Calder, Dalton & Millom

Decommissioning

Decommissioning Programmes

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Table of Abbreviations

Table of Abbreviations	
Abbreviation	**Description**
~, approx.	Approximately
3LPP	3-Layer Polypropylene, coating used for carbon steel pipelines and pipework
acoustic monitoring	An acoustic monitoring survey examines whether the pipelines are exposed, the extent of any exposures and whether any free spans are present but does not examine the depth of burial
approaches	Refer to pipelines, umbilicals and electrical cables as they come nearer to the installations or pipeline structures.
AP1	Accommodation Platform 1 (part of South Morecambe Hub), bridge linked to CPP1
BAP	Biodiversity Action Plan
BEIS	The Department for Business, Energy, and Industrial Strategy
BSI	British Standards Institute
CCUS	Carbon Capture, Usage and Storage
Chrysaor	Chrysaor Resources (Irish Sea) Limited, company number 03440053, 100% licence equity holder in the Calder, Dalton and Millom fields and associated assets. Wholly owned subsidiary of Harbour Energy plc.
COP	Cessation of Production
COSHH	Control of Substances Hazardous to Health
CPP1	Central Processing Platform 1, provides Calder with electrical power
CWC	Concrete Weight Coated (thickness varies between 60mm and 80mm), applies to PL1965 only
DP	Decommissioning Programme (document), ref: Table 1.6.1 and Table 2.3.1
DP1	Drilling Platform 1. Fixed steel jacket.
DP3, DP4	Drilling Platform 3 and Drilling Platform 4, connected to South Morecambe Hub. Both topsides were removed in 2021; the fixed steel jackets are to be removed in 2023.
DP6, DP8	Drilling Platform 6 and Drilling Platform 8, connected to South Morecambe Hub
DPPA	(North Morecambe) Drilling and Production Platform Alpha. Fixed steel jacket. Export route (PL1674) for Millom and provides hydraulic power and chemical injection capability to (PL1678) Millom East and electrical power to Millom West.
EA	Environmental Appraisal
EIS	East Irish Sea
electrical cable	Electrical and fibre-optic cable
ENI	ENI UK Limited
ENVID	Environmental Identification
EPS	European Protected Species
ESDV	Emergency Shutdown Valve
EUNIS	European Nature Information Systems
FishSAFE	The FishSAFE database contains a host of oil & gas structures, pipelines, and potential fishing hazards. This includes information and changes as the data are reported for pipelines and cables, suspended wellheads pipeline spans, surface & subsurface structures, safety zones and pipeline gates (www.fishsafe.eu). FishSAFE is a PC-based safety device that provides the skipper of a fishing vessel with detailed information about subsea obstruction and provides a timely warning of any nearby oil and gas related infrastructure that may pose a snagging hazard and potentially result in the damage or loss of the fishing gear or even the vessel.

Table of Abbreviations	
Abbreviation	**Description**
FL1	Flare Platform 1, tripod jacket, bridge linked to South Morecambe CPP1
FPAL	First Point Assessment Limited
FSJ	Fixed Steel Jacket (Table 1.6.1)
GFE	Glass Flake Epoxy (Table 2.3.2, Table 2.3.3)
Harbour Energy	The Harbour Energy group of companies with Harbour Energy plc as the ultimate top company
H,S&CI	Hydrate, scale, & corrosion inhibitor (Table 2.3.1, Table 2.3.2, Table 2.3.3)
HSE	Health and Safety Executive
ID	Identifier. Usually a number provided by the NSTA for pipelines, umbilicals and electrical cables. Where not available (e.g. electrical cables), an ID will need to be applied for using the Pipeline Works Authorisation (PWA) application process.
infrastructure	Includes Calder and Millom West platforms, all WHPS and all pipelines, umbilicals and electrical cables associated with the Calder, Dalton, and Millom fields.
IMO	International Maritime Organisation
IOM	Isle of Man
IOM Interconnector Cable	Isle of Man Interconnector Cable runs beneath the seabed between Douglas on the Isle of Man, and Bispham on the Lancashire coast and spans a distance of 104km (56 nautical miles) linking the Isle of Man to the UK National Grid.
IRM	Inspection, Repair and Maintenance
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
KP	Kilometre Point, usually measured from point of origin, the start of the pipeline at the pipeline flange. A negative KP means that the features (e.g. tie-in spools) lie between the riser flange and the start of the pipeline.
kV	Unit of 1000 volts, measured in Kilovolts
LAT	Lowest Astronomical Tide
m	metre, 1000mm
MAT	Master Application Template
MCZ	Marine Conservation Zone
MeOH	Methanol
Millom East	Millom Pipeline End Manifold (PLEM), Q1, Q2 & Q3
MLWM	Mean Low Water Mark (PL1965, KP42.424)
mm	millimetre
MoD	Ministry of Defence
MPA	Marine Protected Area
n/a	Not applicable
NMT	North Morecambe Terminal
No.	Number (of)
NSTA	North Sea Transition Authority
NUI	Normally Unattended Installation
NWIFCA	North-Western Inshore Fisheries and Conservation Authority
OD	Outside diameter (used for suction piles, umbilicals and cables)
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo-Paris Convention (The Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention')

Table of Abbreviations	
Abbreviation	**Description**
piggybacked	Clamped or connected to another pipeline along part or all of its length
pipeline	Pipeline, umbilical or electrical & fibre-optic cable
PL, PLU	Pipeline or Umbilical Identification number as given by NSTA using the PWA application process
platform	Installation, typically comprising topsides and substructure such as a jacket or legs supported by suction piles - as is the case for a SIP
PLEM	Pipeline End Manifold
PPE	Personal Protection Equipment
PWA	Pipeline Works Authorisation
PWR	Preparatory Works Request
Q1, Q2, Q3	Millom Well Q1, Q2, and Q3 respectively
R1, R2	Dalton Well R1 and R2 respectively
RBA	Risk Based Assessment
risk	Defined by the Institution of Civil Engineers as being either an 'opportunity' or 'threat'. in this report the word "risk" is used to describe a "threat"
Rivers Terminal	The gas processing facility known as 'Rivers terminal'. It is named as "Rivers" because the hydrocarbon fields which are produced, or could potentially be produced, through the terminal (Calder, Dalton, and Millom) are all named after Lancashire rivers. This is one of three gas terminals (North Morecambe, South Morecambe, and Rivers) located near Barrow-in-Furness. The South Morecambe terminal has been decommissioned.
SAC	Special Area of Conservation
SAT	Subsidiary Application Template
SE	Spirit Energy Production UK Limited (reference Table 1.6.1)
SIP	Self-Installing Platform, sometimes referred to as a Multi-Purpose Platform. Self-Installing Platform comprising a topsides and four legs anchored to the seabed using suction piles. Also called a Multipurpose Platform (MPP) in the Netherlands.
SOSI	Seabird Oil Sensitivity Index
SPA	Special Protection Area
span	Similar to an exposure except that the whole of the section of pipeline is visible above the seabed rather than just part of it. Once the height and length dimensions meet or exceed certain criteria the span becomes a reportable span.
South Morecambe Hub	This comprises three platforms, AP1, CPP1, and DP1, all bridge linked together with a Flare Platform
suction piles	Also referred to as suction caissons, suction anchors, or suction buckets. These are large open-bottomed tubes that are installed into the seabed sediment by using self-weight and pumping water out of the top of the tube until it has reached the penetration required.
TFSW	Transfrontier Shipment of Waste
trunklines	Pipelines that extend from out in the field to shore. E.g. Calder pipelines PL1965 & PL1966.
UKCS	United Kingdom Continental Shelf
umbilical	Flexible pipeline manufactured of various materials including steel and plastics typically used to send electrical power, communication signals, chemicals and hydraulic fluid to a manifold or wellhead. An umbilical pipeline will include cables and tubes that are covered with an outer sheath to protect them from damage.

