address OPRED comments and inclusion of post-decom survey results and proposed monitoring regime.
V03	3rd Draft	19/06/2025	Addressed OPRED comments.
V04	Consultation version	18/07/2025	Addressed OPRED comments. Issued for consultation.

Table of Contents

ABBREVIATIONS & EXPLANATION	
Abbreviation	**Explanation**
“	Inches
AB2/AB3	Abandonment Level 2/3
ADD	Acoustic Deterrent Devices
AL	Action Levels
AP	Thames Processing (and living quarters) Platform
AR	Thames Reception Platform
As	Arsenic
AW	Thames Wellhead Platform
BAC	Background Assessment Concentrations
Bure O	Bure Oscar
Bure W	Bure West
CA	Comparative Assessment
Cd	Cadmium
CEFAS	Centre of Environment Fisheries and Aquaculture Science
CL	Consent to Locate Permit
COP	Cessation of Production
CP	Chemical Permit
Cr	Chromium
CtL	Consent to Locate
Cu	Copper
DECC	Department of Energy & Climate Change
DP	Decommissioning Programme
DSC	Dismantlement Safety Case
DSV	Diving Support Vessel
E	East
EA	Environmental Appraisal
EA	Environment Agency
ERL	Effects Range Low
Ft	Foot
HCS	Hydrocarbon Safe
Hg	Mercury
HLV	Heavy Lift Vessel

ABBREVIATIONS & EXPLANATION	
Abbreviation	**Explanation**
HSEx	Health & Safety Executive
ISQG	Interim Sediment Quality Guideline
IVB	Independent Verification Body
IWOCS	Intervention Workover Control Systems
IWS	International Waste Shipment
JUB	Jack-up barge
Km	Kilometres
L	Litre
m	Metres
MAT	Master Application Template
ML	Marine Licence
MMO	Marine Mammal Observers
MSV	Multi-purpose Support Vessel
N	North
N/A	Not Applicable
NFFO	National Federation of Fishermen's Organisations
Ni	Nickel
NORM	Naturally Occurring Radioactive Material
NSTA	North Sea Transition Authority (formerly OGA)
NUI	Normally Unmanned Installation
OEUK	Offshore Energies UK (formerly OGUK)
OGA	Oil & Gas Authority (now NSTA)
OGUK	Oil & Gas UK (OEUK)
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning (formerly DECC)
OSPAR	Oslo and Paris Convention
OTP	Oil Discharge Permit
P&A	Plug and Abandon (wells)
PAM	Passive Acoustic Monitoring
Pb	Lead
PEL	Probable Effects Levels
PL	Pipeline

ABBREVIATIONS & EXPLANATION	
Abbreviation	**Explanation**
PLA	Pipeline Application (permit)
PLET	Pipeline End Termination
PON	Petroleum Operations Notice
PRA	Production Application (permit)
PSR	Pipeline Safety Regulations
PUK	Perenco UK Limited
PWA	Pipeline Works Authorisation
RIDDOR	Reporting of Incidents, Diseases and Dangerous Occurrences Regulation (to the HSE)
ROV	Remote Operated Vessel
RPS	Radiation Protection Supervisor
SAC	Special Area of Conservation
SAT	Subsidiary Application Template
SZ	Safety Zone
TBC	To be confirmed
Te	Tonnes
TEL	Threshold Effect Levels
TOSK	Tullow Oil SK Ltd
UKHO	United Kingdom Hydrographic Office
WHPS	Wellhead Protection Structure (Protective Cage)
Yare C	Yare Charlie
Zn	Zinc

1.0 SUMMARY

1.1 Summary of Decommissioning Programme

This document is the Close Out Report for the combined Installation and Pipeline Decommissioning Programme ('the Thames Decommissioning Programme' (DP)) for the installations and associated pipelines for the following fields: Thames, Bure West, Bure Oscar (Bure O), Yare Charlie (Yare C), Wensum, and Thurne.

The Thames Field development began in the 1980s, with the first gas from the Thames Field (platform wells) in 1986 and then subsequent NUI and subsea wells tie-ins brought online. The last tie-in was completed in 2008. The Cessation of Production (CoP) date for the Thames platform and associated tie-ins was 14th May 2014.

The Thames complex installation acted as the gathering station for the subsea wells Bure O, Bure West, Gawain, Orwell, Arthur, Yare C, Thurne, Wissey and the Horn and Wren NUI. All gas from the fields was produced through the Thames Field Complex, which consisted of three bridge-linked platforms: the wellhead (AW) platform, the processing and living quarters (AP) platform, and the reception platform (AR). After separation and metering, production was exported through a 24" export pipeline (PL370) to the Perenco gas terminal at Bacton, on the North Norfolk coast.

The Thames field complex was in Block 49/28 of the Southern North Sea, 80km Northeast of the Bacton Terminal off the Norfolk coast. The coordinates of the Thames AP Platform were Latitude: 53° 05' 02.2214" N, Longitude: 02° 32' 53.4770" E (see Figure 1.1).

The Thames Installation DP covers the Thames field Complex (AP, AW, and AR platforms), and the Bure O, Bure West, Yare C, and Thurne subsea installations. The remaining installations that were tied back to the Thames Complex (i.e., Gawain, Arthur, Orwell, Wissey, Horne, and Wren NUI) are covered under different, separate DPs.

The Thames Pipeline DP covers: Bure 'O' PL371/PL373, Yare 'C' PL372/PL374, Bure West PL1635/PL1636, and Deben PL1637/PL1638. PUK were formerly the pipeline operator of the Thames field complex export line PL370. However, the PL370 pipeline was sold to IOG Infrastructure Limited for re-use for the Blythe field development in 2018; the export pipeline was therefore removed from the Thames Pipeline DP scope.

Perenco UK Limited (PUK) is the Thames Field Operator. The installations covered under the Thames DP are owned by PUK (23.33%), Tullow Oil SK Limited (TOSK) (66.67%) and Spirit Energy Resources Limited (10%), and the pipelines covered under the DP are owned by PUK (23.33%), TOSK (66.67%) and Spirit Energy Resources Limited (10%).

Following public, stakeholder and regulatory consultation, the Decommissioning Programme was submitted without derogation and in full compliance with the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) Decommissioning Guidelines. The DP was formally approved on 29th October 2015. Since the initial submission, the DP has been formally revised on three separate occasions (see Table 1.1 below). All requests were granted by the regulator.

The Deben field was originally part of the Thames complex and was installed and commissioned in 1998. Gas was exported back to the Thames platform via the Deben wellhead until 1998. In 2007, the Deben wellhead was used for the Thurne field and renamed the Thurne subsea well. The development

comprised one subsea well within a single protective structure, tied back to the Thames platform by the Deben 8" flowline and 5" Deben control umbilical.

The Thurne subsea well 49/28a-20 and the associated plugging and abandonment (P&A) work, including the removal of the subsea wellhead, were excluded from the approved Thames DP in error. The DP was revised in March 2019 to include the well and the Thurne subsea well decommissioning scope. The responsibility for the delivery of the Thurne Subsea Well Decommissioning work scope was transferred from Perenco to TOSK.

Table 1.1 – Decommissioning Programme Approval & Revisions

Decommissioning Programme	DP - Approval Date	DP Revision - Approval Date	Reason for Revision
Thames (includes Thames, Bure, Yare & Thurne fields)	29th October 2015	22nd March 2018	Removal of the PL370 Thames export line from the DP scope.
		18th March 2019	Inclusion of Thurne subsea well 49/28a-20 & Thurne Subsea Well Decommissioning Work, and extension to DP schedule (completion date of offshore operations to Q4 2022 and Close Out Report issued by Q4 2023). Responsibility for the decommissioning of 49/28a-20 transferred to TOSK.
		29th July 2024	Leaving pipeline stabilisation mattresses in-situ within satellite SZs & extension to schedule (Close Out Report to be accepted by end Q4 2024).

The approved decommissioning proposal for the pipelines and umbilical was to leave the pipelines in-situ with natural remediation. Due to significant exposure of the pipelines and umbilical within the former Thames Complex 500m Safety Zone, with approval from the regulators, the pipelines, umbilical and associated stabilisation mattresses within the Thames Complex Safety Zone were remediated with rock placement in 2023.

The Thames Complex DP work has now been completed. This work included the following activities:

- Pre-decommissioning surveys: benthic surveys along flowlines and within all 500m Safety Zones, and pipeline surveys along flowlines to identify exposures/spans.
- P&A of the platform wells to AB3.
- Rendering the installation and pipelines hydrocarbon safe (HCS).
- Removal of the Thames Complex platforms (Topsides and Jackets).
- P&A of the Bure Oscar, Bure West & Yare subsea wells to AB3
- P&A of the Thurne subsea well to AB3 (completed by TOSK).
- Removal of the Bure Oscar, Bure West & Yare subsea structures.
- Removal of the Thurne subsea structure (completed by TOSK).
- Pipelines and umbilicals remediation in the former Thames field 500m Safety Zone (all flowlines including the Deben pipeline).
- Overtrawl survey along the Thames flowlines and within the former Thames field Safety Zone, and obtainment of Clean Seabed Certificate from the National Federation of Fishermen's Organisations (NFFO).

- Overtrawl survey within Bure O, Bure W, Thurne and Yare C Safety Zones and obtainment of Clean Seabed Certificate from the NFFO.
- Post-decommissioning surveys: benthic surveys along flowlines and within all 500m Safety Zones, and pipelines surveys along flowlines to identify exposures/spans.

This Close Out Report summarises the decommissioning activities completed, and the status of the installation and pipelines covered under the Thames DP.

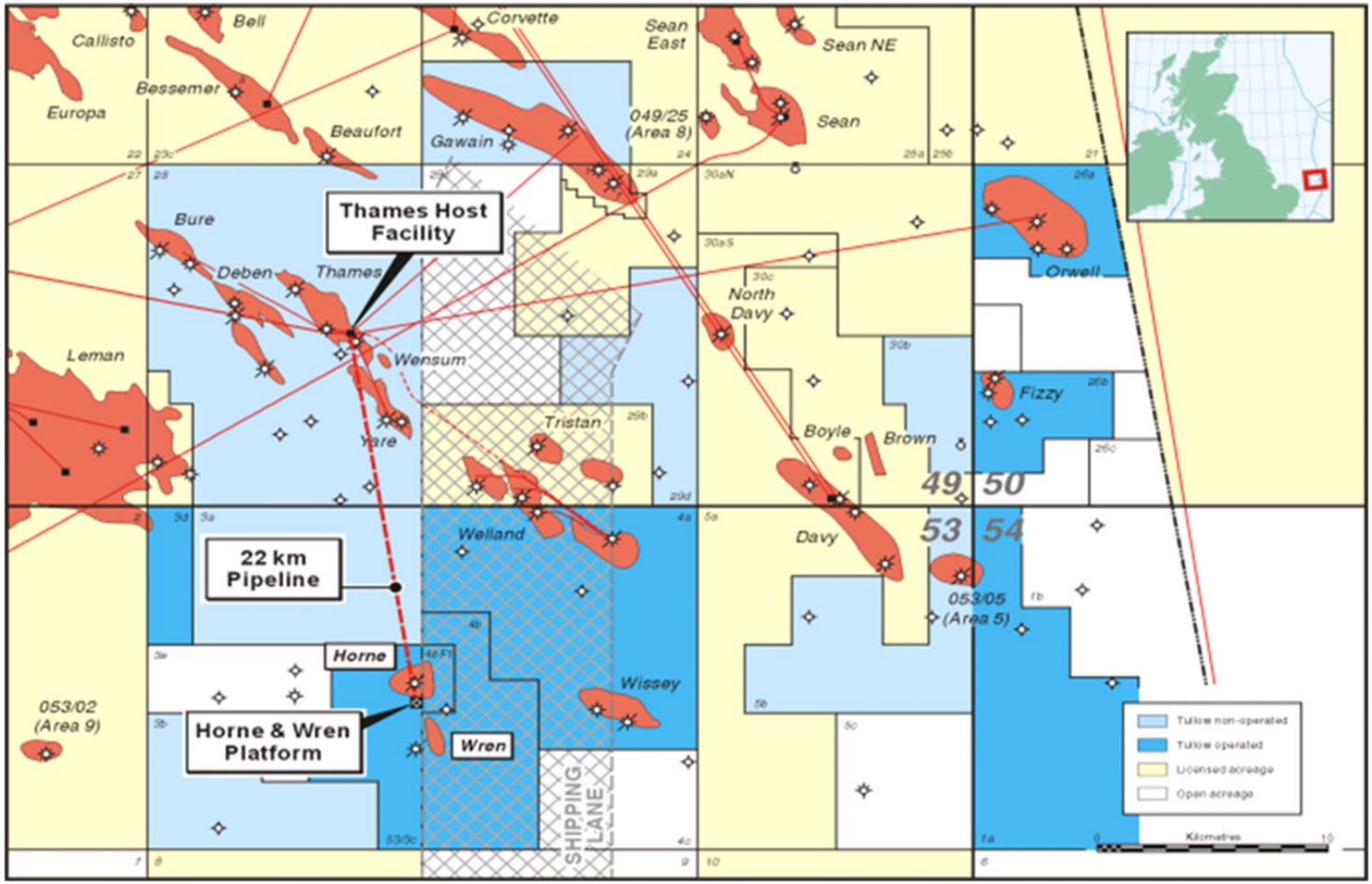

Figure 1.1: Thames Field Location in the Southern North Sea

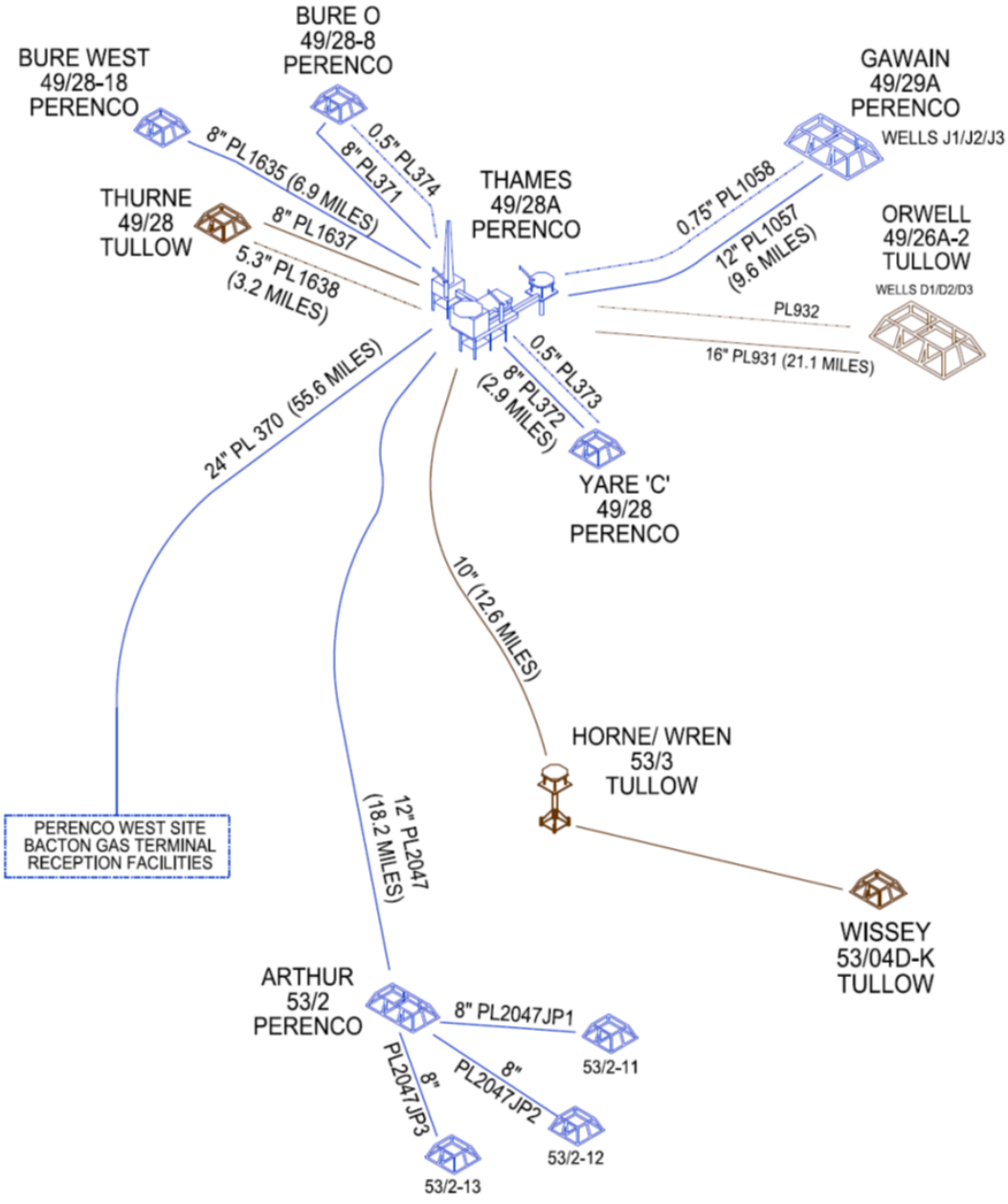

Figure 1.2: Field Layout

Table 1.2: Overview of the Decommissioned Installation(s) in Approved DP		
Installation Type	**Number**	**Weight (Te)**
Steel Platform	3	13,752 Jackets - 4823* Topsides - 8929 **
Subsea Installation Type		
Wellheads (Bure West, Bure O, Yare C, Thames A5 well***, Thurne ****)	4 ****	42 (10.5 per wellhead)
Template (Under AW Jacket)	1	45
Protection Frame (Bure West, Bure O, Yare C, Thurne)	4	360 (90 per frame)