Table of Abbreviations	
Abbreviation	**Description**
UTDA	Umbilical Termination and Distribution Unit
WF	Wind Farm (Table 1.6.1)
WFC	Wind Farm Cables (Table 1.6.1)
WofD	West of Duddon Sands (Wind Farm) (Table 1.6.1)
WONS	Well Operations Notification System
WP	Wellhead platform (Table 1.6.1)
x	Number, e.g. 9x = 9 off or number

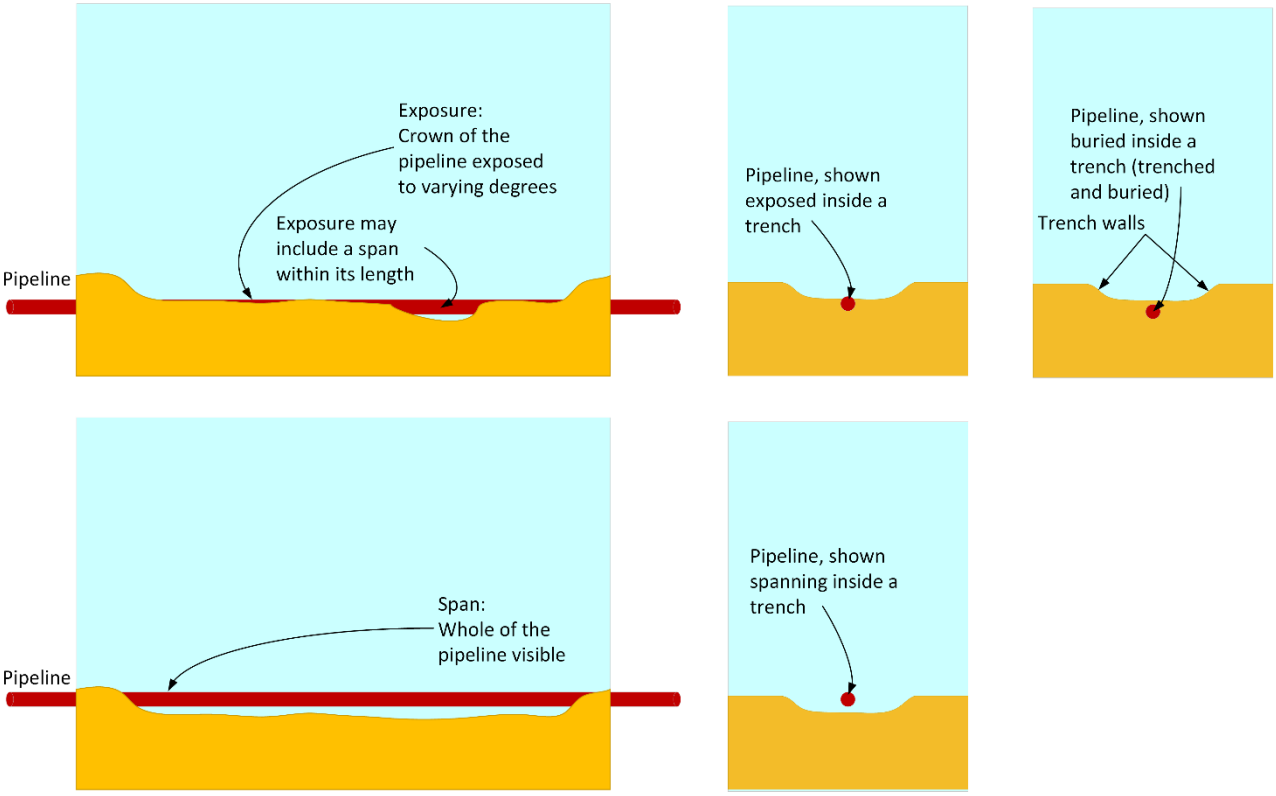


Figure 1.1.1: The difference between pipeline burial, exposures, and spans[1]

[1] Trench walls may or may not be prominent

1 Executive Summary

1.1 Combined Decommissioning Programmes

This document contains six Decommissioning Programmes, one for each set of notices under Section 29 of the Petroleum Act 1998. The Decommissioning Programmes address the following assets:

- Calder platform.
- Calder associated pipelines, including PL1965, PL1966 and the electrical cable, PL6340.
- Dalton installations (R1 & R2 Wellhead Protection Structures (WHPS) and Pipeline End Manifold (PLEM)).
- Dalton associated pipelines, including PL1668, PL1669, PL1670, PL1671, PL1672 and PL1673.
- Millom installations (Millom West platform, Millom Q1, Q2 & Q3 WHPS and Millom East PLEM).
- Millom associated pipelines, including PL1674, PL1675, PL1676, PL1677, PL1678, PL1679, PL1873, PLU1874, PL1980, PLU1678JQ3 and including electrical cable PL6352.

Although decommissioning of these installations and pipelines is being treated in this document as a standalone project, the operational phase could potentially be carried out as part of a wider decommissioning campaign in the East Irish Sea. Harbour Energy and other operators continue to explore such synergies with other projects, as well as opportunities for cost sharing and cost savings.

1.2 Requirement for Decommissioning Programmes

Installations: In accordance with the Petroleum Act 1998, as Section 29 holders of the Calder, Dalton and Millom installations, Chrysaor Holdings Limited and Chrysaor Resources (Irish Sea) Limited[2] (Refer Table 1.4.2, Table 1.4.3, and Table 1.4.4) is applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the installations detailed in Section 2 of this document. Section 29 Notice Holder Letters of Support will be added to the Decommissioning Programmes following statutory consultation.

Pipelines: In accordance with the Petroleum Act 1998, as Section 29 holders of the Calder, Dalton and Millom pipelines, Chrysaor Holdings Limited and Chrysaor Resources (Irish Sea) Limited[2] (Refer Table 1.4.6, Table 1.4.8 and Table 1.4.10) is applying to OPRED to obtain approval for decommissioning the pipelines detailed in Section 2 of this document. Section 29 Notice Holder Letters of Support will be added to the Decommissioning Programmes following statutory consultation.

In conjunction with public, stakeholder and regulatory consultation, the Decommissioning Programmes are submitted in compliance with national and international regulations and OPRED guidance notes. The schedules outlined in this document are for a decommissioning project for each field as follows:

Dalton field – 11-year decommissioning project may commence in 2024. Decommissioning of the associated installations and infrastructure is expected to be undertaken in the period 2024 to 2034 subject to DP approval being given. The program of work has been extended to cater for the uncertainty in the timing of decommissioning works of infrastructure tied into 3rd party owned installations.

Millom fields – 12-year decommissioning project commenced in 2023, starting with decommissioning of the Millom West wells. Decommissioning of the associated installations and infrastructure including the removal of the Millom West platform is expected to be undertaken in the period 2024 to 2035 subject to DP approval being given. The program of work has been extended to cater for the uncertainty in the timing of decommissioning works of infrastructure tied into 3rd party owned installations.

[2] Calder field operations are currently managed by Spirit Energy Production UK Limited during the production phase but Chrysaor Resources (Irish Sea) Limited remains operator of the Calder Field. Chrysaor Resources (Irish Sea) Limited will be responsible for carrying out field decommissioning activities.

Calder field – 12-year decommissioning project, of the associated installation and infrastructure including the removal of the Calder platform, is expected to be undertaken in the period 2024 to 2035[3] subject to DP approval being given. The program of work has been extended to cater for the uncertainty in the timing of decommissioning works of infrastructure tied into 3rd party owned installations.

The well decommissioning schedule and any interim inspection requirements will be agreed with HSE and the NSTA.

Note that a preparatory works request ('PWR') was submitted to OPRED for approval on 10 March 2022. The PWR addressed the following activities:

- Millom West platform barge campaign – topside
- Pipeline flushing campaign
- Pipeline disconnection campaign

The PWR was approved by OPRED on 28 March 2022.

1.3 Introduction

The Calder, Dalton and Millom fields are situated in the East Irish Sea to the west of Blackpool and south-west of Barrow-in-Furness. The Calder and Dalton fields are in Blocks 110/7a and 110/2b respectively of the United Kingdom Continental Shelf (UKCS) and Millom is in Blocks 110/2c, 113/26 and 113/27a.

Chrysaor is the 100% licence equity holder in the Calder, Dalton and Millom fields and associated assets.

1.3.1 Calder

The Calder platform is a Normally Unattended Installation (NUI) that was installed in 2002, with first production occurring in October 2004. It is provided with power using an electrical cable (PL6340, 62mm diameter, ~7.6km long) routed from the South Morecambe Central Processing Platform (CPP1) while the piggybacked trunklines PL1965 (24in nominal diameter, ~42.7km long) & PL1966 (3in, ~42.6km) extend from the Calder platform to the Rivers Terminal. Note that the Petroleum Act [23] only applies to pipelines routed up to Mean Low Water Mark (MLWM) with the remainder of the pipelines being classed as 'onshore' and therefore out of scope. The water depth at Calder and CPP1 are ~28m and ~31.7m respectively, relative to Lowest Astronomical Tide (LAT).

Short lengths of the Calder pipelines pass through the Liverpool Bay / Bae Lerpwl (~7km and ~2km long) and the Morecambe Bay and Duddon Estuary (~5km) Special Protection Areas (SPAs). The SPAs cover an area 2,528km^2 [11] and 669km^2 [2] respectively.

Note that production from the Calder field is processed through the Rivers Terminal and then through the North Morecombe Terminal (NMT).

1.3.2 Dalton

The Dalton installations were installed in 1999 in the same campaign as the Millom West platform and the Q1 & Q2 WHPS, with first production being achieved in August 1999. The Dalton infrastructure is supported by and connected to the North Morecambe Drilling and Processing Platform Alpha (DPPA). The water depths at Dalton and DPPA are ~37.5m and ~29m respectively, relative to LAT.

Gas is exported from the Dalton PLEM to DPPA via PL1668 (12in nominal diameter, ~7.3km) while DPPA provides the Dalton PLEM with chemicals, hydraulic fluids, power, and control signals via PL1671 (113mm outside diameter, ~7.2km) the main umbilical. Dalton wells R1 and R2 export gas to the Dalton PLEM via PL1670 (8in, ~0.1km) and PL1669 (8in, ~1.0km) respectively. The Dalton R1 and R2 wellheads are provided with

[3] The timing of decommissioning activities at third party owned assets (e.g. Central Processing and Production Platform (CPP1) and (North Morecambe) Drilling and Production Platform Alpha (DPPA)) is subject to several factors and a strategy has yet to be agreed. Refer Section 6.5.

chemicals, hydraulic fluids, power and control signals via PL1673 (100mm, ~0.1km) and PL1672 (100mm, ~1.0km) respectively.