** Jacket weight includes the total weight of the piles @ 2173 Te.*
*** Topsides weight includes the weight of the bridges @ 243 Te.*
**** Thames A5 was a suspended subsea well under the AW jacket.*
***** Thurne wellheads are not within the original DP document, added under DP revision @ 10.5 Te.*

Table 1.3: Overview of the Decommissioned Pipelines & Umbilicals in Approved DP		
Number of Pipeline(s) to be decommissioned	4	PL371, PL372, PL1635, PL1637
Number of Umbilical(s) to be decommissioned	4	PL374, PL373, PL1636, PL1638
Total km of Pipeline(s) & Umbilcal(s) to be decommissioned	56.5km	Flowlines – Total 30.6km Bure 'O' PL371 - 9.3km Yare 'C' PL372 - 4.8km Bure 'W' PL1635- 11.2km Deben PL1637 - 5.3km Umbilical – Total 25.9km Yare 'C' PL374 - 4.8km Bure 'O' PL373 - 9.3km Bure 'W' PL1636 - 6.3km Deben PL1638 - 5.4 km
Total km of Pipeline(s) & Umbilical(s) left in situ	56.5km	PL371, PL372, PL1635, PL1637, PL374, PL373, PL1636, PL1638

Table 1.4: Overview of the Stabilisation Features in Approved DP		
Type	**Number**	**Weight (Te)**
Installation (within Thames 500m Safety Zone)		
Concrete Mattresses	50	506
Grout Bags	31	0.8
Frond Mats	40	456
Rock Placement (13,000 Te)	5	13,000
Pipeline (outside Thames 500m Safety Zone)		
Concrete Mattresses	111	1158
Grout Bags	306	8
Frond Mats	30	208
Rock Placement	0	0

Table 1.5: Overview of the Wells in Approved DP	
Type	**Number**
Platform Wells	5
Subsea Wells	4*

** The original DP included 4 subsea wells; a further wellhead (Thurne) was added under a DP revision*

Table 1.6: Overview of the Drill Cuttings in Approved DP	
Number of Piles & Volume (m^3)	0

Table 1.7: Summary of the Approved Decommissioning Option(s) In the Approved DP	
Type	**Selected Option**
1. Topsides	**Complete removal, re-use or recycle.** Decontaminate and remove the topsides and linking bridges by HLV or a combination of crane vessel and small dismantling piece. Re-use followed by recycling and then landfill will be the prioritised options for the topsides.
2. Jackets	**Complete removal, re-use or recycle.** Jacket legs will be removed and dismantled at an onshore location. Re-use followed by recycling and then landfill will be the prioritised options. Piles will be severed at least -3.0m below the seabed. If any practical difficulties are encountered, PUK will consult with the regulator.
3. Subsea Installation(s)	**Complete removal, re-use or recycle.** Wellhead protection frames will be removed along with the top sections of piles. Piles for wellhead protection structures will be severed below the seabed level at such a depth to ensure that any remains are unlikely to become uncovered. Piles will be severed at least -3.0m below the seabed. If any practical difficulties are encountered PUK will consult with the regulator.
4. Pipelines, Flowlines & Umbilicals	**Inter-field flowlines & umbilicals will be flushed and left buried in-situ.** Inter-field flowlines and umbilicals left in situ, with the cut ends re-buried below the seabed level at such a depth to ensure that any remains are unlikely to become uncovered. Surveys indicate pipelines and umbilicals will remain buried with flooding. Degradation will occur over a long period within seabed sediment and is not expected to represent a hazard to other users of the sea.
5. Stabilisation Features	It is intended that the mattresses should be recovered to shore; however, in the event of practical difficulties OPRED will be consulted and a Comparative Assessment submitted.
6. Platform Wells	Abandoned in accordance with OEUK Guidelines for Decommissioning of Wells.
7. Subsea Wells	Abandoned in accordance with OEUK Guidelines for Decommissioning of Wells.
8. Drill Cuttings	Leave in place to degrade naturally. Cuttings were widely dispersed, falling below OSPAR 2006/5 thresholds.

1.2 Schematic of Installation(s)/Pipeline(s) Being Decommissioned

Figures 1.3(a) - 1.3(e) are schematics of the Thames Complex Installations being decommissioned.