The infrastructure in the short distance between Dalton well R1 and Dalton PLEM is surface laid. The pipelines connecting Dalton well R2 to the Dalton PLEM are buried. All surface laid pipelines and umbilicals are protected and stabilised with concrete mattresses, including the pipeline ends as they emerge from burial in the trenches.

All the Dalton pipelines are out of use.

1.3.3 Millom

The Millom West platform is a NUI that was installed in 2000 with first production from Millom being from the Millom East subsea wells in August 1999. The Millom PLEM, Q1 & Q2 WHPS were installed in the same campaign as Dalton, while Q3 WHPS was installed a few years later in 2006. The water depths at Millom and DPPA are ~41.8m and ~29m respectively, relative to LAT.

DPPA provided the Millom West platform with power and control signals using PL6352 (58mm diameter, ~15.3km long), and the Millom PLEM with chemicals, hydraulic fluids for power using umbilical PL1678 (113mm, ~8.8km). The Millom West platform exported gas to DPPA (PL1675, 12in, ~6.2km) via the Millom PLEM. Millom wells Q1, Q2 and Q3 exported gas to the Millom PLEM via PL1677 (8in, ~0.1km), PL1873 (8in, ~0.1km) and PL1980 (6in flexible flowline, ~0.3km) respectively. The Millom PLEM provided the Millom West platform with Methanol via PL1676 (2.5in, ~6.3km) and provided the Millom wells Q1, Q2 and Q3 with chemicals, hydraulic fluids, power, and control signals using umbilicals PL1679 (100mm, ~0.1km), PLU1874 (100mm, ~0.2km), and PLU1678JQ3 (111mm, ~0.3km) respectively. Note that pipelines PL1677, PL1679.1, PL1679.2, PL1873 and PLU1874 are out of use and subject to Disused Pipeline Notifications under the Interim Pipeline Regime.

The infrastructure in the short distances between Millom wells Q1, Q2 and Q3 and the Millom PLEM is all surface laid. According to the as-built data all pipelines, umbilicals and electrical cables longer than 300m were trenched to a depth of at least 1m below seabed and are now all buried. All surface laid pipelines, umbilical and cables are protected and stabilised with concrete mattresses, including the pipeline ends as they emerge from burial in the trenches.

All the Millom pipelines are out of use.

1.3.4 Submission of Decommissioning Programmes

Following public, stakeholder and regulatory consultation, the Decommissioning Programmes will be submitted without derogation and in full compliance with the OPRED guidance notes [19]. The Decommissioning Programmes explain the principles of the removal activities and are supported by an Environmental Appraisal [8]. The Decommissioning Programmes for the pipelines are also supported by a Comparative Assessment [7].

The Dalton and Millom fields have not produced since 21 February 2019 and 11 June 2020 respectively. The Cessation of Production applications were submitted to the North Sea Transition Authority (NSTA) for Millom and Dalton in May 2022 and June 2022 respectively. The NSTA subsequently issued ‘no-objection’ letters in respective of these.

The NSTA Cessation of Production process was retired on 1st November 2022. Cessation of Production of the Calder field will be discussed with the NSTA during the stewardship process.

1.4 Decommissioning overview

1.4.1 Installations

Table 1.4.1 Installations being decommissioned					
Fields	Block		Type of Production	Water Depth (m)	
Calder	110/7a		Gas	28.04m	
Dalton	110/2b		Gas	37.49m	
Millom	110/2c, 113/26a, 113/27a		Gas	41.76m	
Surface Installations					
Name	Type		Topsides' mass (Te)	Substructure mass (Te)	No. of wells
Calder platform	SIP		625.0	1283.7	4
Millom West platform	SIP		400.0	1200.0	4
Subsea Installations					**Number of Wells**
Name	Type, Number		Mass (Te)		Subsea
Dalton	WHPS x2 (R1, R2)		93.4 (R1), 98.4(R2)		2
Dalton PLEM	Manifold, 1		106.0		n/a
Millom East	WHPS x3 (Q1, Q2, Q3)		92.4 (Q1), 58.0 (Q2), 35.0 (Q3)		3
Millom East PLEM	Manifold, 1		112.6		n/a
Name	Drill Cuttings Pile(s)	Total Estimated Volume (m^3)	Distance to Median	Distance from UK coastline	
Calder	n/a	n/a	107km	40km W of Blackpool	
Dalton	n/a	n/a	106km	40km SW of Barrow-in-Furness	
Millom	n/a	n/a	102km	40km SSW of Barrow-in-Furness	

Table 1.4.2 Installation section 29 Holder details – Calder		
Section 29 Notice Holder	Registration Number	License Equity Interest (%)
Chrysaor Holdings Limited	BR009700	0%
Chrysaor Resources (Irish Sea) Limited	03440053	100%

NOTE
Chrysaor Holdings Limited is registered in the Cayman Islands FC027988 with a branch registered in the United Kingdom at 23 Lower Belgrave Street, London, SW1W 0NR (Reg No. BR009700). Overseas company registration in the Cayman Islands Reg Ref. MC-197161.

Table 1.4.3 Installation section 29 Holder details – Dalton		
Section 29 Notice Holder	Registration Number	License Equity Interest (%)
Chrysaor Holdings Limited	BR009700	0%
Chrysaor Resources (Irish Sea) Limited	03440053	100%
NOTE Refer note in Table 1.4.2		

Table 1.4.4 Installation section 29 Holder details – Millom		
Section 29 Notice Holder	Registration Number	License Equity Interest (%)
Chrysaor Holdings Limited	BR009700	0%
Chrysaor Resources (Irish Sea) Limited	03440053	100%
NOTE Refer note in Table 1.4.2		

1.4.2 Pipelines

Table 1.4.5 Calder pipelines, umbilicals and cables being decommissioned	
Number of pipelines, umbilicals and cables	3
NOTES 1. Scope of Section 29 includes: PL6340, PL1965 & PL1966; PWA reference 22/W/02.	

Table 1.4.6 Pipeline Section 29 Notice holder details – Calder		
Section 29 Notice Holder	Registration Number	License Equity Interest (%)
Chrysaor Holdings Limited	BR009700	0%
Chrysaor Resources (Irish Sea) Limited	03440053	100%
NOTE Chrysaor Holdings Limited is registered in the Cayman Islands FC027988 with a branch registered in the United Kingdom at 23 Lower Belgrave Street, London, SW1W 0NR (Reg No. BR009700). Overseas company registration in the Cayman Islands Reg Ref. MC-197161.		

Table 1.4.7 Dalton pipelines, umbilicals and cables being decommissioned	
Number of pipelines, umbilicals and cables	12
NOTE The scope of the Section 29 notice includes: PL1668, PL1669, PL1670, PL1671.1 through PL1671.5, PL1672.1 & PL1672.2, PL1673.1 & PL1673.2. PWA Reference 1/W/99 and 384/V/22. The PL1668 and PL1674 risers at DPPA are out of scope.	

Table 1.4.8 Pipeline Section 29 Notice holder details – Dalton		
Section 29 Notice Holder	Registration Number	License Equity Interest (%)
Chrysaor Holdings Limited	BR009700	0%
Chrysaor Resources (Irish Sea) Limited	03440053	100%
NOTE Refer note in Table 1.4.6.		

Table 1.4.9 Millom pipelines, umbilicals and cables being decommissioned	
Number of pipelines, umbilicals and cables	16
NOTE Scope of Section 29 includes: PL1674, PL1675, PL1676, PL1677, PL1678.1 though PL1678.5, PLU1678JQ3, PL1679.1 & PL1679.2, PL1873, PLU1874 & PL1980 (all PWA reference 1/W/99) and PL6352 (PWA reference 165-V-23).	

Table 1.4.10 Pipeline Section 29 Notice holder details – Millom		
Section 29 Notice Holder	Registration Number	License Equity Interest (%)
Chrysaor Holdings Limited	BR009700	0%
Chrysaor Resources (Irish Sea) Limited	03440053	100%
NOTE Refer note in Table 1.4.6.		

1.5 Summary of proposed Decommissioning Programmes

Table 1.5.1 Summary of Decommissioning Programmes	
Proposed decommissioning solution	Reason for selection
1. Topsides (Calder, Millom West)	
Complete removal and recycling. The topsides will be removed and recovered to shore and recycled. Environmental permit applications required for work associated with removal of the topsides will be applied for.	Allows substructure to be removed and maximises recycling of materials.
2. Substructure (Calder, Millom West)	
Complete removal and recycling. The legs and associated suction piles will be completely removed and recovered to shore for recycling. Environmental permit applications required for work associated with removal of the substructures will be applied for.	To comply with IMO Standards and Guidance and OSPAR requirements leaving an unobstructed seabed. Removes a potential obstruction to fishing operations and maximises recycling of materials.

Table 1.5.1 Summary of Decommissioning Programmes	
3. Subsea installations	
The Dalton and Millom WHPS will be completely removed with the associated piles being cut 3m below the seabed, taken to shore, dismantled, and recycled unless alternative re-use options are found by the owner to be viable and more appropriate. The Dalton & Millom PLEMs will be completely removed with the associated piles being cut 3m below the seabed. All the associated protection and stabilisation features will be completely removed. Environmental permit applications required for work associated with decommissioning of the subsea installations will be applied for.	To comply with IMO Standards and Guidance leaving an unobstructed seabed. Removes a potential obstruction to fishing operations and maximises recycling of materials.
4. Pipelines, umbilicals, and cables (Calder, Dalton & Millom)	
All pipelines and chemical cores of the umbilicals will be flushed and cleaned with seawater. The buried sections of the pipelines will be left *in situ*. On the approaches the pipeline, umbilical and cable ends will be cut at trench depth where they enter burial, and the associated surface laid sections will be removed. Any local excavations will be left to backfill naturally. Surface laid pipelines, and umbilicals will be completely removed. Existing exposed sections (total length up to ~1.3km) of the Calder trunklines (PL1965 & PL1966) will be remediated. The preference will be for the exposed (and span) sections to be removed, minimising the number of remaining cut ends as they could re-appear as exposures. The option to bury the exposed sections under rock especially near the windfarm cable crossings remains a valid approach but given the sensitivity of the area, consideration will be given to the loss of native habitat. The amount of rock required to bury the exposed sections around the windfarm crossings is estimated at ~550Te. Other pipeline stabilisation materials such as concrete mattresses and grout bags will be completely removed to shore for reuse, recycling, or disposal as appropriate. Environmental permit applications required for work associated with decommissioning of the pipelines will be applied for.	Removes a potential obstruction to fishing operations, minimises use of energy and resulting emissions, minimises impact on seabed in a sensitive area, and maximises recycling of materials.
4. Well decommissioning (Calder, Dalton, Millom, Crossans & Darwen)	
All wells will be decommissioned in accordance with the latest version of Offshore Energies UK Well Decommissioning Guidelines [18] and in compliance with HSE "Offshore Installations and Wells (Design and Construction, etc.) Regulations 2018".	Meets the NSTA and HSE regulatory requirements.
5. Drill cuttings (Calder, Dalton, Millom)	
n/a	No cuttings piles exist at Calder, Dalton, or Millom. Cuttings are widely dispersed and fall below OSPAR 2006/5 thresholds [21].

Table 1.5.1 Summary of Decommissioning Programmes
6. Interdependencies
CPP1 provides the Calder platform with electrical power using PL6340, while the Calder trunklines connect to the Rivers Terminal. Gas was exported from Dalton (via Dalton PLEM) & Millom (via Millom PLEM) to DPPA. DPPA provides Millom West with electrical power, and provides Millom PLEM with chemicals, hydraulic fluids, power, and control signals. PL1668 & PL1671 are crossed over by Rhyl PL2969. This pipeline crossing is out of scope of the pipeline Decommissioning Programme contained herein. The expectation is that this pipeline crossing will be decommissioned at the same time as the Dalton infrastructure but will be addressed by a separate Decommissioning Programme for the North Morecambe and Rhyl field infrastructure.

1.6 Field location including field layout and adjacent facilities

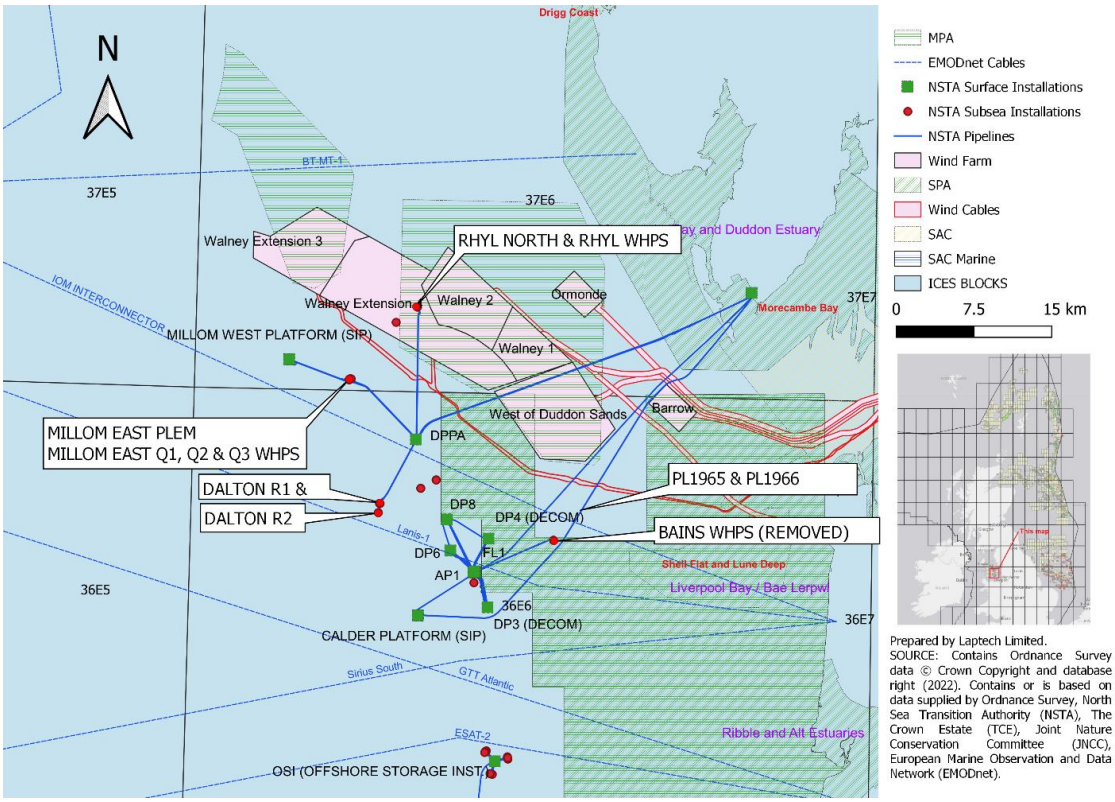


Figure 1.6.1: Location of Calder, Dalton & Millom installations in UKCS[4]

[4] The routes of BT-MT1 and Lanis-1 shown here do not agree with that shown on the Admiralty Chart. Items in red text are noted for information only – they are third-party owned infrastructure.