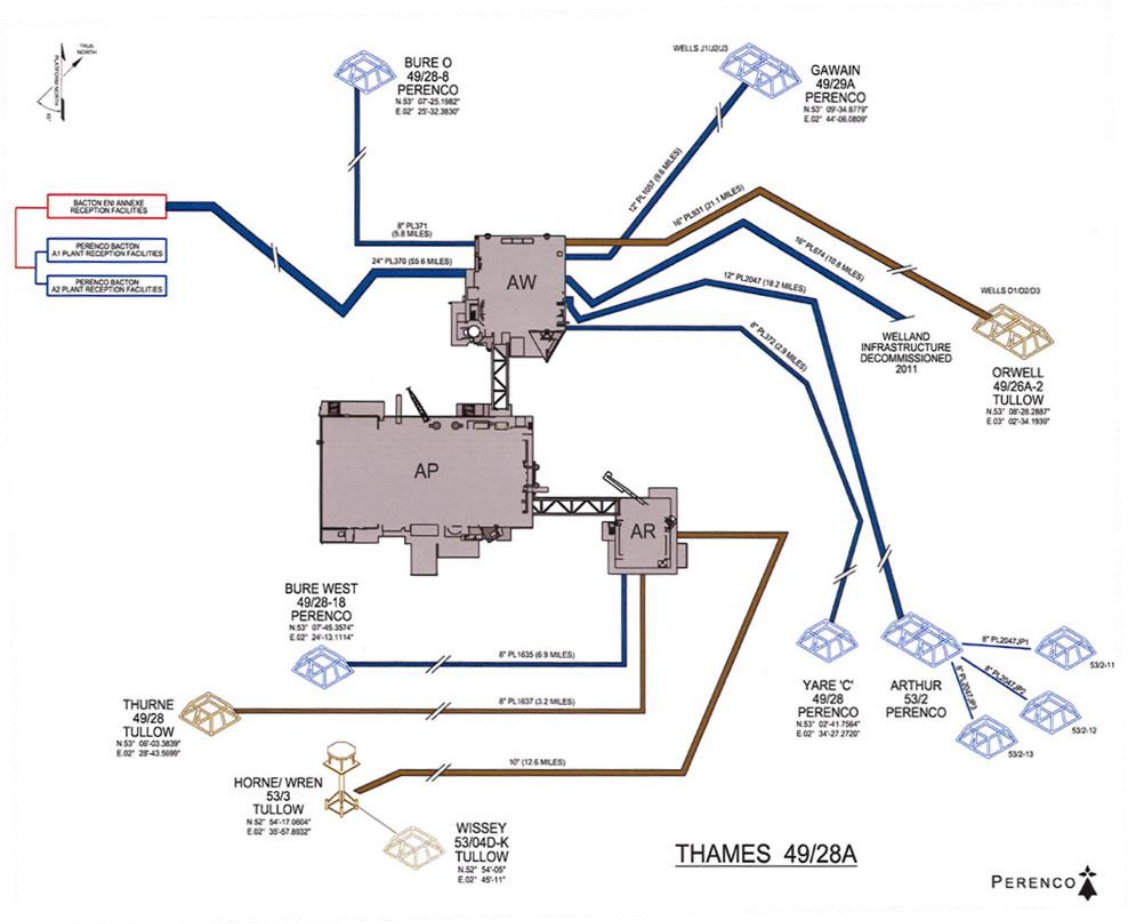

Figure 1.3a: Installation Schematic

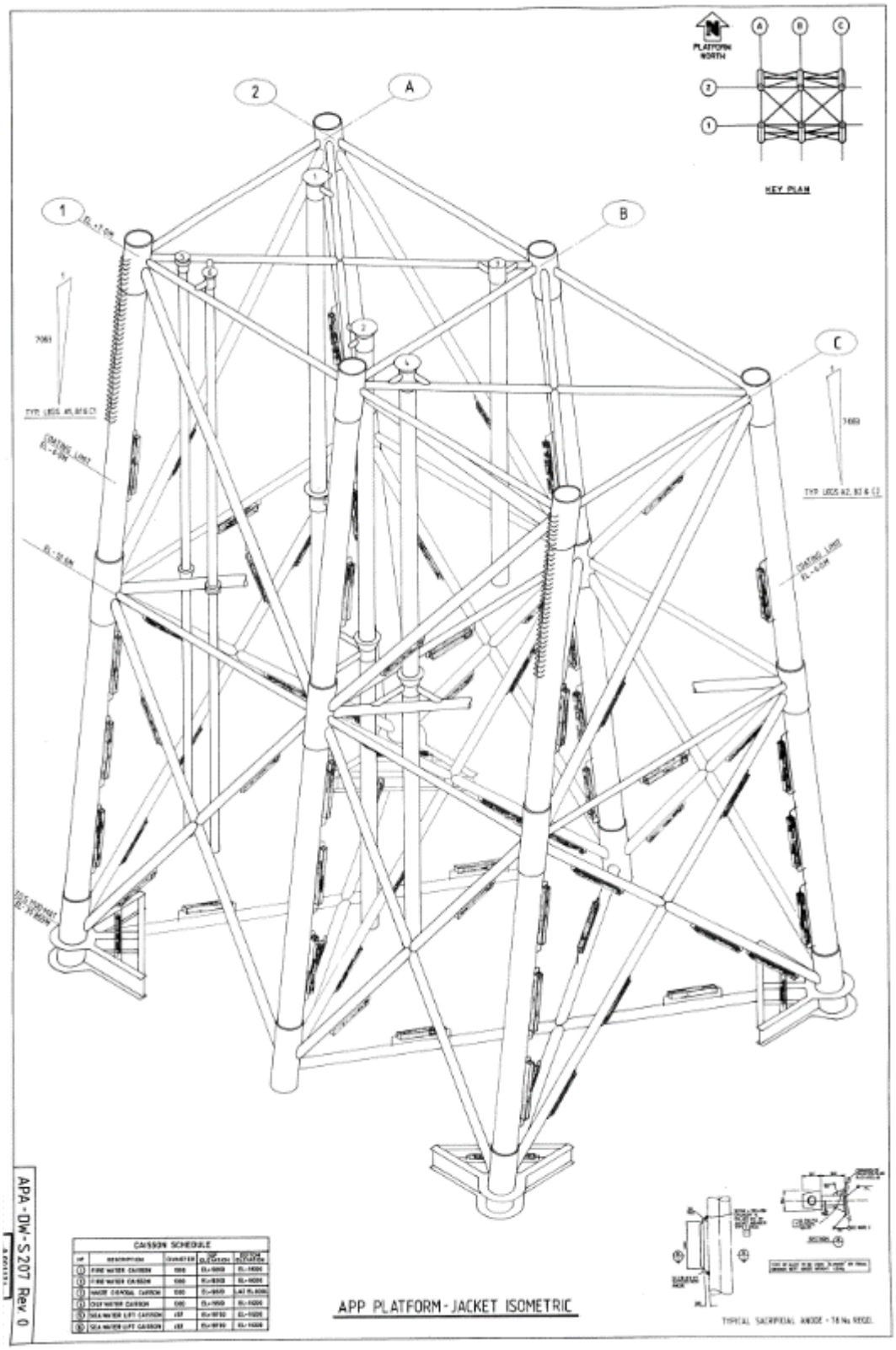

Figure 1.3 (b): Thames AP Jacket

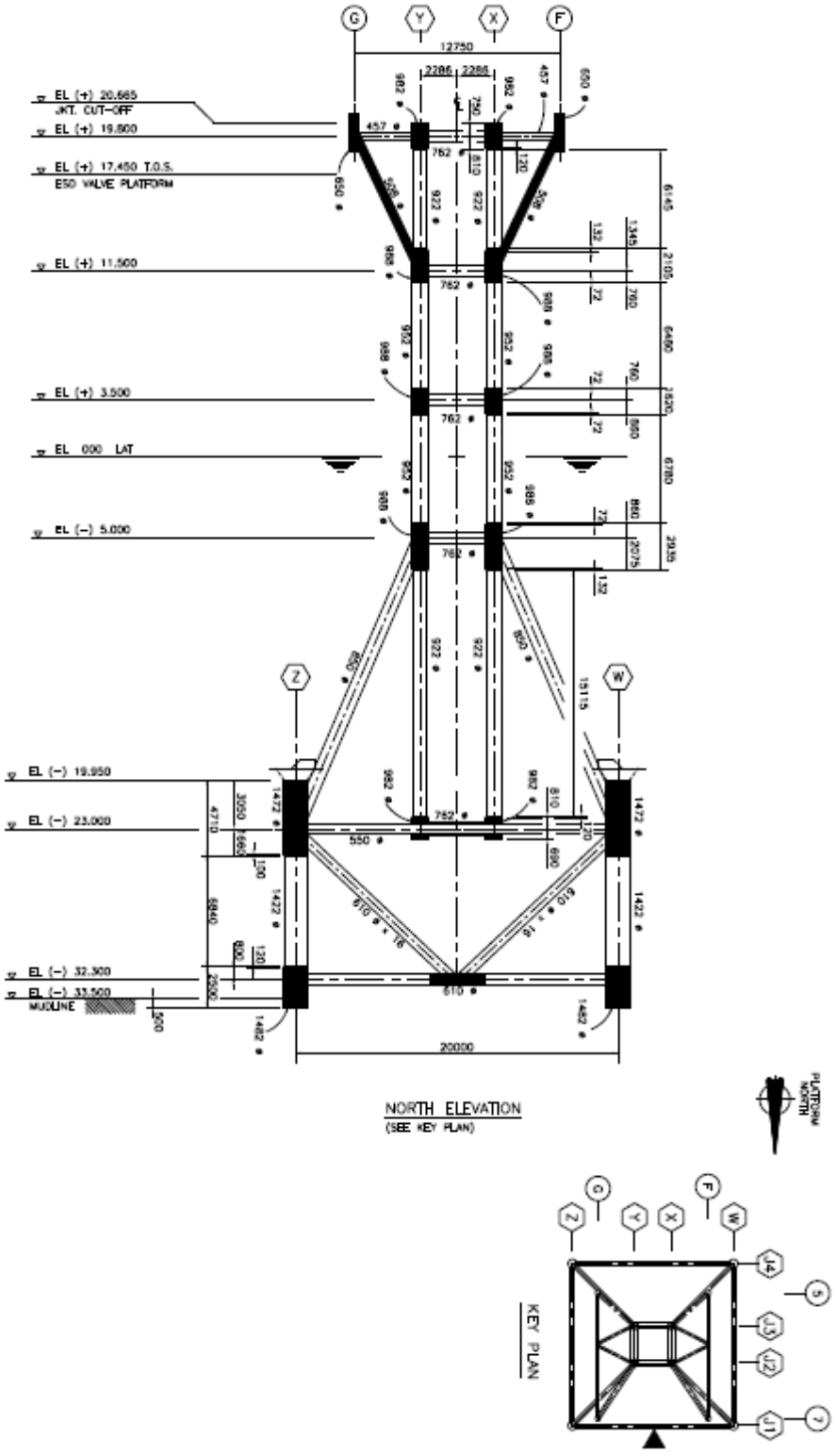

Figure 1.3 (c): Thames AR Jacket drawing

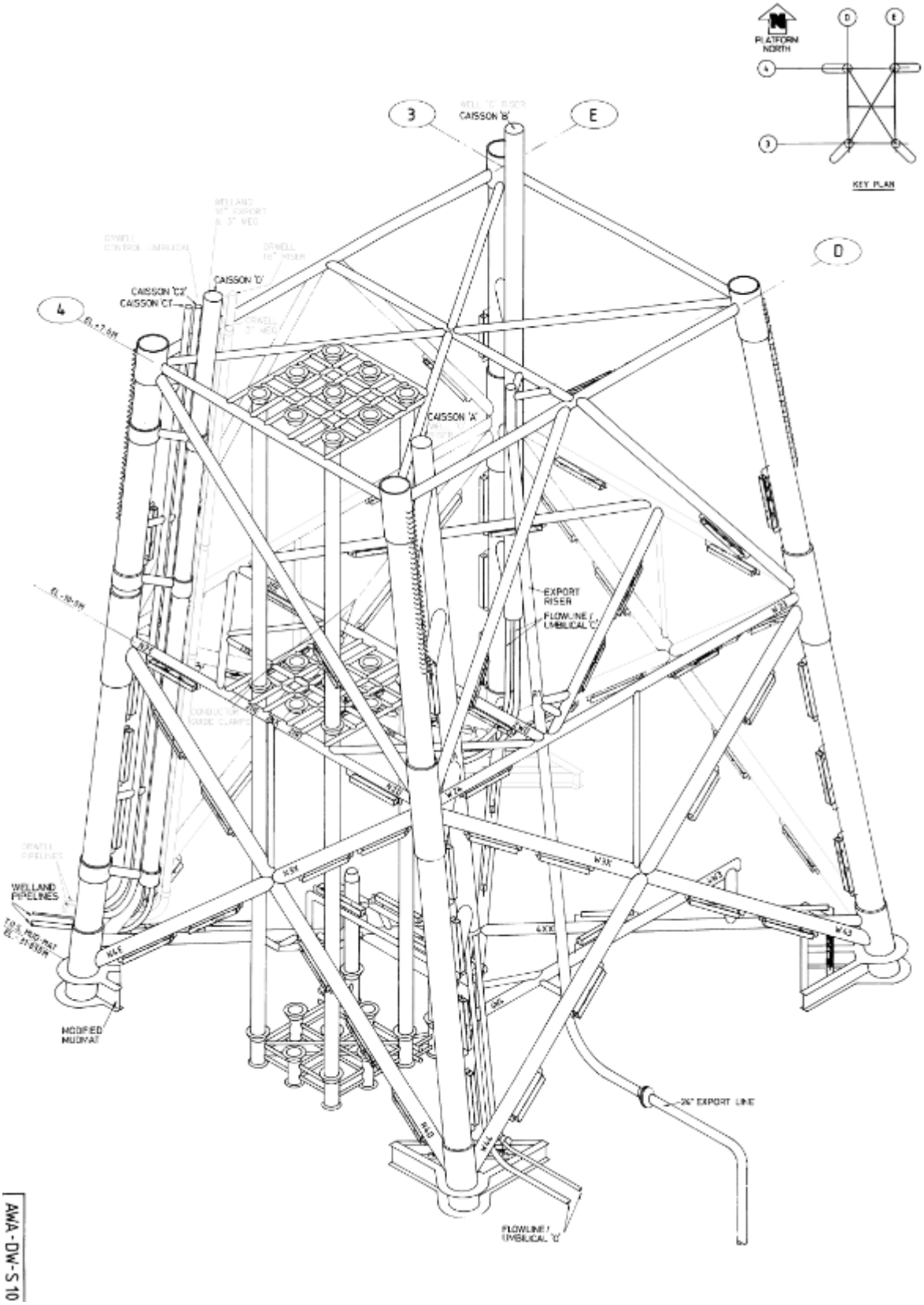

Figure 1.3 (d): Thames AW Jacket Drawing

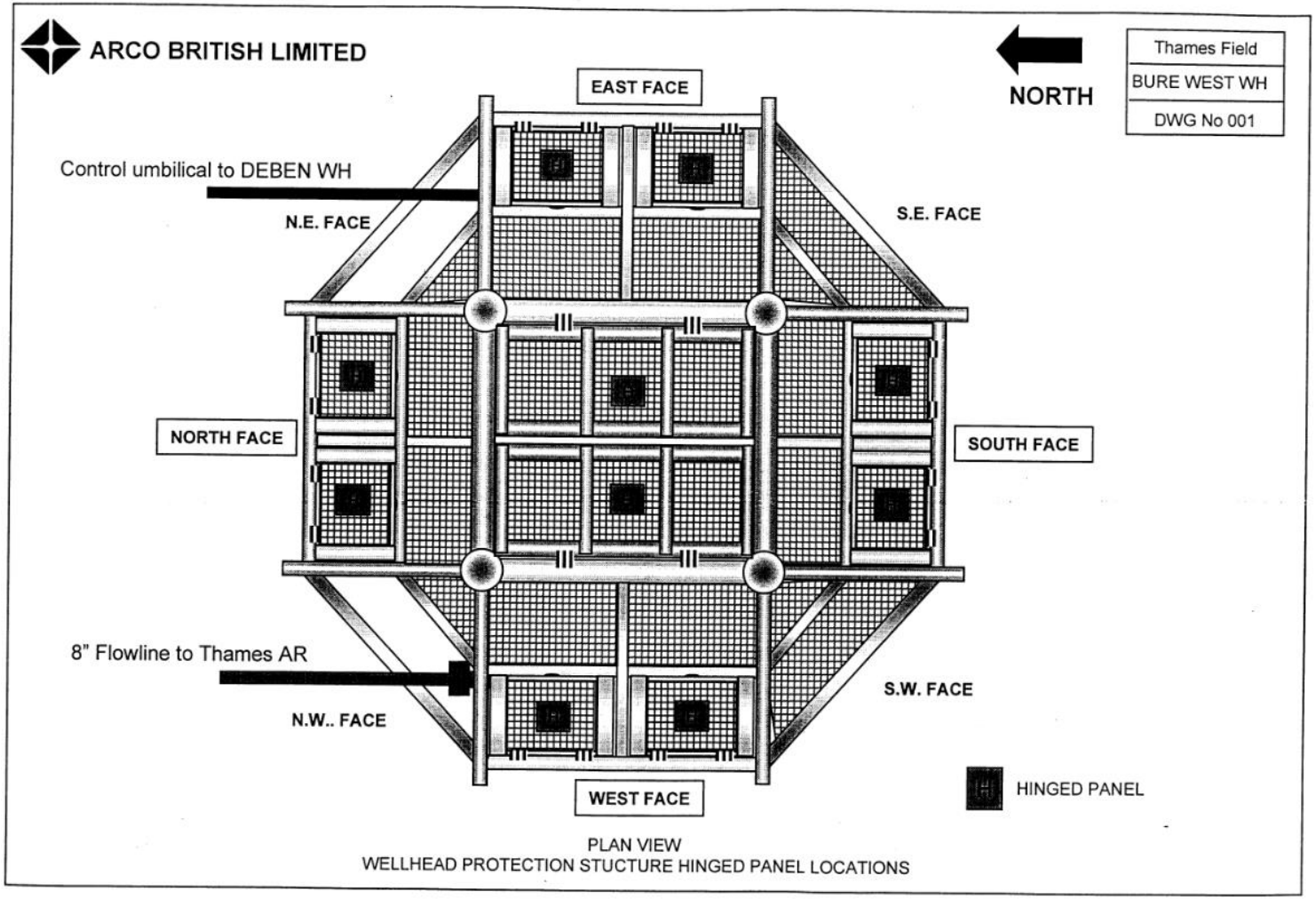

Figure 1.3 (e): WHPS general arrangement

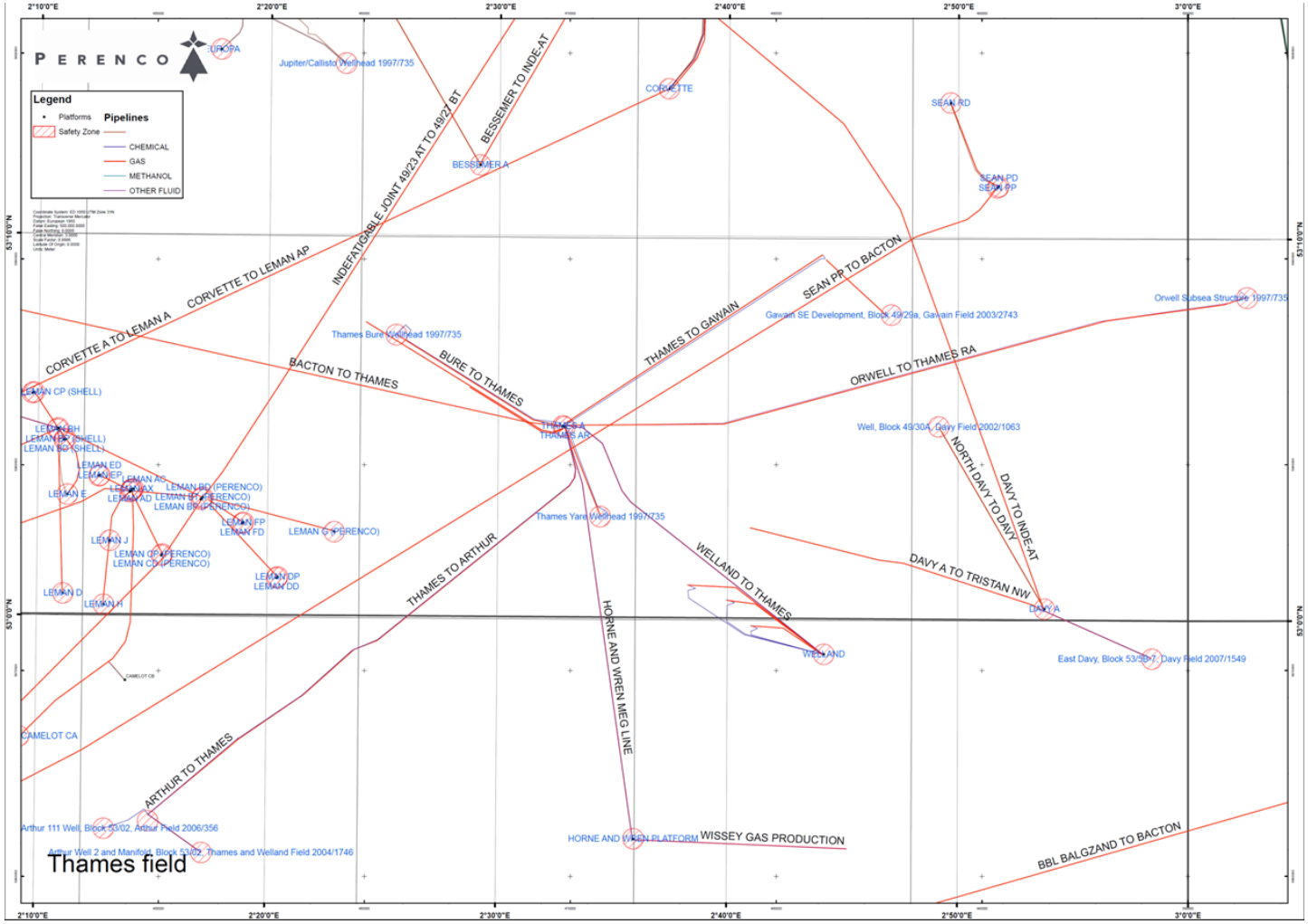

Figure 1.4: Pipeline Schematic

1.3 Project Delivery against the Approved Schedule

The DP was formally approved on the 29th October 2015. Since the initial submission, the DP schedule has been formally revised on three separate occasions (see Table 1.1). All requests were granted by the regulator.

The first revision request was approved on 22nd March 2018. The request was to remove the PL370 Thames export line from the DP scope. The second revision request was approved on 18th March 2019. The request was to extend the completion date of offshore operations to Q4 2022, with the subsequent Close Out Report issued by Q4 2023 and for the addition of Thurne well 49/28a-20. The third revision request was approved on 29th July 2024, which requested an extension to the submission date for the Close Out Report and to change the Decommissioning Solution for the stabilisation materials to “leave in situ”. The report was to be issued and submitted by Q4 2024, see Figure 1.5 below.

There are no outstanding decommissioning activities concerning the approved DP.