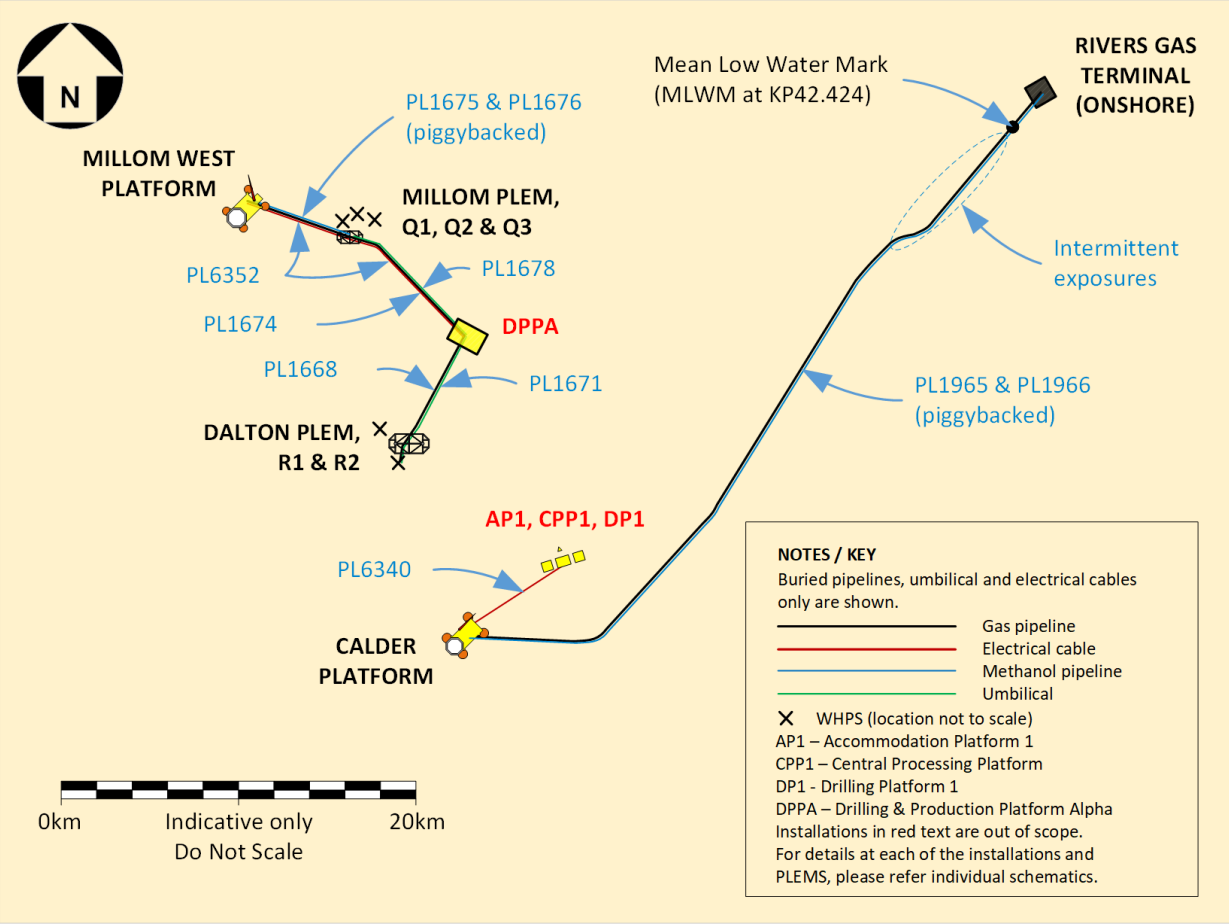


Figure 1.6.2: Layout of Calder, Dalton & Millom in relation to each other

Table 1.6.1 List of adjacent facilities								
			Distance and Direction					
Owner	Name	Type	from Calder platform	from Dalton PLEM	from Millom PLEM	from Millom West platform	Information	Status
Ørsted A/S	Barrow	WF	31.6km, NE	29.9km, NEE	31.5km, E	37.5km, E	WFC(s) cross over PL1965 & PL1966	Operating
Vattenfall	Ormonde	WF	34.4km, NNE	27.7km, NNE	23.4km, NEE	28.4km, NEE		Operating
Ørsted A/S	Walney 1	WF	27.7km, N	20.4km, NNE	17.1km, NEE	26.7km, NEE		Operating
Ørsted A/S	Walney 2	WF	30.0km, N	20.6km, NNE	13.0km, NE	17.7km, NEE		Operating
Ørsted A/S	Walney Ext. 3	WF	31.5km, N	20.5km, N	8.8km, N	10.7km, NE		Operating
Ørsted A/S	WofD Sands	WF	23.1km, NNE	19.1km, NE	20.4km, E	26.7km, E		Operating
Chrysaor	Calder platform	SIP	n/a	S, 11.4km	S, 23.6km	SSW, 27.6km	This DP	Operating
Chrysaor	Millom West platform	SIP	NNE, 27.6km	NNE, 16.4km	NEE, 6.1km	n/a		Out of use
Chrysaor	Dalton R1	WHPS	N, 11.4km	n/a	S, 12.3km	SSW, 16.4km		Out of use
Chrysaor	Dalton R2 Dual	WHPS	N, 10.6km	SSE, 0.9km	S, 13.1km	SSW, 17.1km		Out of use
Chrysaor	Millom Q1, Q2, Q3	WHPS	N, 23.6km	N, 12.3km	NW, <0.2km	WSW, 6.15km		Out of use
Chrysaor	Dalton PLEM	PLEM	N, 11.4km	n/a	S, 12.3km	SSW, 16.4km		Out of use
Chrysaor	Millom PLEM	PLEM	N, 23.6km	N, 12.3km	n/a	WSW, 6.1km		Out of use
SE	DPPA	Platform	N, 16.9km	NW, 7.1km	SW, 8.6km	SW, 14.4km	Export route for Millom and provides chemicals, power and control signals to Millom East, and provides electrical power to Millom West	Operating
SE	DP8	Platform	NNW, 9.6km	WSW, 6.6km	SSW, 16.4km	SW, 21.6km	Exports via CPP1	Operating
SE	DP3	FSJ	W, 6.7km	SW, 14.4km	SSW, 25.6km	SSW, 30.5km	DP approved Sept 2019	Decommissioned
SE	DP4	FSJ	NW, 10km	WSW, 11km	SSW, 20.3km	SW, 25.8km		Decommissioned
SE	DP6	Platform	NW, 7km	SW, 8.1km	SSW, 19.1km	SSW, 24km	Exports via CPP1	Operating
SE	Rhyl North	WHPS	N, 29.7km	NNW, 19.2km	NW, 9.6km	NWW, 13.3km	Exports via DPPA	Operating
SE	Rhyl	WHPS	N, 29.7km	NNW, 19.2km	NW, 9.6km	NWW, 13.3km	Exports via DPPA	Operating
SE	AP1	FSJ	NWW, 6.7km	SW, 11.2km	SSW, 22km	SSW, 27.1km	Bridge linked to CPP1	Operating

Table 1.6.1 List of adjacent facilities								
			Distance and Direction					
Owner	Name	Type	from Calder platform	from Dalton PLEM	from Millom PLEM	from Millom West platform	Information	Status
SE	CPP1	Platform	NWW, 6.8km	SW, 11.2km	SSW, 22.1km	SSW, 27.1km	Provides electrical power to Calder	Operating
SE	FL1	Tripod jacket	NWW, 6.9km	SW, 11.2km	SSW, 22km	SSW, 27.1km	Bridge linked to CPP1	Operating
SE	DP1	FSJ	NWW, 6.9km	SW, 11.3km	SSW, 22.1km	SSW, 27.2km		Operating
SE	Bains	WHPS	NWW, 14.9km	WSW, 17km	SW, 25km	SW, 30.8km	DP approved Jan 2019	Decommissioned
ENI	Hamilton North	WP	E, 59.2km	ESE, 59.7km	ESE, 63.5km	ESE, 60.4km		Operating
ENI	Hamilton East	Manifold	SSW, 28.1km	SSW, 39.2km	SSW, 51.1km	SSW, 55.6km		Operating
ENI	Hamilton	WP	ESE, 64.3km	ESE, 66km	ESE, 70.9km	SE, 68.2km		Operating
ENI	IOM Interconnector	Crossing	NWW, 14.6km	WSW, 17.4km	SW, 25.7km	SW, 31.5km	PL1965 (& PL1966) cross over IOM cable at KP15.993	Operating

Impacts of Decommissioning Proposals

There are no direct impacts on adjacent facilities from the decommissioning works associated with the Calder, Dalton, Millom West or Millom East installations and associated pipeline infrastructure other than interfaces with DPPA (Dalton & Millom) and CPP1 (Calder) that will need to be managed effectively.
As part of the operational phase any potential environmental impacts will be mitigated in two ways. The first is via direct communication with the parties involved, and the other is via submission of the MATs and SATs.

NOTES

1. Distance to windfarms is to estimated centre of the windfarm rather than to the nearest edge.
2. Bains WHPS & pipeline ends at the WHPS were removed in 2021.

1.7 Industrial implications

It is Chrysaor's intention to develop a contract strategy and Supply Chain Action Plan that will result in an efficient and cost-effective execution of the decommissioning works. Principles of the contracting and procurement strategies to be used by Chrysaor as Section 29 notice holder for the decommissioning of the Calder, Dalton, and Millom installations and associated pipelines are listed below:

1) Harbour Energy work extensively with the NSTA and OEUK to ensure the supply chain is fully abreast of our future contracting plans.
2) Harbour Energy is a founding member of SEQual which is used as the primary tool to develop bid lists across all procurement activities.
3) Harbour Energy have established key strategic partnerships across various disciplines and are in the process of building further relationships. These partnerships are designed to ensure collaborative and efficient delivery of work across a wide range of projects including both traditional Oil and Gas and energy transition activity such as Viking.

2 Description of items to be decommissioned

2.1 Surface installations (topsides & substructure) & stabilisation

Table 2.1.1 Surface installations & stabilisation			
Description	Location WGS84 Decimal WGS84 Decimal Minute	Mass (Te)	Comments / status
Calder platform	53.809464° N 03.661811° W 53°48.5678' N 03°39.7087' W	1,908.7	Topsides mass 625 Te, 1x module. Anchored to the seabed using 4x 9.25m OD suction piles. Mass 1,283.7 Te. 23x anchored fronded mattresses may be present in and around the suction piles (total mass ~1.3Te).
Fronded mattresses	As above. Refer Figure A.1.1	1.28	Estimated number – 23. Refer Figure A.1.1.
Deposited rock	As above. Refer Figure A.1.1	5,866	Dimensions 68 x 60 x 1.75m. Around perimeter of legs and bulldozed to some extent underneath the platform to prevent scour. Refer Figure A.1.1.
Millom West platform	54.028217° N 03.860114° W 54°1.6930' N 03°51.6068' W	1,600	Topsides mass 400 Te, 1x module. Anchored to the seabed using 4x 7.0m OD (estimated) suction piles. Mass 1,200 Te. 18x anchored fronded mattresses may be present in and around the suction piles (total mass ~0.8Te). Deposited rock is present underneath the structure as anti-scour mitigation (approx. 70m x 70m x 2m high).
Fronded mattresses	As above. Refer Figure A.5.1.	0.81	Estimated number – 18. Refer Figure A.5.1.
Deposited rock	As above. Refer Figure A.5.1.	12,728	Dimensions 70 x 70 x 2m. Around perimeter of legs to prevent scour and bulldozed to some extent underneath the platform. Refer Figure A.5.1.

NOTES

1. Fronded mattresses have not been found on 'as-built' drawings so they may or may not be present. This is to be determined at the time of decommissioning operations.
2. The dimensions of the deposited rock are based on an interpretation of survey information. The estimated mass is calculated by volume multiplied by a density of 1.85Te/m^3 in air.
3. If protection and stabilisation features are not listed in this table, according to the documentation reviewed they were not installed.