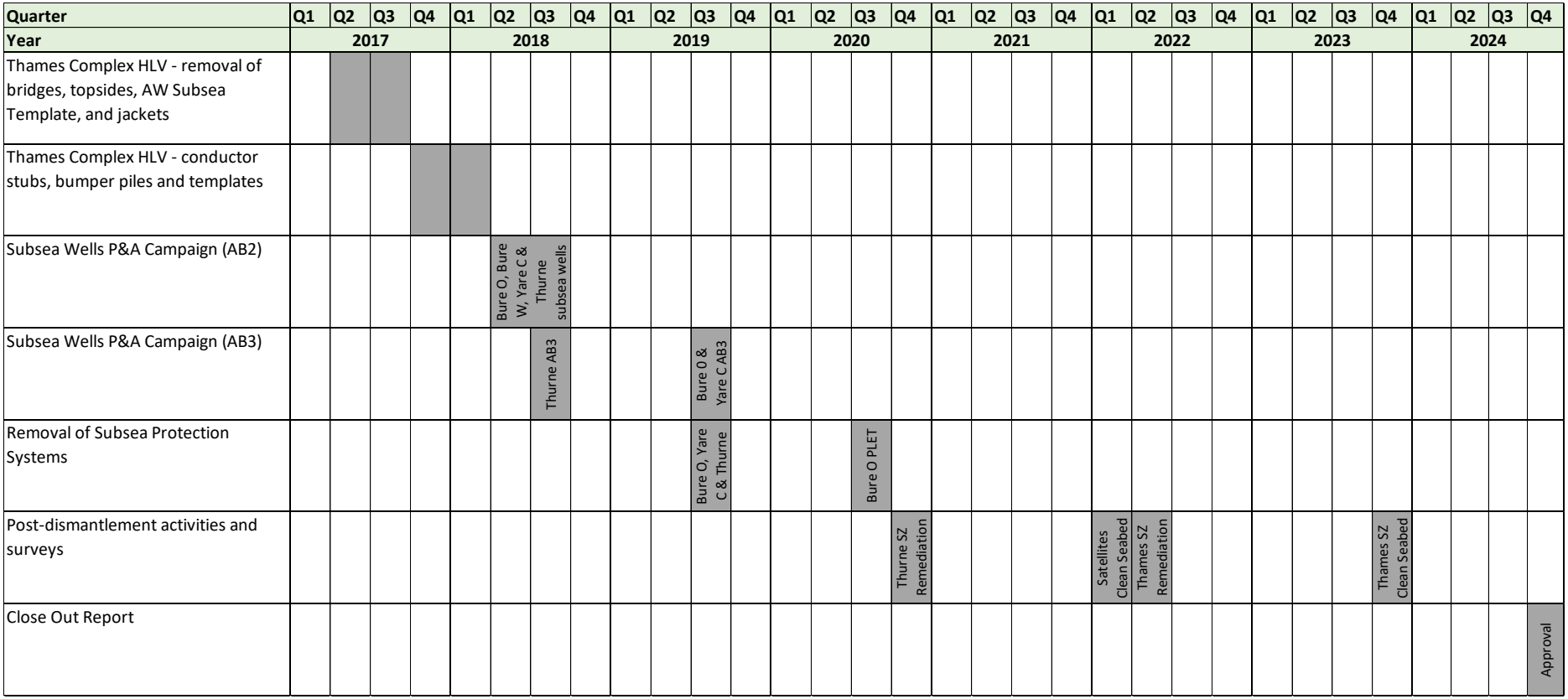

Figure 1.5: Gantt chart

1.4 Associated Decommissioning Approvals

Table 1.8: Associated Decommissioning Approvals	
Thames Field COP	Cessation of Production COP for Thames field accepted by OGA (now NSTA) on 14th May 2014.
Thames Field Decommissioning Programme Approval	Initial DP approved by OPRED (previously DECC) on 29th October 2015. Subsequent revisions were approved in March 2018, March 2019, and July 2024.
Thames Dismantling Safety Case (DSC)	Acceptance of Thames DSC in October 2015.
Consent to Locate (CtL)	Consent to Locate for Thames was relinquished on 10th January 2019, (MAT PRA/67, CL/363-4).
International Waste Permit (IWS)	IWS permits for transportation, onshore dismantlement/recovery at Hoondert yard in the Netherlands: GB 0001 006598 GB 0001 004469.
Pipelines Safety Regulations (PSR) Notification	PSR Notification submitted to HSE on 14th September 2014 for all Thames pipelines and umbilical.
Pipeline Works Authorisation (PWA) variation consent	PWA variations for flushing and topside pipeline cuts for Thames export pipeline, Thames subsea well flowlines. • PWA 1/W/86 - Bure O PL371/PL373 & Yare C PL372/PL374 • PWA 19/W/98 - Bure W PL1635/PL1636 • PWA 20/W/98 - Deben PL1637/PL1638
Marine Licence	Marine Licences for Removal of Thames Installations and Conductors (ML/84/3 and ML/84/4).
	Marine Licence for subsea disconnection of flowlines Thames Pipelines, (MAT PLA/145, ML/53/4).
	Marine Licence for removal of Thurne protection cage (MAT DCA/122, ML/622).
Marine Licence	Marine Licence for rock placement in Thames Safety Zone on flowlines (ML/799/0) as listed in Appendix 10.2.
PWA Deposit Consents	PWA Deposit Consent Variations for rock placement in Thames Safety Zone on flowlines, as listed in Appendix 10.2.
NORM Permit	EA approval of NORM Permit EPR/UB3398DG for removal of NORM waste.
Oil discharge Permit	Oil discharge Permit for subsea disconnection of flowlines Thames Pipelines (MAT PLA/145, OTP/189/4).

Table 1.8: Associated Decommissioning Approvals	
Chemical Permit	Chemical Permit for decommissioning of Thames Complex (MAT PRA/6, CP/68/7).

2.0 DECOMMISSIONING ACTIVITIES

2.1 Contracts Awarded

Table 2.1: Contracts Awarded		
Company	**Contract Award Date (Year)**	**Activity Services & Equipment Provided**
BOSKALIS OFFSHORE SUBSEA SERVICES	2014	Diving and ROV service
CLAXTON ENGINEERING SERVICES LTD	2018	Subsea services
DET NORSKE VERITAS LTD	2015	Marine warranty surveyors
ENVIROCO LIMITED	2015	Waste Management
EPIC INTERNATIONAL LTD	2015	Labour
HALLIBURTON MANUFACTURING AND SCES LTD	2015	Abandonment Plug and cement
JEE LIMITED	2015	Engineering support
MAERSK SUPPLY SERVICE SUBSEA UK LTD	2018	Wellhead removal
N-SEA OFFSHORE LTD	2018	Wellhead removal diving support
OVERDICK GMBH & CO. KG	2014	Consultant engineers
PANGEO SUBSEA	2015	Subsea survey
PRODRILL ENGINEERING LIMITED	2018	Conductor removal
PROSERV UK LTD	2018	IWOCS rental
ROVOP LIMITED	2018	ROV hire and operation
SCALDIS	2015	Decom services (engineering)
SCHLUMBERGER OILFIELD UK LIMITED	2015	Well plugging
THAMES JV V.O.F	2016	Heavy lift transport and disposal
TRINITY HOUSE	2015	Cardinal Buoys

2.2 Platform Operations

2.2.1 HCS Decommissioning Activities

The decommissioning activities carried out to render the Thames Complex hydrocarbon safe (HCS) were carried out whilst the platform was manned by PUK with support from various sub-contractors. A diving support vessel (DSV) was used to flush the flowlines from the subsea well to the platform and to disconnect the flowlines at the subsea well and the platform. Verification of HCS status by an Independent Verification Body (IVB) was achieved in June 2015.

The platform was subsequently left in lighthouse mode until the commencement of the dismantlement campaign to remove the topsides and jackets. During lighthouse mode, the platform was marked with two solar-powered navaids mounted on the AP topsides which were monitored remotely via a web satellite link to the Bacton Control Room. The installation was also marked with four cardinal buoys in a square format around the complex.

Table 2.2: HCS Pipeline Decommissioning - Completed Activities

Activity	Scope	Date
Flushing & Purging of Thames Process Pipework & Vessels	The Thames process pipework and process vessels were vented, drained, flushed and purged with nitrogen to render the process hydrocarbon-safe. The production manifolds were then disconnected (air-gapped) from the platform wells.	2014/2015
Flushing of Thames Export Pipeline	The Thames Export pipeline was pigged and flushed from the platform to the Bacton Gas Terminal. The pipeline was air-gapped at the platform and subsea before being sold to IOG.	2015
Flushing of Flowline & Disconnection of Flowlines	Using a Diving Support Vessel at the subsea well locations. The flowlines were flushed from the subsea completion back to the Thames Complex and the displaced fluids in the pipeline were injected into a Thames platform well. The subsea wells were shut-in and disconnected (i.e., air-gapped) from the flowline. Following the flushing, the flowlines and control umbilical were subsequently air-gapped at the base of the risers at the Thames Complex, allowing for the future removal of the Thames platform.	2014/2015
HCS Certification	Following the completion of the platform wells P&A, the disconnection of the flushed flowlines from the platform, and the disconnection of the flushed process system from the wells, the Thames Complex was certified as Hydrocarbon Safe by the IVB.	June 2015

2.3 Platform Well P&A

Abandonment of the 5 Thames platform wells was completed during three operational phases. The first phase of the campaign, abandonment to AB2 status, was carried out from September to December 2014 whilst the platform remained manned. Abandonment of the wells to 'AB2' status was achieved by placing cement plug barriers across the wellbore to isolate the well in accordance with the relevant OGUK guidelines at that time.

The second phase of the campaign to recover the conductors and surface casing strings was included in the scope to dismantle the Thames platform. This was undertaken in 2017 using the Rambiz Heavy Lift Vessel. During this campaign, wells A1, A3 and A6 were successfully cut and recovered from below the seabed in accordance with the OGUK guidelines at that time. Recovery of conductors from wells A2 and A4 from below the seabed was unsuccessful, and the conductors were cut and removed from above the mudline leaving a section of conductor remaining. An alternative method for cutting the remaining conductor stubs using explosives was agreed with OPRED. A Marine licence was submitted and approved which included mitigation measures (i.e., Marine Mammal Observers (MMO), Passive Acoustic Monitoring (PAM) and the deployment of Acoustic Deterrent Devices (ADD)) to minimise the impact on the environment.

The final phase of the operation to remove the A2 and A4 well conductors from the below seabed was completed in March 2018 using the Normand Reach MSV.

Table 2.3a: Platform Well Decommissioning – Completed Activities – Thames

Activity	Scope	Date
Platform well P&A	Plug and abandonment of 5 x platform wells to AB2 status.	2014
Removal of surface casings and conductors	Surface casing recovered from all wells from below seabed. Conductor from wells A1, A3 and A6 recovered from below seabed. Conductor recovered from wells A2 and A4 with the section remaining above seabed.	2017
Removal of remaining conductor (A2 and A4)	Well A2 and A4 conductors recovered from below seabed.	2018

Table 2.3b: Platform Well Decommissioning – Abandonment Status – Thames

Well	Designation	Status (& Date of Abandonment)	Category of Well
49/28-10 (Well 2)	Gas Production	AB2 (2014) / AB3 (2017)	AB3
49/28-A2 (Well 1)	Water Injection	AB2 (2014) / AB3 (2018)	AB3
49/28-A3 (Well 3)	Water Injection	AB2 (2014) / AB3 (2017)	AB3

Table 2.3b: Platform Well Decommissioning – Abandonment Status – Thames			
Well	**Designation**	**Status (& Date of Abandonment)**	**Category of Well**
49/28-A4 (Well 6) WENSUM	Gas Production	AB2 (2014) / AB3 (2018)	AB3
49/28-A6 (Well 4)	Gas Production	AB2 (2014) / AB3 (2017)	AB3

2.4 Surface Installations

The removal of the Thames Complex was carried out in several stages under a joint venture of Boskalis and Scaldis using the Taklift 4 sheerleg HLV and the Rambiz HLV.

The preparation for the dismantlement of the topsides commenced in July 2015 using the Taklift HLV; preparation activities included the disconnection of pipework across the bridges, the reinstatement of lifting points, the separation of topsides modules, and weight-shedding activities. The Taklift HLV subsequently removed the AP Cooler Unit, AP Compressor Module 1, AR – AP Bridge, and AR Topside in Q2 2016. The Taklift HLV was then demobilised from the platform.

The Eversea Neptune JUB then mobilised to the complex and completed the removal of the AW vent tower to allow for the mobilisation of the Rambiz HLV in Q4 2016.

The scope of work carried out using the Rambiz HLV was carried out as three separate campaigns during 2017, as detailed in Table 2.4 below.

The former Thames Complex SZ area was initially marked with four cardinal buoys due to the exposed pipelines that remained on the seabed. However, at the advice of Trinity House, the cardinal buoys were removed because the buoys were likely to attract fishing vessels to the area. PUK requested that the SZ be reinstated. However, the request was denied by the HSEx as the reinstatement SZ would require a change in legislation to implement. Instead, the area continued to be shown on the Admiralty Maps to provide a warning that the area had not been fully decommissioned.

Table 2.4: Surface Installation Decommissioning - Completed Activities		
Activity	**Vessel/Scope**	**Date**
Removal of Thames Complex Topsides & Platform Well Conductors.	**Taklift 4 sheerleg HLV:** Removal of AP Cooler Unit & Compressor Module 1, AR – AP Bridge, and AR Topside.	Q2 2016
	Eversea Neptune JUB: Removal of AW Vent Tower.	Q4 2016
	Rambiz Campaign I: Removal of AR Compressor Modules 2 & 3 plus Support Frames, AP Living Quarters, AP Contactors 1 & 2, AP Compressor module 3 grillage, AP Crane Boom, Rest and House, AP Crane Pedestal, AW Leg Extensions (4x), and AW Conductors (5x).	Q2 2017
Removal of Thames Complex Topsides & Bridges	**Rambiz Campaign II:** Removal of AP Topside Block 1, AW – AP Bridge, AP Caissons (6x), AP Topside Block 2, and AP Leg Extensions (6x).	Q3 2017

Table 2.4: Surface Installation Decommissioning - Completed Activities		
Activity	**Vessel/Scope**	**Date**
Removal of Thames Complex Jackets & Cutting of Piles	**Rambiz Campaign III:** Removal of AP Jacket, AR Jacket, AW Jacket, AW Subsea Template, and Bumper Piles.	Q3 2017

2.5 Subsea Installations

The Thames 49/28-A5 was a suspended subsea well under the AW jacket. Well 49/28-A5 was drilled in 1985. After logging it was decided that the well would be abandoned. The 9-5/8" casing was cut at 7515ft, seven cement plugs were set in the well and tested, all of the casings and conductor were recovered from the mud-line hangers and a 30" debris cap was installed. All casings except for the 30" conductor were removed to 10ft below the seabed. The abandonment to AB2 was completed in Q1 1986.

During the HL Rambiz Campaign III, the 49/28-A5 conductor was only partially removed due to the inability to cut the conductor stub using the abrasive water jets. An alternative method for cutting the conductor stub using explosives was required in order to remove the stub. This work was completed in Q1 2018 using the Normand Reach vessel. The abandonment to AB3 status was achieved in Q1 2018.

In 2015, the Bure O, Yare C and Deben flowlines were isolated and disconnected from the wellhead at the Pipeline End Manifold (PLET) assembly (see section 2.2.1) during the HCS campaign.

In Q3 2017, during the 3rd Rambiz Campaign the AW subsea template was removed following the removal of the AW jacket.

In Q3 2018, the Bure-O, Yare-C and Bure-W subsea wells were plugged and abandoned to level AB2 in accordance with the HSEx "Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996" and the OGUK guidelines for the Suspension and Abandonment of Wells (Issue 5, July 2015).

In Q3 2019, the Bure W subsea well 49/28-18 and Yare C subsea well 49/28-13 moved from AB2 to AB3 status. The wellhead and protective structure were removed, and the conductor and inner casing were removed to approx. 3m below the mudline. The operation to cut and recover the Bure O subsea well 49/28-8 wellhead was abandoned due to issues encountered during wellhead cutting with the Proserv severance tool deployed into the well. The severance tool was self-ejected from the conductor before the completion of the first cut.

In Q1 2020, the Bure O wellhead was successfully removed using an explosive charge within the wellhead. The Bure O subsea well moved from AB2 to AB3 status. The conductor and inner casing were removed to approx. 3m below the mudline.

During the campaign in Q3 2019 to undertake the removal of the subsea wellheads, it was identified that the Bure O PLET assembly had not been removed (ref. Figure 2.1). The Bure O PLET assembly was removed in Q3 2020. An ROV as-found survey was unable to locate the Yare C PLET and the Bure W PLET. It was assumed that they were buried below the seabed, so have been left in-situ.

In Q3 2018, the Thurne subsea well 49/28a-20 was successfully plugged and abandoned to level AB3. The X-tree and wellhead were removed, and the inner casing was removed to approx. 3m below the mudline. In addition, the Thurne protection structure piles were cut to approx. 3m below the mudline. In Q3 2019, the Thurne protection structure was removed by an HLV.

In Q4 2020, the Thurne seabed remediation activities were completed within the Thurne 500m SZ. The Deben flowline and umbilical at the Thurne wellhead location were severed as they entered the seabed. The mattresses covering the removed sections of pipeline/umbilical were removed and an existing mattress was placed over the cut end of the pipe and umbilical to protect the pipeline end and allow an over trawlable survey to be conducted.