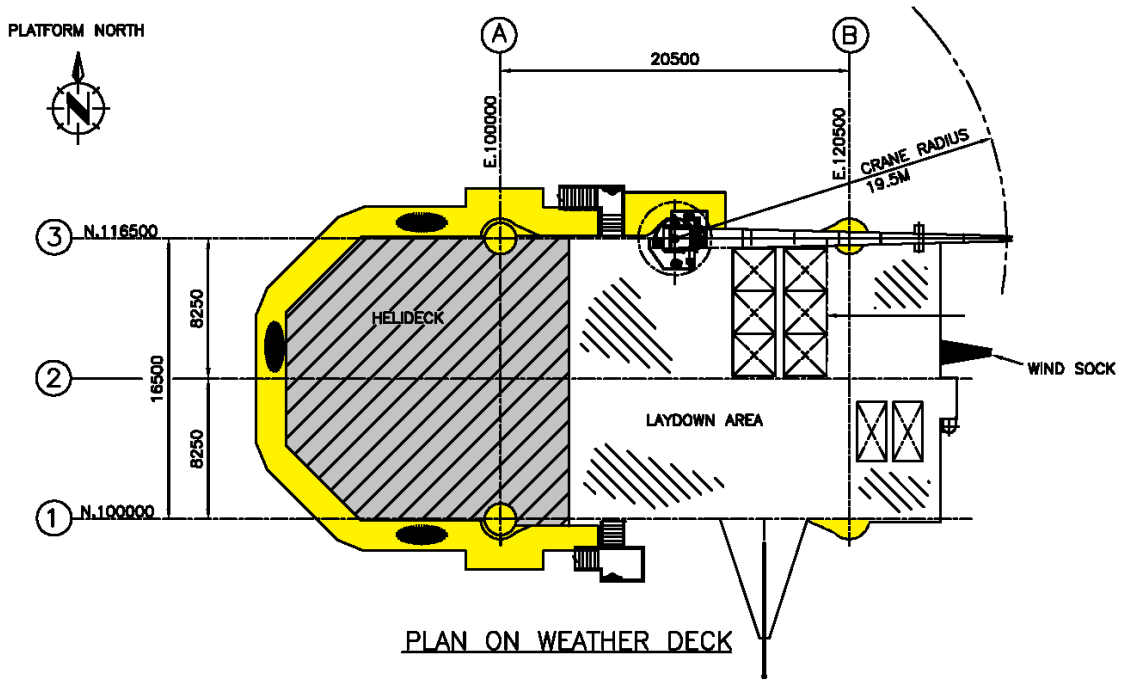


Figure 2.1.1: Calder platform outline plot plan on weather deck

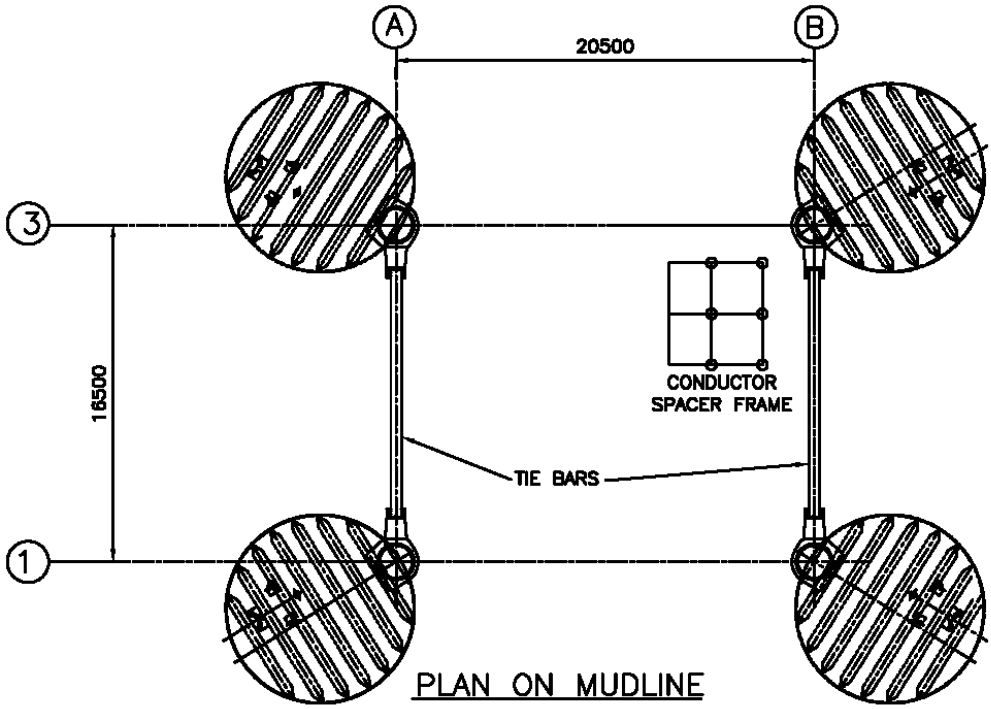


Figure 2.1.2: Calder platform plan at mudline (i.e. seabed)[5]

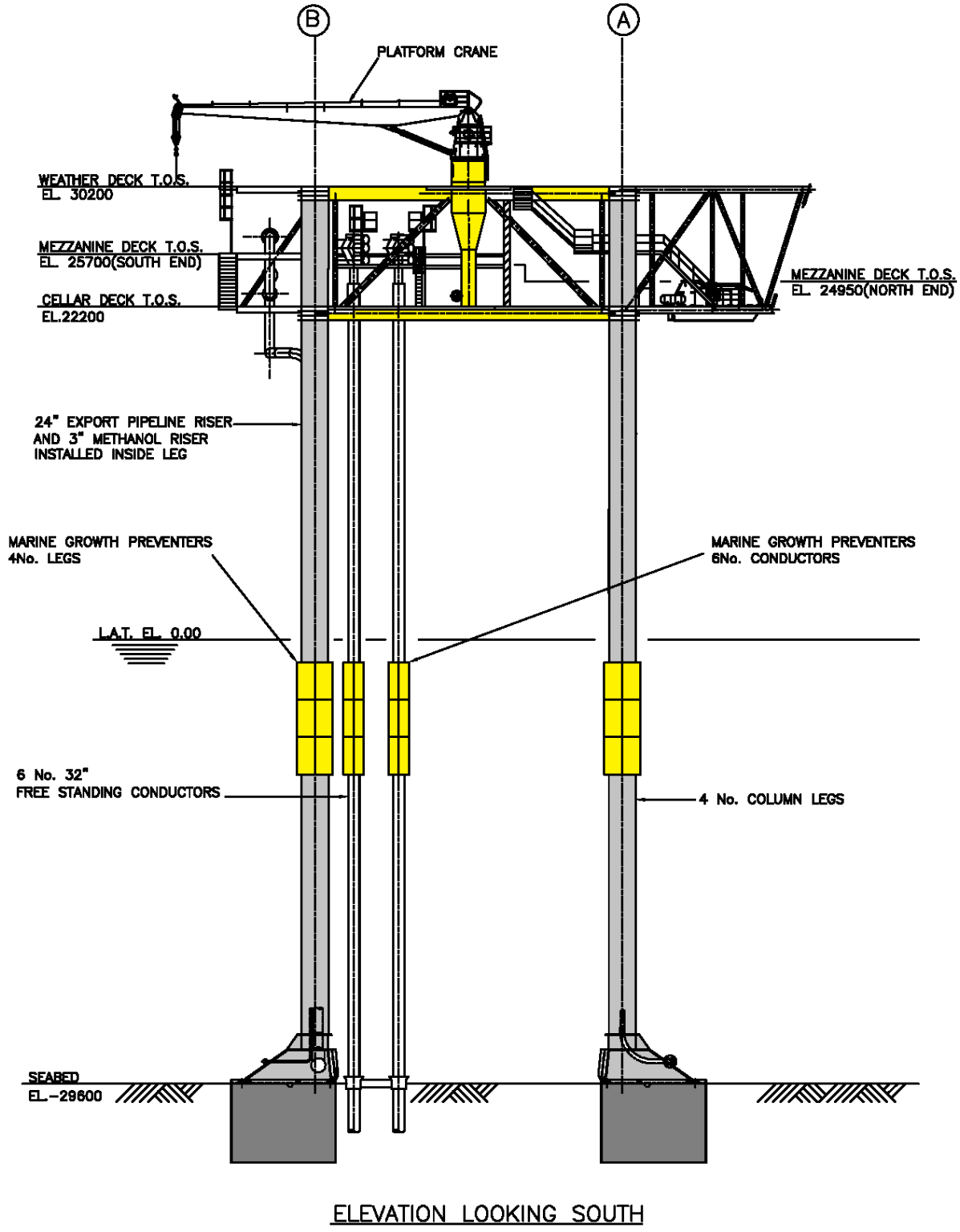


Figure 2.1.3: Calder platform (elevation looking south)[5]

[5] Protection and stabilisation features are not shown

Figure 2.1.4: Photograph of the Calder platform (south face)