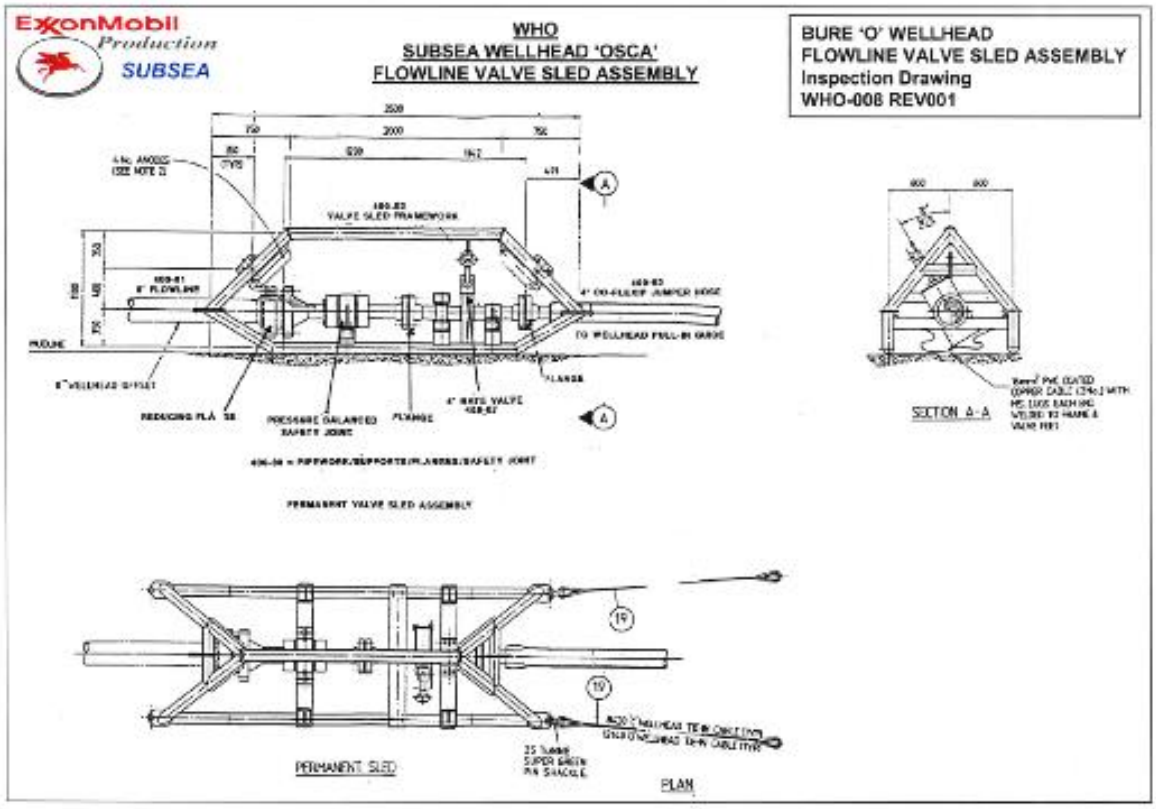

Figure 2.1 – PLET 'Sled' Assembly

Table 2.5a Subsea Installations Decommissioning Activities – AW Subsea Template		
Activity	**Vessel/Scope**	**Date**
AW Subsea Template	**Scaldis Rambiz HLV** (Campaign III) – Removal of AW Subsea Template	Q3 2017

Table 2.5b Subsea Installations Decommissioning Activities - Bure W		
Activity	**Vessel/Scope**	**Date**
Subsea Well P&A	**Paragon C20051** – Plug and abandonment of Bure W subsea well 49/28-18 to AB2 status.	Q3 2018
Wellhead Protection Structure recovery	**Maersk Lifter -** Bure W WHPS recovered.	Q3 2019
Wellhead Recovery	**Maersk Lifter -** Bure W wellhead recovery. AB3 status achieved.	Q3 2019

Table 2.5c: Subsea Installations Decommissioning Activities - Bure O		
Activity	**Vessel/Scope**	**Date**
Subsea Well P&A	**Paragon C20051** - Plug and abandonment of Bure O subsea well 49/28-8 to AB2 status.	Q3 2018
Wellhead Protection Structure recovery	**Maersk Lifter -** Bure O WHPS recovered.	Q3 2019
Wellhead Recovery	**Maersk Lifter** - Bure O wellhead recovery. AB3 status achieved.	Q1 2020
PLET Recovery	**Maersk Lifter** - Bure O wellhead recovery. AB3 status achieved.	Q3 2020

Table 2.5d: Subsea Installations Decommissioning Activities - Yare C		
Activity	**Vessel/Scope**	**Date**
Subsea Well P&A	**Paragon C20051** - Plug and abandonment of Yare C subsea well 49/28-13 to AB2 status.	Q2 2018
Wellhead Protection Structure recovery	**Maersk Lifter** - Yare C WHPS recovered.	Q3 2019
Wellhead Recovery	**Maersk Lifter** - Yare C wellhead recovery. AB3 status achieved.	Q3 2019

Table 2.5e: Subsea Installations Decommissioning Activities – Thurne		
Activity	**Vessel/Scope**	**Date**
Subsea Well P&A	**Polaris 92** - Plug and abandonment of Thurne subsea well 49/28a-20 to AB3 status.	Q3 2018
Wellhead Protection Structure recovery	**Scaldis Rambiz** - Thurne WHPS recovered.	Q3 2019
Wellhead Recovery	**Polaris 92** - Thurne wellhead recovery. AB3 status achieved.	Q3 2018

Table 2.5f: Subsea Installations Decommissioning Activities – 49/28-A5		
Activity	**Vessel/Scope**	**Date**
Conductor removal (partial)	**Rambiz Campaign I -** Partial removal of 49/28-A5 conductor using abrasive water jets.	Q4 2017
Removal of Conductor Stub	**Norman Reach -** Removal of 49/28-A5 conductor stub using explosives.	Q1 2018

The following tables (Table 2.6a to 2.6e) provide a summary of the abandonment status of the subsea wells.

Table 2.6a: Subsea Well Decommissioning – Abandonment Status – Bure W			
Well	**Designation**	**Status (& Date of Abandonment)**	**Category of Well**
49/28-18	Gas Production	AB2 (2018) / AB3 (2019)	AB3

Table 2.6b: Subsea Well Decommissioning – Abandonment Status – Bure O			
Well	**Designation**	**Status (& Date of Abandonment)**	**Category of Well**
49/28-8	Gas Production	AB2 (2018) / AB3 (2020)	AB3

Table 2.6c: Subsea Well Decommissioning – Abandonment Status – Yare C			
Well	**Designation**	**Status (& Date of Abandonment)**	**Category of Well**
49/28-13	Gas Production	AB2 (2018) / AB3 (2019)	AB3

Table 2.6d: Subsea Well Decommissioning – Abandonment Status – Thurne			
Well	**Designation**	**Status (& Date of Abandonment)**	**Category of Well**
49/28a-20	Gas Production	AB2 (2018) / AB3 (2018)	AB3

Table 2.6e: Subsea Well Decommissioning – Abandonment Status – Suspended Well 49/28-A5			
Well	**Designation**	**Status (& Date of Abandonment)**	**Category of Well**
49/28 – A5	Dry development - Suspended	AB2 (1986) / AB3 (2018)	AB3

The following tables (Table 2.7a to 2.7e) provide a summary of the abandonment status of the subsea installations.

Table 2.7a: Subsea Installations Decommissioning – Status – AW Subsea Template				
Description	**Agreed Decom Solution**	**Total Removed (Actual)**	**Date of Removal**	**Status**
Subsea Template	Removal	1 removed	Q3 2017	All removed

Table 2.7b: Subsea Installations Decommissioning – Status – Bure W				
Description	**Agreed Decom Solution**	**Total Removed (Actual)**	**Date of Removal**	**Status**
Wellhead (x1)	Removal	1 removed	Q3 2019	Partially removed*
Protection Frame	Removal	1 removed	Q3 2019	All removed

** Bure W PLET assembly buried below seabed - left in-situ*

Table 2.7c: Subsea Installations Decommissioning – Status – Bure O				
Description	**Agreed Decom Solution**	**Total Removed (Actual)**	**Date of Removal**	**Status**
Wellhead (x1)	Removal	1 removed	Q1 2020	All removed*
Protection Frame	Removal	1 removed	Q3 2019	All removed

** Bure O PLET assembly removed Q3 2020.*

Table 2.7d: Subsea Installations Decommissioning – Status – Yare C				
Description	**Agreed Decom Solution**	**Total Removed (Actual)**	**Date of Removal**	**Status**
Wellhead (x1)	Removal	1 removed	Q3 2019	Partially removed*
Protection Frame	Removal	1 removed	Q3 2019	All removed

** Yare C PLET assembly buried below seabed - left in-situ*

Table 2.7e: Subsea Installations Decommissioning – Status – Thurne				
Description	**Agreed Decom Solution**	**Total Removed (Actual)**	**Date of Removal**	**Status**
Wellhead (x1)	Removal	1 removed	Q3 2018	All removed
Protection Frame	Removal	1 removed	Q3 2019	All removed

2.6 Pipelines/Umbilical & Jumpers Decommissioning

During the 2017 dismantlement campaigns to remove the Thames jackets, the flowline and umbilical risers were removed with the jackets, and the subsea flowlines and umbilical remained in-situ.

The pre-decommissioning survey carried out in 2016 before the removal of the Thames platforms identified several exposed pipeline sections within the former Thames Safety Zone. In 2021, a post-decommissioning survey of the Thames Complex Area identified that the pipelines and cut pipeline ends within the Thames 500m Safety Zone remained exposed and presented a significant snagging hazard for fishermen.

The conclusion on comparing the two survey datasets, (which are 5 years apart), was that seabed movement in the Thames Complex area had not changed significantly and that natural remediation in the short to medium term was unlikely. As there was no Safety Zone in place, PUK were unable to justify waiting for natural infill as a remediation method and alternative remediation methods were required in the short term to mitigate the known snagging hazards. PUK requested that the Safety Zone be reinstated. However, as the installation had already been removed, the HSEx advised that the current regulation would not allow for the reinstatement of the Safety Zone.

As the exposures presented an immediate risk to the fisherman and the Thames Complex Safety Zone could not be reinstated, PUK requested a revision to the Thames Pipeline DP to carry out the 2nd best option in the original CA, i.e., 'Option 3 - Rock dump the line in specific areas where the line is uncovered'. OPRED subsequently approved a deviation from the approved Thames Field Pipeline Decommissioning CA on 5th May 2022 to allow for the immediate requirement to remediate the pipelines.

On approval of the required permits, a rock placement campaign was completed in 2022 and 30,000Te of rock was deposited over the exposed pipelines, umbilical and stabilisation materials within the Thames Complex 500m Safety Zone.

The rock placement covered all flowlines in the Thames Complex area, including the Bure W, Bure O, Deben, Gawain and Arthur flowlines operated by PUK; the disused section of the Thames export pipeline owned by IOG; and the Horne/Wren flowlines and Orwell flowlines operated by TOSK. Permission to place the rock on the 3rd party pipelines was obtained before the commencement of the operations, and all work was carried out under approved deposit consents and marine licences (approved by NSTA and OPRED respectively).

Approximately 30,000Te of rock was placed over the exposed pipelines and mattresses within the Thames Complex Area. The new rock placement aligned with the original rock placement (13,000Te) which was placed during the commissioning of the Thames Complex.

The rock placement, pipelines and mattresses as agreed with OPRED will remain in situ but will be monitored as part of the post-decommissioning monitoring regime.

During the Deben pipeline remediation campaign in Q4 2020, the Deben flowline and umbilical at the Thurne wellhead location were severed as they entered the seabed. The mattresses covering the removed sections of pipeline/umbilical were removed and an existing mattress was placed over the cut end of the pipe and umbilical to protect the pipeline end and allow an over trawlable survey to be conducted.

In consultation with OPRED and the National Federation of Fishermen's Organisation (NFFO), an overtrawl survey was carried out on the Thames assets within the former Thames 500m Safety Zone and along the subsea well flowlines. Upon completion, a clean seabed certificate was issued by the NFFO for the Thames satellite assets' safety zones (see Section 9.1).

Figure 2.2 – Rock placement Thames Complex Area post-remediation

Table 2.8: Pipeline/Umbilical Decommissioning - Completed Activities

Activity	Vessel/Scope	Date
Removal of Risers at Thames Complex	**Rambiz Campaign III:** During the campaign to remove the Thames jackets, the flowline and umbilical risers were removed with the jackets, and the subsea flowlines and umbilical remained in-situ.	2017
Removal of exposed pipeline section at Thurne wellhead	**Helix Robotics Solutions:** During the Thurne seabed remediation campaign, exposed mattresses at the Thurne wellhead and a 4m section of exposed pipelines (PL1637/1638) were removed.	Q4 2020
Rock placement on exposed flowlines & umbilical in former Thames 500m Safety Zone	**Van Ordd DP FFPV Nordnes:** Rock placement was completed on the flowlines/umbilical and associated stabilisation mattresses within the former Thames 500m Safety Zone under an approved Marine Licence and Deposit Consents in 2022.	Q2 2022

Table 2.9: Pipelines/Umbilicals & Jumpers Decommissioning				
PL Number	**Description**	**Agreed Decom Solution**	**Date of Removal**	**Status with lengths in Km removed and left in situ**
PL371	Bure O flowline	Leave in situ	N/A	9.3 km in situ
PL372	Yare C flowline	Leave in situ	N/A	4.8 km in situ
PL1635	Bure West flowline	Leave in situ	N/A	11.2 km in situ
PL1637	Deben flowline	Leave in situ	Q4 2020	5.3 km in situ (4 m removed) *
PL374	Yare C Umbilical	Leave in situ	N/A	4.8 km in situ
PL373	Bure O Umbilical	Leave in situ	N/A	9.3 km in situ
PL1636	Bure West Umbilical	Leave in situ	N/A	6.3 km in situ
PL1638	Deben Umbilical	Leave in situ	Q4 2020	5.4 km in situ (4 m removed) *

** c.4m section of Deben flowline and umbilical removed at Thurne wellhead location.*

2.7 Stabilisation Features Decommissioning

The original Thames Pipeline Comparative Assessment (CA), Thames Comparative Assessment Report 2014, had considered 'stabilisation materials removed and transported to shore' as the preferred option; with the proviso that if operational difficulties were encountered then the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) would be consulted, and an alternate CA would be submitted.

However, as stated in Section 2.6 above, the pipeline exposures within the former Thames 500m Safety Zone presented an immediate risk to the fisherman and the Thames Complex Safety Zone could not be reinstated. Therefore, PUK requested a revision to the Thames Pipeline DP to carry out the 2nd best option in the original CA, i.e., 'Option 3 - Rock dump the line in specific areas where the line is uncovered'. The pipeline remediation rock placement campaign was completed in 2022.

Rock was deposited over the exposed pipelines, umbilical and stabilisation materials within the Thames Complex 500m Safety Zone. A revision to the Thames Field Pipeline DP was approved by OPRED to allow for the stabilisation mattresses within the former Thames 500m Safety Zone under the rock placement to remain in situ.

Table 2.10 provides a summary of the abandonment status of the subsea stabilisation features within the former Thames 500m Safety Zone.

Table 2.10: Stabilisation Features Decommissioning (within the former Thames 500m SZ)

Description	Agreed Decom Solution	Date of Removal	Status
Concrete Mattresses (x 50) (inside former Thames 500m SZ)	Remove unless operational difficulties are encountered.	N/A	50 remain in situ. Covered by rock placement due to exposed flowlines/ mattresses.
Grout Bags (x 31) (inside former Thames 500m SZ)	Remain in situ.	N/A	31 remain in situ. Grout bags are no longer visible. Considered to have dispersed.
Frond mattresses (x 40)	Remain in situ.	N/A	40 remain in situ. Covered by rock placement due to exposed flowlines/ mattresses.
Rock Placement (x 5)	Remain in situ.	N/A	5 remain in-situ. Includes original rock (13,000 Te) placed during the commissioning of the Thames Complex and the additional rock (30,000 Te) placed over the exposed pipeline and mattresses post-decommissioning.

In 2021, a bathymetry survey at the Bure W, Bure O, Yare C and Thurne 500m safety zones was carried out to establish the status of the stabilisation materials left in-situ. All mattresses observed in the video footage were either fully or partially buried with no grout bags visible. As the grout bags were not visible it was considered that the bags had become fully buried and/or had disintegrated and had been washed away.

The in-house EIVA NAVISUITE software data from the 2021 bathymetry survey and as-built records were used to interpret the slope profiles of the mattresses proud of the surrounding seabed, (i.e., the mattresses that were not fully buried). The slope angles for the protruding mattresses were less than 45 degrees to the horizontal which PUK considered a low probability of being a snagging hazard.

A revised CA of the potential decommissioning options was therefore completed for the pipeline stabilisation materials within the 500m Safety zones of the Thames satellite assets and at the pipeline crossing points, Thames Satellite Assets Stabilisation Material Comparative Assessment 2023.

The revised CA concluded that the preferred option for the decommissioning of the stabilisation materials within the satellite assets 500m safety zones (and the pipeline crossings) was to leave all stabilisation materials in-situ with ongoing monitoring. The revised CA was approved by OPRED in July 2024.

In consultation with OPRED and the National Federation of Fishermen's Organisation (NFFO), an overtrawl survey was carried out on the Thames satellite assets. Upon completion, a clean seabed

certificate was issued by the NFFO for the Thames satellite assets' safety zones (see Section 9.1). The outcome of the overtrawl survey confirmed the analysis of the bathymetry survey results, i.e., the probability of the mattresses being a potential snagging hazard is very low.

Table 2.11 provides a summary of the abandonment status of the subsea stabilisation features within the 500m Safety Zones for the Thames subsea wells and at the pipeline crossings.

Table 2.11: Subsea Stabilisation Features Decommissioning (i.e., outside Thames 500m zone including pipeline crossings)

Description	Agreed Decom Solution	Total Removed	Date of Removal	Status
Concrete Mattresses (x 111)	Partial Removal *	1	Q4 2020	1 concrete mattress was removed within Thurne SZ. 5 mattresses are partially buried but remain in situ due to poor condition. The remaining mattresses are predominantly buried and are to remain in situ.
Grout Bags (x 306)	Remain in-situ	N/A	N/A	Bags no longer visible; considered dispersed/buried.
Frond Mats (x 30)	Partial Removal *	1	Q4 2020	1 frond mattress removed within Thurne SZ. The remaining mattresses are predominantly buried.

* As TOSK previously agreed with OPRED, only mattresses that were predominantly exposed (>51%) were removed and disposed of onshore.

2.8 Drill Cuttings Status

Table 2.12: Drill Cuttings Decommissioning

Description & Volume (m3)	Agreed Decom Solution	Date of Removal	Status
Cuttings were widely dispersed and fall below OSPAR 2006/5 thresholds.	Leave to degrade naturally	N/A	Left In Situ

2.9 Post Decommissioning & Environmental Surveys & Debris Clearance Activities

Table 2.13: Environmental Surveys & Debris Clearance		
Activity	**Scope**	**Date**
Post decommissioning surveys & debris clearance	**Braveheart Spirit:** Completion of post-decommissioning benthic and pipeline surveys for former Thames Complex SZ, Satellite field SZs and satellite flowlines.	Q3 2022
Overtrawl Surveys	**Atlas B WY 101:** Overtrawl survey completed by NFFO in Thames Satellite SZs. Clean Seabed Certificates were issued (see Section 9.1).	Q1 2022
	Atlas B WY 101: Overtrawl survey completed by NFFO in the former Thames Complex SZ area and along Thames satellite flowlines. Clean Seabed Certificates were issued (see Section 9.1).	Q4 2023

2.10 Key Milestones

Table 2.14: Key Milestones	
Thames Cessation of Production	14th May 2014
IVB HCS Verification	18th June 2015
Completion of Thames Complex HLV campaign	September 2017
Completed removal of all Thames Conductors	March 2018
Completion of Satellite Field Decommissioning	September 2020
Clean Seabed Certificate – Thames Satellite Fields	7th March 2022
Clean Seabed Certificate – Thames Complex	6th November 2023

2.11 Stakeholder Engagement

Table 2.15: Stakeholder Engagement
OPRED/NSTA - Quarterly Progress Meetings and Reports. **Trinity House** - Advice sought from Trinity House regarding the deployment of cardinal buoys at the former Thames Complex SZ following the removal of the SZ.

Table 2.15: Stakeholder Engagement
HSEx - PUK requested for Thames Complex SZ to be reinstated; however, the request was denied by the HSEx as the reinstatement of the SZ would require a change in legislation to implement.
United Kingdom Hydrographic Office (UKHO) - Request that former Thames SZ continue to be shown on Admiralty Maps to provide a warning that the area had not been fully decommissioned.
Environment Agency (EA) - Correspondence with EA regarding an error on the Thames IWS permit.

3.0 IMPACT ON ENVIRONMENT

3.1 Activities/Incidents

- **Waste Shipment**: The EA requested PUK to cease shipments to the Netherlands under Notification GB0001006598. Following an internal review of the data it was concluded that due to an error the permitted tonnage stated in the notification did not match the sum of the weight of the structures as provided in the documents supporting the permit. Advice was sought from the EA Shipments Team regarding the shipment of the waste under Article 18 Controls. PUK confirmed that the three conductors were free from contaminants and then proceeded with the shipment of the conductors to the Netherlands on 16th March 2018.
- **PON – 1/4015**: Release of hydraulic oil (<0.5L) to sea from 1/2" stainless steel hydraulic supply pipe fitting during decommissioning of Thames AW platform on 25th April 2015. The pipe fitting had damaged threads due to previously being incorrectly made resulting in loss of integrity of the fitting. Follow-up action was to ensure only persons with the required competence work on small bore pipe fittings and tubing. This requirement was reiterated in safety meetings and monitored by the offshore management team.
- **PON-1/6449:** Release of small residual diesel (<0.005 tonnes) from cut pipework during heavy lift operations for the separation of the AP topside from the jacket. Some residue diesel drained from some cut pipework. For future operations, dead legs are thoroughly flushed and inspected before topside removal.
- **PON – 1/8709 (3rd Party**): Release of hydraulic oil to the environment during decommissioning of Bure O wellhead on 31st July 2019. A high-pressure hydraulic hose in the head of the dredge tool had burst and approx. 100L of bio-degradable oil was lost. No evidence of any oil leak on the surface at the time of the incident (no sheen on the surface). The direct cause was the functioning of actuators in the head of the tool causing rubbing against the high-pressure hoses.
- **PON – 1/8753:** Light water surface sheen observed during the process of removing the Yare C wellhead. The incident occurred on 13th August 2019. An unknown chemical was released; reported as diesel. The intermediate cause was a lack of information/history on the structure being removed.

3.2 Future Monitoring & Management Planning

3.2.1 Comparative Analyses of Benthic Survey Results

An independent third-party environmental consultancy undertook a Decommissioning Environmental Survey Review (200605-S-REP-0046 Rev 1 Thames, May 2024) of the environmental survey data for the Thames complex area and nearby wells and pipelines with a focus on sediment composition,

contaminants, and benthic biodiversity to assess the condition of the Thames complex area and identify any changes that may have occurred between pre- and post-decommissioning activities. Through a comparative analysis of pre-and post-decommissioning survey data of the Thames complex area, it has been determined that there is no significant contamination of the area.

Annex 1 Habitat Assessment

Video footage from the pre-decommissioning survey confirmed the findings of an earlier geophysical survey indicating the presence of a low reefiness S. spinulosa reef around the Bure wells. During the post-decommissioning survey, S. spinulosa Annex I biogenic reef was identified within the surveyed area at one sampled station, BO_10, approximately 250m at the closest point from the Bure O well. These reef features were classified as 'low reefiness'.

Benthic Fauna

Benthic fauna showed a similar mean diversity between the pre- and post-decommissioning surveys; whilst a slight (but significant) reduction was observed in mean abundance. Differences were also observed in the dominant taxa at each asset with a general trend towards a greater dominance of hydrocarbon intolerant species and individual S. Spinulosa. As the benthic fauna showed a similar mean diversity between surveys and a general trend towards a greater dominance of hydrocarbon-intolerant species, it is proposed that no further monitoring of benthic fauna is required.

Heavy Metals

A total of 8 main heavy and trace metals were analysed from sediments taken at each of the sampling stations for the pre-and post-decommissioning surveys. These were Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), and Zinc (Zn).

There are currently no definitive guides for 'acceptable' contamination levels from oil and gas activities. A common practice is to assess contamination levels against:

- Centre for Fisheries and Aquaculture Science (CEFAS) action levels for the disposal of dredged material, and/or
- Interim Sediment Quality Guideline (ISQG) levels.

While dredging is clearly a different activity from gas field decommissioning, the industry has relatively well-developed guidelines concerning the remobilisation of sediment contaminants which provide useful reference points for other activities:

- CEFAS guidelines have two Action Levels (AL). Contaminant concentrations below Action Level One (AL1) are thought to be of no danger to the environment if disposed of at sea, whilst levels above Action Level Two (AL2) are considered unsuitable for disposal at sea.
- The ISQG provides Threshold Effect Levels (TEL) and Probable Effects Levels (PEL). Below TEL it is thought that contaminants will have little or no effect on the environment, whilst levels above PEL are expected to show at least some effects on the environment.
- Additionally, OSPAR developed Background Assessment Concentrations (BAC) and Effects Range Low (ERL) values to allow assessment of contaminant concentrations in the environment and indicate potential levels which may cause toxic effects respectively.

Where relevant, comparisons against these 'guidance' contamination levels (i.e., CEFAS, ISCG, OSPAR) were made for the survey samples analysed pre- and post-decommissioning.

Focusing on the pre-decommissioning survey, except for As and Cd, heavy metals were observed below CEFAS Action Level 1 for the samples analysed.

Arsenic was present above CEFAS Action Level 1 at most stations but only exceeded Action Level 2 at one location (Station 27) in the centre of the offshore survey area close to the location of the former Thames platform. Cd was present above CEFAS AL1 at the same location (Station 27).

Arsenic may be associated with Barite, a common additive used within oil-based drilling muds. Barite contains high levels of heavy metals such as Hg, As, Selenium, Pb, Cd, Zn, Cu and Cr. While elevated levels of As were observed it should be noted that concentrations of these other metals were low suggesting the origin of elevated As levels is not related to historical oil-based drill mud discharge.

Focusing on the post-decommissioning survey, as for the pre-decommissioning survey, Figure 3.1 below illustrates the comparison of the heavy metal contaminant levels for the post-decommissioning samples against the 'guidance' contaminant levels.

Zn exceeded CEFAS AL1 at two locations, near the Bure W location (station BW 11) and the Bure O flowline (station PL371_04). Arsenic was the only metal that consistently exceeded reference levels at all the Thames asset locations. AS exceeded CEFAS AL2 at 5 stations, two stations with the Thames area survey cruciform (Station TH_02 and Station TH_07), two stations near the Bure O location (Station BO_03 and Station BO_06), and one station along the Bure West to Thames PL 1635 (Station PL1635_05). Overall, a reduction of mean Arsenic concentrations was observed between pre- and post-decommissioning surveys from 47.2 mg kg-1 to 42.2 mg kg-1 respectively.

For the oil and gas industry, the OSPAR commission recommended the monitoring of metals to focus on Cd, Pb and Hg. Cd and Hg concentrations were below the detection limit at most stations and never exceeded any of the guideline levels.

Pb concentrations varied between 4.6 mg kg-1 and 32.6 mg kg-1, with the maximum concentration found at the Thames platform location (station TH_02) exceeding the TEL but below all other reference levels.

Metal	CEFAS		OSPAR BAC		ISQG	
	AL1	AL2	BAC	ERL	TEL	PEL
As	48	5	38	69	69	20
Cd	0	0	0	0	0	0
Cr	0	0	0	0	0	0
Cu	0	0	0	0	0	0
Pb	0	0	0	0	1	0
Hg	0	0	0	0	0	0
Ni	0	0	0	0	0	0
Zn	2	0	2	0	2	0

- Red – Threshold exceedance
- Green – Under threshold

Figure 3.1 - Total sample exceedances of threshold levels post-decommissioning for Heavy Metals

Whilst some subtle fluctuations can be observed within the data, there is a general downward trend in mean metal concentrations across the surveyed assets between the pre-and post-decommissioning surveys.

Future monitoring of heavy metals will focus on those areas where CEFAS AL2, have been exceeded, and where Cd, Pb and Hg levels exceed the OSPAR BAC or ISQG TEL, i.e., at the following stations:

- Thames platform location - Station TH_02 and Station TH_07.

- Bure O location - Station BO_03 and Station BO_06.
- Bure West to Thames PL 1635 - Station PL1635_05.

Benthic samples were collected at these stations as part of the post-decommissioning survey campaign for the Gawain and Arthur fields as these fields are in close proximity to the Thames fields. This survey campaign was conducted in March 2025.

The 2025 benthic samples will be tested for heavy metals and if the concentrations of metals have reduced from 2022, with OPRED's agreement, no further benthic surveys will be carried out around the Thames Fields' assets.

Hydrocarbons and Polyaromatic Hydrocarbons (PAH)
A downward trend was observed for PAH concentrations, with no samples occurring above CEFAS AL1 for the substances assessed and results indicating that there is no gross hydrocarbon contamination of superficial sediments or evidence of historical drill cuttings piles in the survey area. As all samples were below CEFAS AL1, it is proposed that no further monitoring of PAH is required.

3.2.2 Pipeline Survey Trending of Exposures & Spans

For each Thames pipeline, a survey trending exercise has been performed by an independent 3rd party consultant. The pre- and post-decommissioning survey data sets have been reviewed and compared to establish the presence of exposures and free spans along each pipeline and determine their rate of change. The findings from the survey trending exercise have then been used as input into a risk assessment which determines the legacy inspection interval for each pipeline. The risk assessment has been performed against a modified risk matrix for decommissioned pipelines. The risk matrix, along with its associated likelihood and consequence definitions is provided in Appendix 10.3.

In all cases the event being risk assessed is 3rd party interaction (e.g., trawler snag) occurring with the decommissioned pipeline. The following sections summarise the key findings from the comparative analysis of the pre-and post-decommissioning surveys Decommissioning Close Out Report - Thames field pipelines, JEE-PER275-REP-001.

PL371 & PL373 (Bure 'O' to Thames Complex)
PL371 is the 8" production pipeline which runs 9.3km between Bure 'O' and Thames AW. PL373 is the 4" control umbilical which is laid parallel. The pipelines are trenched and buried to 1m top-of-pipe. Both pipelines have very short sections (~100m) that cross over into the North Norfolk Saturn Sandbanks Special Area of Conservation (SAC). The length of each pipeline which extends into the identified SAC amounts to just over 1% of the overall pipeline length.

A trawl sweep of the Bure 'O' pipelines was performed in February 2022 covering 50 metres on either side of each pipeline, and a clean seabed certificate was issued by the NFFO in November 2023, see Appendix 10.1.

Figure 3.2 summarises the exposures and freespans which were reported for PL371/PL373 from the surveys conducted in 2011, 2013, and 2022.

Parameter	2011	2013	2022	Trend
Total exposure length (m)	48	79	121	↑
Total number of exposures	7	10	6	↓
Total freespan length (m)	0	1	0	↓
Total number of freespans	0	1	0	↓

Figure 3.2 – PL371/PL373 survey comparison

The total exposed length of the pipe was reported to have increased marginally across the pre- and post-decommissioning surveys. However, the number of individual exposures was seen to have decreased, potentially suggesting smaller exposures joining up over time. From an examination of the MBES data, no obvious exposures can be seen, therefore if the pipelines are truly exposed at the locations reported then the level of exposure appears to be limited to the crown of the pipe/umbilical.

The legacy inspection interval risk assessment for the Bure 'O' pipelines PL371 and PL373 is provided in Figure 3.3 below, based on the known pipeline details and the results of the survey trending exercise. Using the modified risk matrix, the governing risk score for both pipelines is a '2D'. This score is driven by the impact on other users of the sea and financial consequence categories, resulting in an 8-year inspection frequency putting the next scheduled inspections in 2030.

PL no.	L/hood	Consequence						Risk	Freq.
		Other sea users	Env.	Financial	Socio-economic	Regulatory	Reputation		
PL371	D	2	3	2	5	4	4	2D	8
PL373	D	3	3	2	5	4	4	2D	8

Figure 3.3 –PL371/PL373 risk assessment

PL372 / PL374 (Yare 'C' to Thames)

PL372 is the 8" interfield pipeline which runs 4.8km between Yare 'C' and Thames AW. PL374 is the 0.5" control umbilical which is laid parallel. The pipelines are trenched and buried to 1m top-of-pipe. Both pipelines run through the South North Sea Special Area of Conservation (SAC); the length of each pipeline which extends into the identified SAC amounts to just over 90% of the overall pipeline length, the sections of the pipeline which are contained within the old Thames platform 500m zone do not fall within the SNS SAC boundary.

A trawl sweep of the Yare 'C' pipelines was performed in February 2022 covering 50 metres on either side of each pipeline, and a clean seabed certificate was issued by the NFFO in November 2023, see Appendix 10.1.

Figure 3.4 summarises the exposures and freespans which were reported for PL372/PL374 from the surveys conducted in 2011, 2013, and 2022.