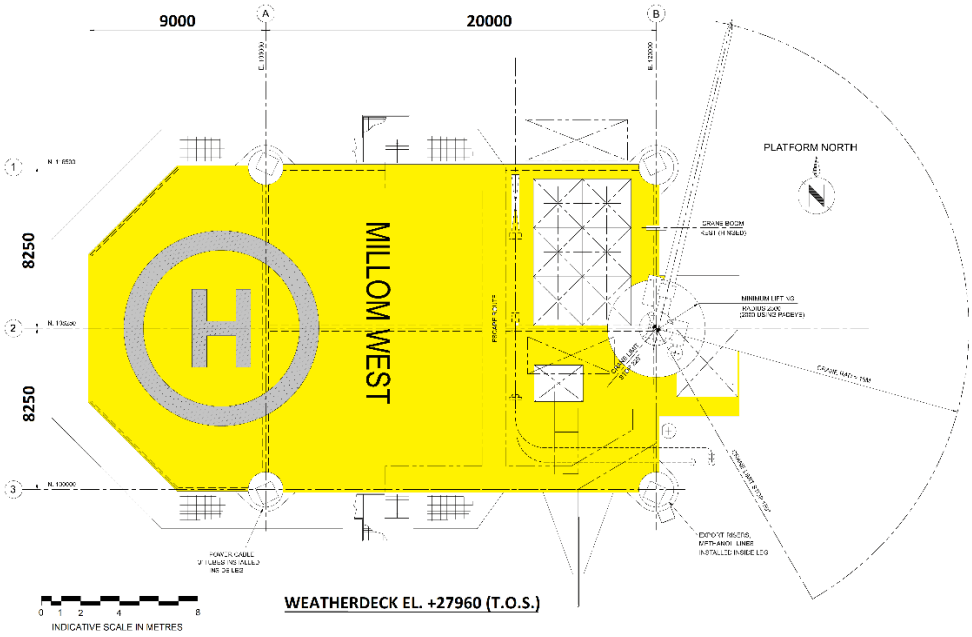


Figure 2.1.5: Millom West platform outline plot plan on weather deck

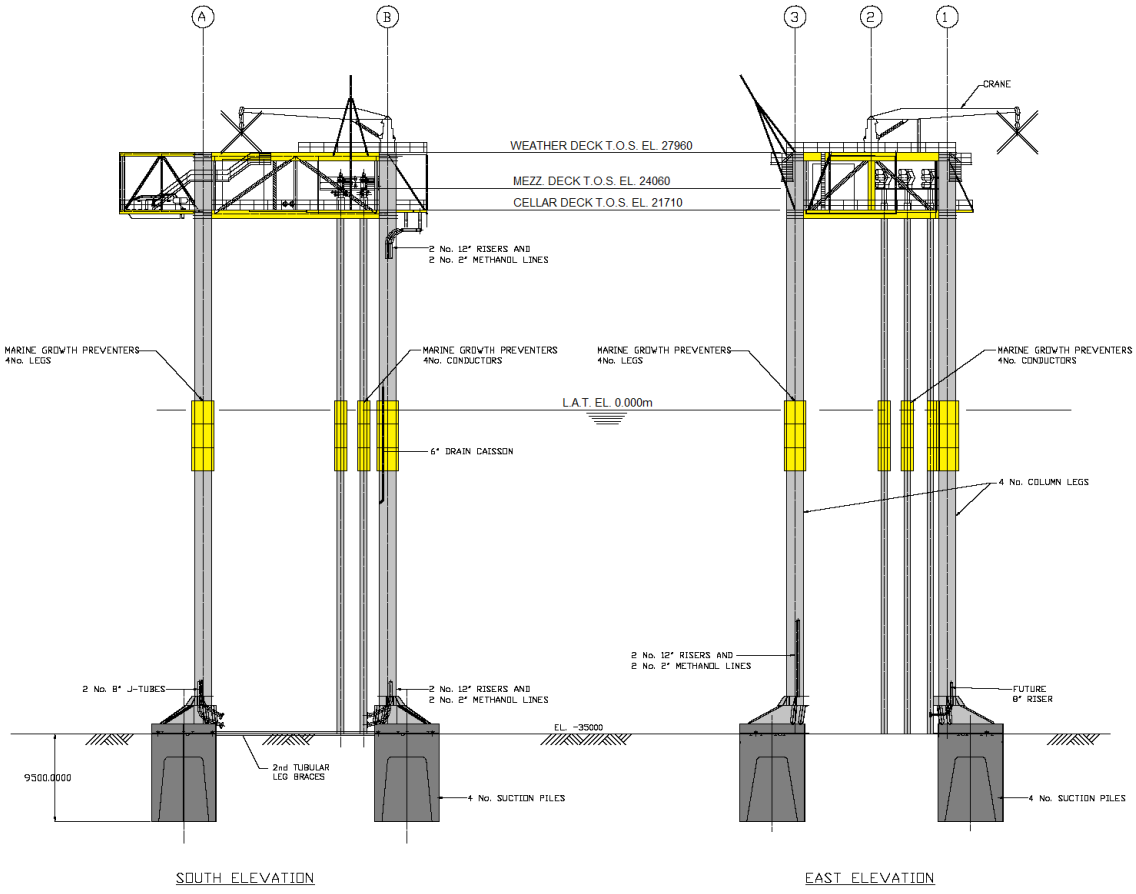


Figure 2.1.6: Millom West platform outline elevations[6]

Figure 2.1.7: Photograph of the Millom West platform (west face)

[6] Potential protection and stabilisation features are not shown.

2.2 Subsea installations including stabilisation features

Table 2.2.1 Dalton subsea installation information					
Subsea installations incl. stabilisation features	No.	Mass (Te) / Size (m)	Location: WGS84 Decimal	Location: WGS84 Decimal Minute	Comments / status
Dalton R1 WHPS					
Dalton R1 WHPS	1	92.4 / 11.9x11.9x5.9	53.905465° N 03.721955° W	53°54.3279' N 03°43.3173' W	4x 610OD25mm piles, 23.5m long. Refer Figure 2.2.1.
Concrete mattresses (6m x 3m x 0.15m)	7	34.3	As above	As above	Please refer Figure A.2.1 and note 1.
Dalton R2 WHPS					
Dalton R2 Dual WHPS	1	98.4 / 15.9x11.9x5.1	53.897520° N 03.723521° W	53°53.8512' N 03°43.4113' W	4x 660OD25mm piles, 23.5m long. refer Figure 2.2.2 and note 1.
Concrete mattresses (6m x 3m x 0.15m)	8	39.2	As above	As above	Please refer Figure A.3.1 and note 1.
Dalton PLEM					
Dalton PLEM	1	106 / 24.4x8x3.8	54.028217° N 03.860114° W	54°1.6930' N 03°51.6068' W	2x 1219OD25mm piles, 20m long. Refer Figure 2.2.3 & Figure 2.2.4.
NOTES 1. All concrete mattresses are believed to be exposed, but their status will be confirmed at the time decommissioning works are executed.					