Parameter	2011	2013	2022	
Total exposure length (m)	11	22	0	↓
Total number of exposures	4	5	0	↓
Total freespan length (m)	0	0	0	↓
Total number of freespans	0	0	0	↓

Figure 3.4 – PL372/374 survey comparison

The total exposure for this pipeline has been consistently low with the most recent survey not recording any exposures or spans. The legacy inspection interval risk assessment for the Yare 'C' pipelines PL372 and PL374 is provided in Figure 3.5 below, based on the known pipeline details and the results of the survey trending exercise. The governing risk score for both PL372 and PL374 is a '2E', driven by the impact to 'other users of the sea' and financial categories, resulting in an 11-year inspection frequency, putting the next scheduled inspections in 2033.

PL no.	L/hood	Consequence						Risk	Freq.
		Other sea users	Env.	Financial	Socio-economic	Regulatory	Reputation		
PL372	E	2	3	2	5	4	4	2E	11
PL374	E	3	3	2	5	4	4	2E	11

Figure 3.5 –PL372 / PL374 risk assessment

PL1635 / PL1636 (Bure West to Thames/Bure West to Thurne)
PL1635 is the 8" flowline which runs 11.2 km from the Bure West wellhead back to the Thames AR platform. PL1636 is the 5" Bure West umbilical which runs 6.3km between Thurne and Bure West. Approximately 2km of PL1635 and PL1636 transit through the North Norfolk Saturn Sandbanks Special Area of Conservation (SAC).

A trawl sweep of the Bure 'W' pipelines was performed in February 2022 covering 50m on either side of each pipeline, and a clean seabed certificate was issued by the NFFO in November 2023, see Appendix 10.1. Figure 3.6 summarises the exposures and freespans reported on PL1635 from the surveys conducted between 2011 and 2022.

Parameter	2011	2013	2022	Trend
Total exposure length (m)	266	509	77	↓
Total number of exposures	33	55	5	↓
Total freespan length (m)	0	50	0	↓
Total number of freespans	0	6	0	↓

Figure 3.6 - PL1635 survey comparison

The exposed length of the pipeline PL1635 was found to increase in 2013; however, a decrease was observed by 2022 to the lowest recorded across the three surveys. The number of exposures along PL1635 increased between the 2011 and 2013 surveys, but subsequently significantly reduced between the 2013 and 2022 surveys.

The only year in which spans were recorded on PL1635 was 2013, with the largest measuring 18m in length. However, the spans reported could not be verified when the same locations were checked in the multibeam data. Figure 3.7 summarises the exposures and freespans reported on PL1636 from the surveys conducted between 2011 and 2022.

Parameter	2011	2013	2022	Trend
Total exposure length (m)	161	124	92	↓
Total number of exposures	19	15	1	↓
Total freespan length (m)	0	4	0	↓
Total number of freespans	0	1	0	↓

Figure 3.7 - PL1636 survey comparison

The overall exposed length of pipeline PL1636 and the number of exposures reported were found to decrease in the 2013 and 2022 surveys. A new 92m long exposure was reported local to the Thurne wellhead in 2022 which had not been reported in previous surveys. This location matches exactly with a 93m long 'stabilisation' that was reported in the 2013 survey.

Only one span has historically been reported in 2013, measuring 4m in length. The seabed profiles at this location from the 2013 and 2022 surveys were checked and no evidence of any freespans could be seen. The legacy inspection interval risk assessment for the Bure West pipelines PL1635 and PL1636 is provided in Figure 3.8 below, based on the known pipeline details and the results of the survey trending exercise.

The governing risk score for PL1635 and PL1636 is a '2E', driven by the impact on other users of the sea and financial categories, resulting in an 11-year inspection frequency for both pipelines putting the next scheduled inspections in 2033.

PL no.	Likelihood	Consequence						Risk	Freq.
		Other sea users	Environ.	Financial	Socio-economic	Regulatory	Reputation		
PL1635	E	2	3	2	5	4	4	2E	11
PL1636	E	3	3	2	5	4	4	2E	11

Figure 3.8 – PL1635 / PL1636 risk assessment

PL1637 / PL1638 (Deben (Thurne) to Thames)

PL1637 is the 8" Deben interfield pipeline and PL1638 is the 5" Deben umbilical, between the Thurne wellhead and Thames AR. The pipelines are 5.3km (PL1637) and 5.4km (PL1638) in length, and both are trenched and buried to 1m top-of-pipe. Neither of the Deben pipelines runs through an environmentally sensitive area, although both skirt the edge of the Southern North Sea Special Area of Conservation (SAC).

A trawl sweep of the Deben pipelines was performed in February 2022 covering 50m on either side of each pipeline and a clean seabed certificate was issued by the NFFO in November 2023, see Appendix 10.1 Figure 3.9 summarises the exposures and freespans reported on PL1637 across the surveys conducted in 2011, 2013, and 2022.

Parameter	2011	2013	2022	Trend
Total exposure length (m)	10	85	0	↓
Total number of exposures	1	17	0	↓
Total freespan length (m)	0	0	0	↔
Total number of freespans	0	0	0	↔

Figure 3.9 - PL1637 survey comparison

It should be noted that the 2011 survey did not cover the full 5.3km; a SSS survey was performed from KP4.739 to KP5.272 and an MBES survey from KP4.631 to KP5.343. The 2013 and 2022 surveys covered the full pipeline length. The 2011 survey reported an intermittent exposure of 10m within the 700m section that was surveyed. 2013 saw an increase in the overall exposure length and number of exposures compared to 2011, but this is owed primarily to the disparity in the survey limits between the two inspections. In 2022, no exposures were identified at all. None of the inspections identified the presence of any freespans. Figure 3.10 summarises the exposures and freespans reported on PL1638 across the surveys conducted in 2011, 2013, and 2022.

Parameter	2011	2013	2022	Trend
Total exposure length (m)	10	0	282	↑
Total number of exposures	1	0	4	↑
Total freespan length (m)	0	0	0	↔
Total number of freespans	0	0	0	↔

Figure 3.10 - PL1638 survey comparison

The 2011 survey reported intermittent exposure with a length of 10m. As noted for PL1637, the full length of the line was not surveyed in 2011. The 2013 survey covered the full length of the line, reporting no exposures. The 2022 survey included the full line and observed several exposures.

The 2022 survey shows that there has been a notable increase in exposure length since 2013, with the formation of four exposures, the largest of which is 176m long. No free spans were identified in any of the historical surveys trended. The legacy inspection interval risk assessment for the Deben pipelines PL1637 and PL1638 is provided in Figure 3.11 below, based on the known pipeline details and the results of the survey trending exercise.

The governing risk score for PL1637 and PL1638 is a '2D', driven by the impact on other users of the sea and financial consequence categories, resulting in an 8-year inspection frequency putting the next scheduled inspections in 2030.

PL no.	L/hood	Consequence						Risk	Freq.
		Other sea users	Environ.	Financial	Socio-economic	Regulatory	Reputation		
PL1637	D	2	4	2	5	4	4	2D	8
PL1638	D	3	4	2	5	4	4	2D	8

Figure 3.11 – PL1637 / PL1638 risk assessment

3.2.3 Proposed Post-decommissioning Monitoring Regime

Table 3.1: Future Surveys and Monitoring Proposals
1. **Substructures** (Jackets)
• Thames Complex: all substructures have been removed. No further monitoring is required. • Bure 'W' PLET assembly (buried in-situ): 11-year inspection frequency, next survey in 2033. • Thurne: all substructures have been removed. No further monitoring is required. • Yare 'C' PLET assembly (buried in-situ): 11-year inspection frequency, next survey in 2033. 11-year inspection frequency, next survey in 2033. • Bure 'O': all substructures have been removed. No further monitoring is required.
2. Pipelines, Flowlines & Umbilicals
• Bure 'O' PL371/PL373: 8-year inspection frequency, next survey in 2030. • Yare 'C' PL372/PL374: 11-year inspection frequency, next survey in 2033. • Bure West PL1635/PL1636: 11-year inspection frequency, next survey in 2033. • Deben PL1637 / PL1638: 8-year inspection frequency, next survey in 2030.
3. Pipeline Stabilisation Features
• Thames Complex: No further surveys. Mattresses covered with rock placement. • Bure 'O': 8-year inspection frequency, next survey in 2030. • Yare 'C': 11-year inspection frequency, next survey in 2033. • Bure West: 11-year inspection frequency, next survey in 2033. • Deben: 8-year inspection frequency, next scheduled inspections in 2030.
4. Drill Cuttings
No further monitoring is required. Cuttings are widely dispersed.
5. Environmental Surveys
One additional survey is to be carried out at the following stations: • Thames platform location - Station TH_02 and Station TH_07. • Bure O location - Station BO_03 and Station BO_06. • Bure West to Thames PL 1635 - Station PL1635_05. The survey scope for the Thames field assets will be limited to heavy metal analysis and will be carried out during the post-decommissioning surveys for the Gawain and Arthur fields that are currently planned for 2025. No additional macrofauna samples are required and will not form part of the additional environmental survey scope.

4.0 IMPACT ON HSE

- **Undeclared NORM shipped to dismantlement yard:** Contaminated decommissioning waste (topsides process pipework) from the Thames AP platform was received at Hoondert yard in

Vlissingen Holland on 21st August 2015 due to ineffective labelling system offshore. Items that had not been checked by the site Radiation Protection Supervisor (RPS) for contamination were put into a scrap metal skip with other items that had been checked.
Follow-up action: all waste that was not marked being re-checked and marked appropriately. A system was put into place to mark items as 'checked NORM clear' and a NORM awareness presentation was given to all crew.

- **Lifting Operations (near-miss):** The incident occurred on 14th October 2015 during the decommissioning works on the Thames AP platform. During the lifting operations, a 20ft empty container touched the hydraulic hoses on the back of the Telehandler. Lifting operations were being carried out at the same time as the cutting operations using the telehandler to remove cut pipework in a confined area. The deck crew had failed to assess all the potential hazards and either remove other work parties from the area or use a different method of moving the container to the designated space.
Follow-up action: Clarification and exact requirements of safe deck operation reiterated to deck crew and crane operator.

- **Rupture of Oxygen hose on OxyPropane heat gun (near-miss):** The incident occurred on 22nd February 2016 during the decommissioning works on the Thames AP platform. The rupture occurred in the short section of the oxygen hose between the torch and the quick-connect coupling in the hose. On closer inspection, an oily substance was noticed coming from the propane hose.
Follow-up action: the equipment used was immediately removed from the worksite for inspection. All crew were reminded of the importance of equipment integrity checks before starting work, and a reminder was added to the 'welcome on board' brief.

- **Loss of air during diving operations (RIDDOR) (near-miss):** The incident occurred on 11th May 2018 during decommissioning works to remove the Bure O subsea wellhead. Diver reported loss of primary and bailout gas supplies. The diving operations were stopped, the DSV was pulled clear of the work site, and the diving helmet was quarantined. N-Sea (diving contractor) carried out a comprehensive investigation to determine the causes of this event and a RIDDOR report was subsequently submitted to HSEx.

- **Dropped object at dismantlement yard (3rd party near-miss):** Onshore dismantling operations were managed by Hoondert Services & Decommissioning BV in the Netherlands. PUK were informed of a near-miss at the Hoondert yard which occurred in September 2017. A steel hatch (approx. 5kg) fell from a height of 40m, missing two personnel at a proximity of 3 - 5m. Corrective action was put in place by the yard.

5.0 WASTE

The Thames Complex was removed in 2017/2018 and onshore dismantlement and recovery/disposal was carried out at the Hoondert dismantlement yard in the Netherlands. The dismantlement and recovery were completed in Q4 2018. The transportation was carried out under two separate International Waste Shipment (IWS) permits; GB 0001 006598 and GB 0001 004469. The Thames conductor stubs were shipped as "green listed waste" to the Netherlands and recovered under Article 18 controls.

The amount of NORM contaminate from the Thames Complex process systems had been significantly underestimated. The amount recovered at the yard was circa 44Te. Approximately 99.62 % of the waste material transported onshore was recovered. The remaining waste was either incinerated or sent to waste disposal. The amount to landfill was 47Te.

Onshore dismantlement of the recovered Bure O, Bure W and Yare C subsea structures was carried out at Port of Blyth's licensed decommissioning bay. All material was recycled. Onshore dismantlement of the recovered Thurne subsea structures was carried out at the licensed at the Great Yarmouth Veolia decommissioning quay. All material was recycled.

The total waste to shore was 11,378Te. This was less than had been estimated due to the mattresses remaining in-situ, and an overestimate of the weight of the Thames Complex in the original DP document.

Table 5.1: Materials/Waste Returned to Shore - Installation

Material/Waste	Total Weight (Te) – as per the approved DP	Tonnage In situ (Te)	Tonnage to shore (Te)	Date to shore	Disposal Method
Steel – Surface Installations	13,477	0	10,482	2016 – 2017	Recycled
Steel – Subsea Installations	447*	0	457.5	2017 – 2020	Recycled
Steel – Pipelines	23,541	23,540	1	2020	Recycled
Concrete	65,333	65,311	22	2020	Recycled
Plastics	530	218	312	2016 – 2017	Recycled
Hazardous (asbestos-containing material)	26	26	3	2016 – 2017	Landfill
Hazardous (NORM scale)	0	0	44	2016 – 2017	Landfill
Other	896	933	56	2016 – 2017	Recycled
Rock Placement	13,000	43,000 **	0		In-situ
Total	**117,250**	**133,028**	**11,378**		

** Original DP excluded Thurne wellhead (42 Te). Thurne well head added in 2nd revision of Thames DP.*
*** Includes an additional 30,000Te in Thames Complex Area for remediation*

6.0 LESSONS LEARNED

- **Underestimation of NORM**: The level of NORM within the Thames Complex process system was significantly underestimated before commencing the offshore campaign. This led to a dispute with the JV dismantlement contractors due to health and safety concerns. An investigation was carried out to identify regulatory requirements and best practices. Two independent Radioactive Protection Advisors (RPA) were put in place to oversee the handling of the NORM waste. The PUK procedures concerning the handling of NORM were updated

and the amount of NORM recovered from the Thames Complex was used to inform future calculations of the NORM estimate on future decommissioning programmes where NORM had been identified.

- **Poor JV welding quality control:** Poor welding quality controls were identified offshore for secondary steelworks to primary structures. PUK suspended the JV welding operation, and an investigation was carried out. The investigation identified that no fabrication drawings were available at work locations and no Material Traceability System was being followed by the JV welding subcontractors to ensure correct materials and welding consumables were applied as per the required standards. PUK assisted the JV with the development of the welding repair procedures and established welding quality control systems offshore.

- **Cutting of Conductors**: Conductors A2 and A4 could only be partially removed due to the inability to cut the remaining conductor stubs using abrasive water jets. An alternative method for cutting the conductor stubs using explosives was discussed and approved with the OPRED Environmental Management Team. Future decommissioning programmes have reviewed alternative conductor-cutting methods to abrasive water jets.

- **Joint MBES survey:** A joint MBES survey was carried out with TOSK. The PUK survey scope was being carried out in the same vicinity (i.e., Bure O, Bure W, Yare, Thames area, Thurne/Deben) and the appropriate tools were onboard to perform the scope of work required by Tullow. The joint campaign resulted in significant cost reduction for both parties.

- **Joint P&A campaign:** A joint P&A campaign for Thurne, Orwell, and Wissey was carried out by TOSK. The joint campaign resulted in significant cost reduction.

- **Use of ROV in congested Thames Complex Area:** remediation work was completed by TOSK for the Orwell, Horne and Wren flowline and umbilical in the Thames area. The seabed condition at the Thames Complex is heavily congested which resulted in several hazards to safe ROV operations. Protrusions from the seabed caused major damage to the ROV contributing to significant downtime. The issues identified during the TOSK campaign were provided as inputs into the updated PUK CA for the exposed Thames pipelines within the former Thames 500m Safety Zone.

7.0 COST SUMMARY

The cost summary for the decommissioning of the Thames Complex, the Bure W, Bure O, and Yare C subsea structures and the work completed by PUK on the Bure W, Bure O, Yare C, and Deben flowlines pipeline decommissioning scope has been provided separately by PUK to OPRED.

The costs associated with the removal of the Thurne subsea well installation and the remediation of the pipeline/mattresses within the Thurne 500m Safety Zone (completed by TOSK), have been provided separately by TOSK to OPRED.

8.0 PHOTOGRAPHS

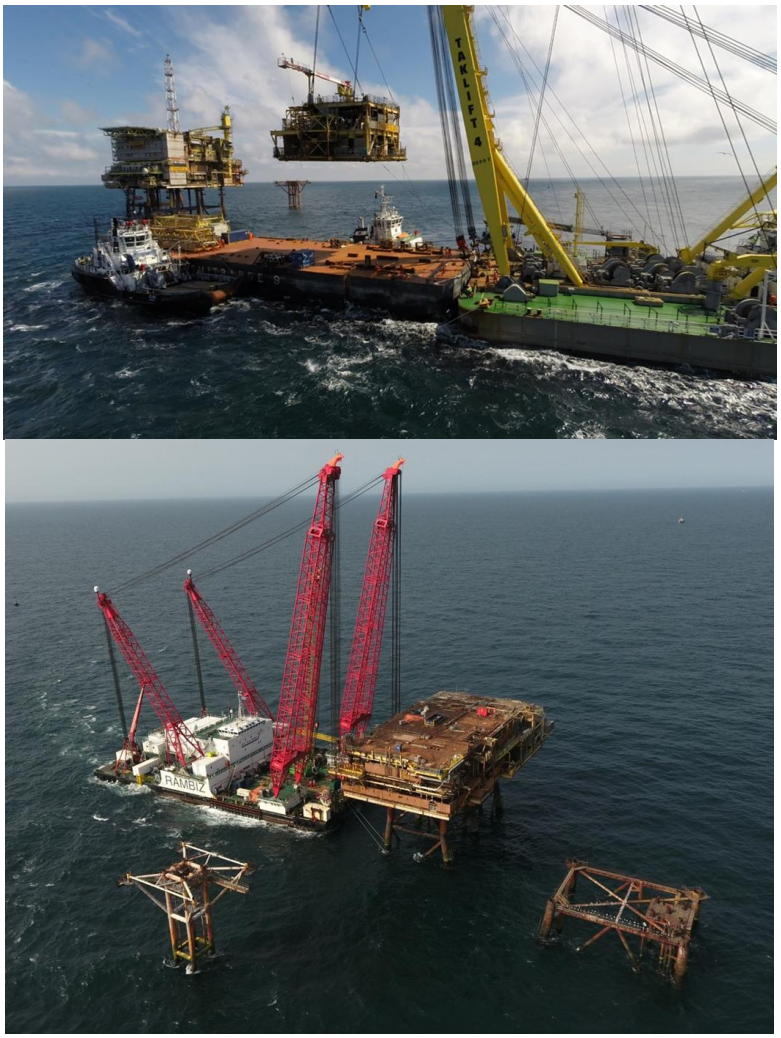

Figure 8.1 – Removal of Thames Complex Topsides

Figure 8.2 – AW Jacket set down at Hoondert disposal yard, Netherlands

Removal of NORM contaminated sand from a Thames process vessel at Hoondert Yard

Figure 8.3 – Removal of NORM contaminated sand from Thames process vessel at Hoondert Yard

Figure 8.4 – Removal of Bure Oscar subsea wellhead onto barge

Figure 8.5 – Set-down of Bure Oscar subsea protective at Port Blythe yard & Removal of Bure W subsea protective cage onto the barge.

Figure 8.6 – Set down of Thurne WHPS structure (behind crane) on the quayside at GY Veolia yard.

9.0 REFERENCES

Table 9.1: Referenced Documents		
Document Number	Title	Reference
1	Decommissioning Environmental Survey Review	200605-S-REP-0046 Rev 1 Thames, May 2024.
2	Decommissioning Close Out Report - Thames field pipelines	JEE-PER275-REP-001 – B002 October 2024
3	Decommissioned pipelines risk matrix	JEE-PER275-REP-002 – B002 October 2024
4	Thames Comparative Assessment Report	PER-SNS-DECOM-THA-001 Rev 02, (2014).
5	Thames Satellite Assets Stabilisation Material Comparative Assessment	DECOM-2023-THAMES-ST-U-001, (2023).

10.0 APPENDICES

10.1 Clean Seabed Certificates

The National Federation of Fishermen's Organisations

Clean Seabed Certificate.

Date: 7th March 2022.

To whom it may concern.

Bure O Decommissioning.

The Commercial Trawl Vessel Atlas B WY 101 operating under NFFO membership conducted the following activities in the Decommissioned Bure O Well 500 metre zone.

A series of intense bi-directional sweeps over the full 500-metre zone has been conducted with the objective of safe future over trawl within the said zone.

A significant number of passes have been made across each area. (Individual plotter data has been supplied) Standard Southern North Sea trawl equipment was used to conduct the sweeps.

A light tickler chain was attached to the trawl to ensure continuous contact with the seabed to determine whether there were any major obstructions which might present a major snagging hazard for future fishing activities. The trawl net was also seen as a means of gathering any items of debris located in the area.
No debris or obstructions were encountered.

Following completion of the sweep programme the skipper of the trawl vessel Atlas B has reported to the NFFO the following:

a) No major snag was experienced during any of the sweeps.
b) On no occasion did the winch pressure show any increase.
c) As a result of the sweeps and the absence of any debris or snagging points on any of the above-named decommissioned site the Commercial Fishing Skipper to the best of his knowledge is satisfied that the areas will not pose any significant problem for future fishing operations.

Based upon feedback provided by the skipper, the Federation accepts that the decommissioned Bure O 500m safety zone was found to be clear of debris or major obstruction and posed no significant problem for future fishing operations.

The Federation would like to thank Perenco UK for their efforts in ensuring that all significant items of equipment and debris have been recovered.

Signed

Chief Executive
National Federation of Fishermen's Organisations

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Tel: 01904 635430 | Email: nffo@nffo.org.uk | Web: www.nffo.org.uk

The National Federation of Fishermen's Organisations

Clean Seabed Certificate.

Date: 7th March 2022.

To whom it may concern.

Bure W Decommissioning.

The Commercial Trawl Vessel Atlas B WY 101 operating under NFFO membership conducted the following activities in the Decommissioned Bure W 500 - metre zone.

A series of intense bi-directional sweeps over the 500 - metre zone has been conducted with the objective of safe future over trawl within the said zone.

A significant number of passes have been made across each area. (Individual plotter data has been supplied) Standard Southern North Sea trawl equipment was used to conduct the sweeps.

A light tickler chain was attached to the trawl to ensure continuous contact with the seabed to determine whether there were any major obstructions which might present a major snagging hazard for future fishing activities. The trawl net was also seen as a means of gathering any items of debris located in the area.
No debris or obstructions were encountered.

Following completion of the sweep programme the skipper of the trawl vessel Atlas B has reported to the NFFO the following:

a) No major snag was experienced during any of the sweeps.
b) On no occasion did the winch pressure show any increase.
c) As a result of the sweeps and the absence of any debris or snagging points on any of the above-named decommissioned site the Commercial Fishing Skipper to the best of his knowledge is satisfied that the areas will not pose any significant problem for future fishing operations.

Based upon feedback provided by the skipper, the Federation accepts that the decommissioned Bure W 500m safety zone was found to be clear of debris or major obstruction and posed no significant problem for future fishing operations.

The Federation would like to thank Perenco UK for their efforts in ensuring that all significant items of equipment and debris have been recovered.

Signed

Chief Executive
National Federation of Fishermen's Organisations

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The National Federation of Fishermen's Organisations

Clean Seabed Certificate.

Date: 7th March 2022.

To whom it may concern.

Deben / Thurne Decommissioning.

The Commercial Trawl Vessel Atlas B WY 101 operating under NFFO membership conducted the following activities in the Decommissioned Deben / Thurne 500 - metre zone.

A series of intense bi-directional sweeps over the 500 - metre zone has been conducted with the objective of safe future over trawl within the said zone.

A significant number of passes have been made across each area. (Individual plotter data has been supplied) Standard Southern North Sea trawl equipment was used to conduct the sweeps.

A light tickler chain was attached to the trawl to ensure continuous contact with the seabed to determine whether there were any major obstructions which might present a major snagging hazard for future fishing activities. The trawl net was also seen as a means of gathering any items of debris located in the area.
No debris or obstructions were encountered.

Following completion of the sweep programme the skipper of the trawl vessel Atlas B has reported to the NFFO the following:

a) No major snag was experienced during any of the sweeps.
b) On no occasion did the winch pressure show any increase.
c) As a result of the sweeps and the absence of any debris or snagging points on any of the above-named decommissioned site the Commercial Fishing Skipper to the best of his knowledge is satisfied that the areas will not pose any significant problem for future fishing operations.

Based upon feedback provided by the skipper, the Federation accepts that the decommissioned Deben / Thurne 500m safety zone was found to be clear of debris or major obstruction and posed no significant problem for future fishing operations.

The Federation would like to thank Perenco UK for their efforts in ensuring that all significant items of equipment and debris have been recovered.

Signed

Chief Executive
National Federation of Fishermen's Organisations.

The National Federation of Fishermen's Organisations Ltd | 30 Monkgate, York YO31 7PF
Tel: 01904 635430 | Email: nffo@nffo.org.uk | Web: www.nffo.org.uk

The National Federation of Fishermen's Organisations

Clean Seabed Certificate.

Date: 7th March 2022.

To whom it may concern.

Yare C Decommissioning.

The Commercial Trawl Vessel Atlas B WY 101 operating under NFFO membership conducted the following activities in the Decommissioned Yare C 500 - metre zone.

A series of intense bi-directional sweeps over the 500 - metre zone has been conducted with the objective of safe future over trawl within the said zone.

A significant number of passes have been made across each area. (Individual plotter data has been supplied) Standard Southern North Sea trawl equipment was used to conduct the sweeps.

A light tickler chain was attached to the trawl to ensure continuous contact with the seabed to determine whether there were any major obstructions which might present a major snagging hazard for future fishing activities. The trawl net was also seen as a means of gathering any items of debris located in the area.
No debris or obstructions were encountered.

Following completion of the sweep programme the skipper of the trawl vessel Atlas B has reported to the NFFO the following:

a) No major snag was experienced during any of the sweeps.
b) On no occasion did the winch pressure show any increase.
c) As a result of the sweeps and the absence of any debris or snagging points on any of the above-named decommissioned site the Commercial Fishing Skipper to the best of his knowledge is satisfied that the areas will not pose any significant problem for future fishing operations.

Based upon feedback provided by the skipper, the Federation accepts that the decommissioned Yare C 500m safety zone was found to be clear of debris or major obstruction and posed no significant problem for future fishing operations.

The Federation would like to thank Perenco UK for their efforts in ensuring that all significant items of equipment and debris have been recovered.

Signed

Barrie Deas

Chief Executive
National Federation of Fishermen's Organisations.

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The National Federation of Fishermen's Organisations

Clean Seabed Certificate.

Date: 6th November 2023.

To whom it may concern.

Thames Decommissioning.

The Commercial Trawl Vessel Atlas B WY101 operating under NFFO membership conducted the following activities in the Decommissioned Thames 500 - metre zone.

A series of intense bi-directional sweeps over the Thames 500 - metre zone has been conducted with the objective of safe future over trawl within the said zone.

A significant number of passes have been made across the area. (Individual plotter data has been supplied)
Standard Southern North Sea trawl equipment was used to conduct the sweeps in 2 phases.

Phase 1 - using standard rock hopper ground gear with no net attached.
Phase 2 - using standard trawl gear as used in the Southern North Sea with trawl net attached.

A light tickler chain was attached to the trawl to ensure continuous contact with the seabed to determine whether there were any major obstructions which might present a major snagging hazard for future fishing activities. The trawl net was also seen as a means of gathering any items of debris located in the area.
No debris or obstructions were encountered.

Following completion of the sweep programme the skipper of the trawl vessel Atlas B, WY101 has reported to the NFFO the following:

a) No major snag was experienced during any of the sweeps.
b) On no occasion did the winch pressure show any increase.
c) As a result of the sweeps and the absence of any debris or snagging points on the above-named decommissioned site, the Commercial Fishing Skipper, to the best of his knowledge, is satisfied that the areas will not pose any significant problem for future fishing operations.

Based upon feedback provided by the skipper, the Federation accepts that the decommissioned Thames 500 - metre safety zone was found to be clear of debris or major obstruction and posed no significant problem for future fishing operations.

The Federation would like to thank Perenco for their efforts in ensuring that all significant items of equipment and debris have been recovered.

M Cohen, Chief Executive
National Federation of Fisherman's Organisation.

The National Federation of Fishermen's Organisations Ltd, 30 Monkgate, York YO31 7PF

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ISO9001-15 Issue 2 07/03/2022

The National Federation of Fishermen's Organisations

Clean Seabed Certificate.

Date: 6th November 2023.

To whom it may concern.

Thames Pipelines Decommissioning.

The Commercial Trawl Vessel Atlas B WY101 operating under NFFO membership conducted the following activities in the along the following Thames associated pipelines covering 50 metres either side of each pipeline excluding the 500-metre zones of the Bure O / Bure W / Deben, Thurne / Yare C previously trawl swept with no snagging hazards encountered February 2022.

Pipelines covered: Thames to Yare C / Thames to Thurne / Thames to Bure O / Thames to Bure W

A series of trawl sweeps has been conducted with the objective of safe future over trawl along each pipeline. (Individual plotter data has been supplied).

Standard Southern North Sea trawl equipment was used to conduct the sweeps.

Phase 1 - using standard rock hopper ground gear with no net attached.
Phase 2 - using standard trawl gear as used in the Southern North Sea with trawl net attached.

A light tickler chain was attached to the trawl to ensure continuous contact with the seabed to determine whether there were any major obstructions which might present a major snagging hazard for future fishing activities. The trawl net was also seen as a means of gathering any items of debris located in the area.
No O&G debris or obstructions were encountered throughout the operations.

Following completion of the sweep programme the skipper of the trawl vessel Atlas B, WY101 has reported to the NFFO the following:

a) No major snag was experienced during any of the sweeps.
b) On no occasion did the winch pressure show any increase.
c) As a result of the sweeps and the absence of any debris or snagging points on any of the above-named decommissioned pipelines, the Commercial Fishing Skipper to the best of his knowledge is satisfied that the areas will not pose any significant problem for future fishing operations.

Based upon feedback provided by the skipper, the Federation accepts that the decommissioned pipelines were found to be clear of debris or major obstruction and posed no significant problem for future fishing operations.

The Federation would like to thank Perenco for their efforts in ensuring that all significant items of equipment and debris have been recovered.

M Cohen, Chief Executive
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ISO9001-15 Issue 2 07/03/2022

10.2 List of approved permits for rock placement on the pipelines and associated stabilisation mattresses within the Thames Complex Area

PWA Deposit Consents:

- PL370 (Bacton – Thames) – 26.5m span – (PWA Deposit Reference: PA/4163)
- PL371 (Bure O – Thames AW) – 17m span – (PWA Deposit Reference: PA/3960)
- PL372 (Yare C – Thames AW) – 31m span – (PWA Deposit Reference: PA/3960)
- PL1057 (Gawain – Thames AW) – 122m span – (PWA Deposit Reference: PA/3966)
- PL1058 (Gawain – Thames AW) – 92m span – (PWA Deposit Reference: PA/3966)
- PL2047 (Arthur – Thames AW) – 187m span – (PWA Deposit Reference: PA/3967)
- PL931 (Thames AW – Orwell) – 86m span – (PWA Deposit Reference: PA/3988)
- PL933 (Thames AW – Orwell) – 145m span – (PWA Deposit Reference: PA/3988)
- PL2080 (Thames AR – Horne & Wren) – 150m span – (PWA Deposit Reference: PA/3989)
- PL674 (Welland to Thames AW) – 71m span – (PWA Deposit Reference: PA/3963)
- PL1635 (Bure West – Thames AR) – 12m span – (PWA Deposit Reference: PA/3968)
- PL1637 (Thurne (Deben) – Thames AR) – 12m span– (PWA Deposit Reference: PA/4103)
- PL1638.1 (Thames - Thurne (Deben)) – 12m span – (PWA Deposit Reference: PA/3969)

Marine Licence:

- MAT PLA - 901
- ML/799/0 (Version 6)