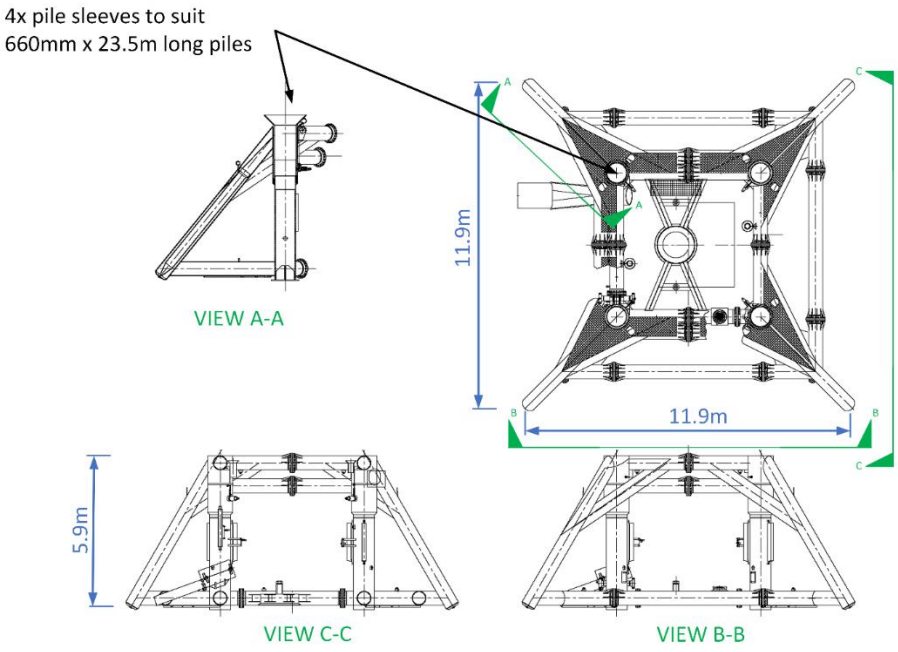


Figure 2.2.1: Schematic of Dalton R1 & Millom Q1 WHPS

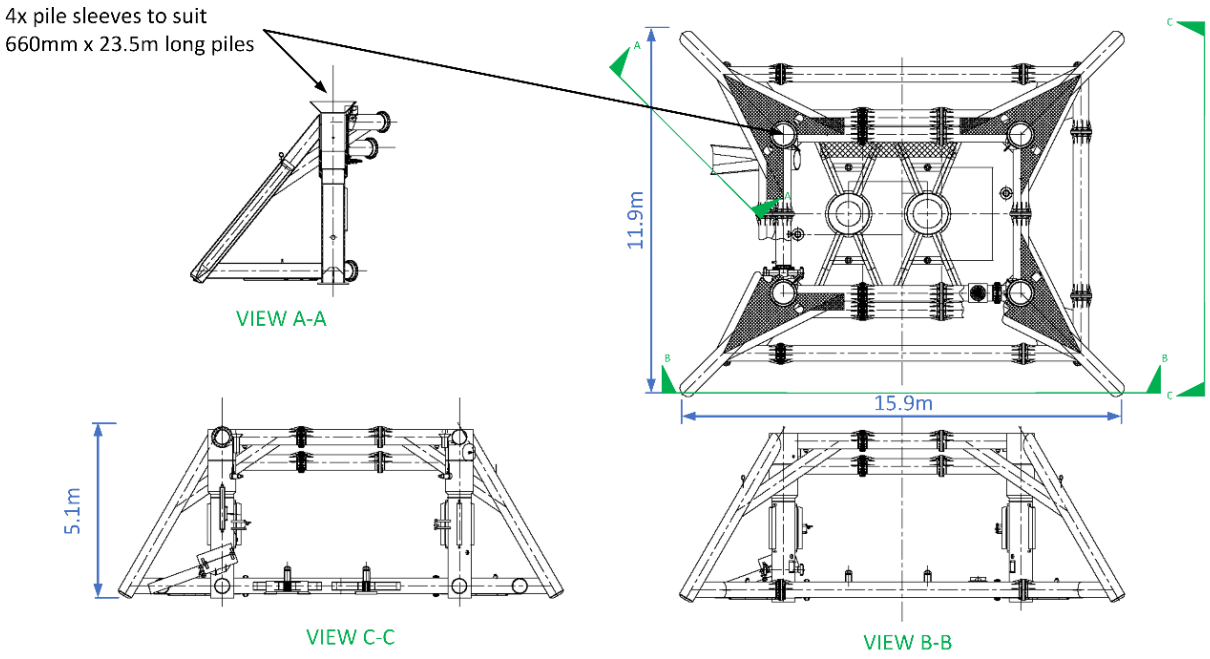


Figure 2.2.2: Schematic of Dalton R2 WHPS

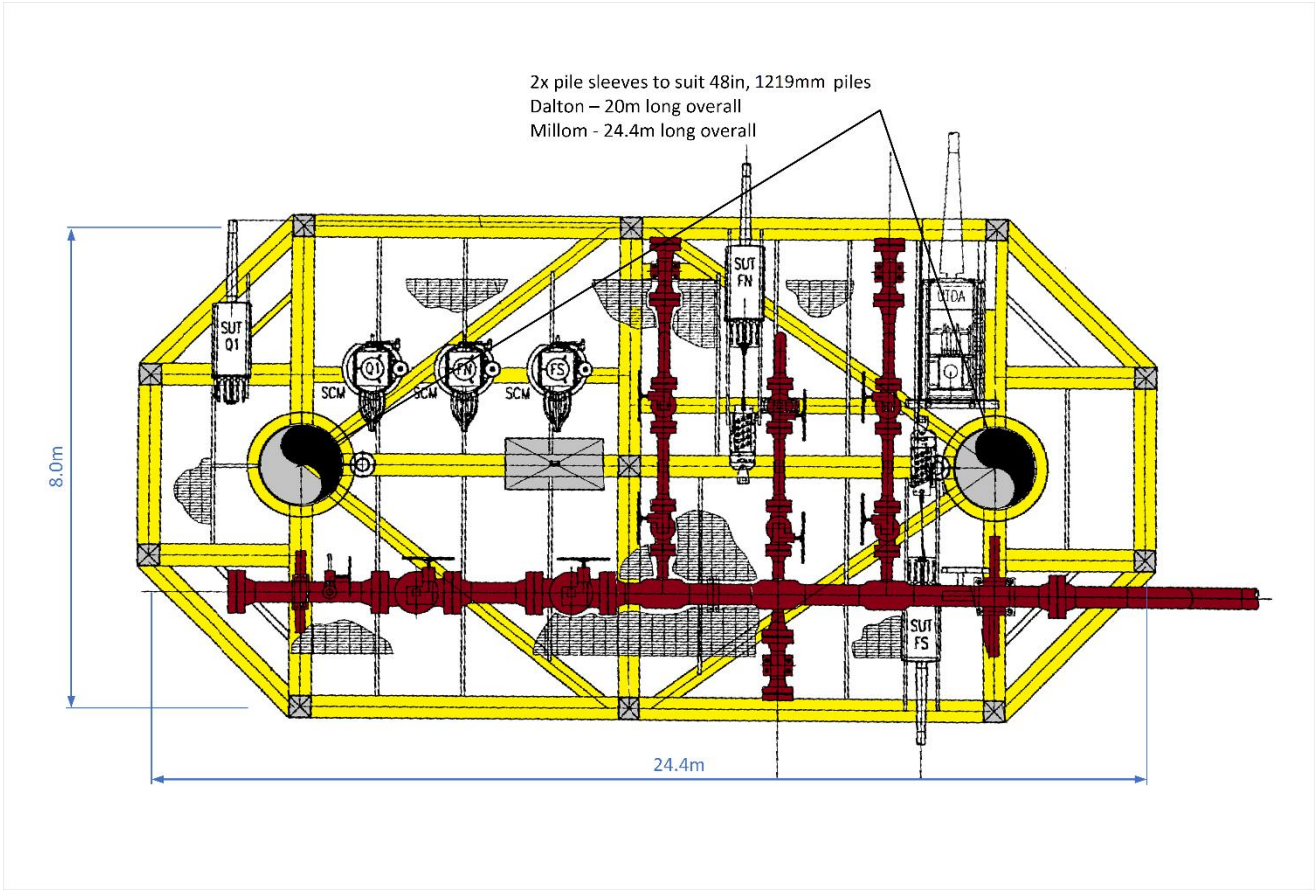


Figure 2.2.3: Outline plan view Dalton & Millom East PLEMS

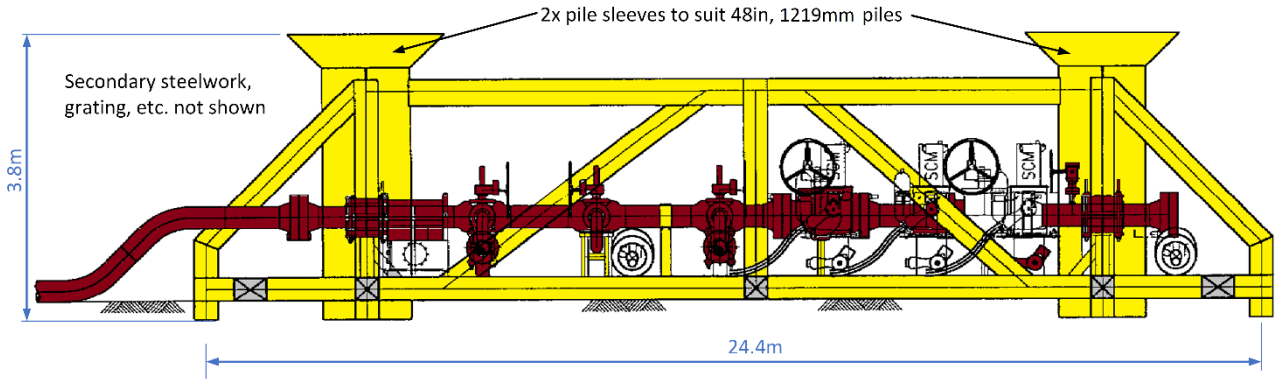


Figure 2.2.4: Outline side view on Dalton & Millom East PLEMS

Table 2.2.2 Millom subsea installation information

Subsea installations incl. stabilisation features	No.	Mass (Te) / Size (m)	Location: WGS84 Decimal	Location: WGS84 Decimal Minute	Comments / status
Millom Q1 WHPS					
Millom Q1 WHPS	1	64.3 11.9x11.9x5.9	54.012045° N 03.771144° W	54°0.7227' N 03°46.2687' W	4x 610OD25mm piles, 23.5m long. Refer Figure 2.2.1
Concrete mattresses (6m x 3m x 0.15m)	8	39.2	As above	As above	Please refer Figure A.4.1 and note 2
Millom Q2 WHPS					
Millom Q2 WHPS	1	46.6 8.9x8.9x5.1	54.012651° N 03.769991° W	54°0.7590' N 03°46.1995' W	2x 1219OD25mm retrofitted pin piles, 24m long. Refer Figure 2.2.5.
Millom Q3 WHPS					
Millom Q3 WHPS	1	44.3 8x8x5.1	54.012678° N 03.768192° W	54°0.7607' N 03°46.0915' W	Refer Figure 2.2.6 and note 2
Fronded concrete mattresses (6m x 3m x 0.15m)	9	44.1	As above	As above	Refer Figure A.4.1. Status unknown but seabed sediment is likely to be at least partially trapped within the fronds
Millom PLEM					
Millom East PLEM	1	112.6 24.4x8x3.8	54.011795° N 03.770970° W	54°0.7077' N 03°46.2582' W	2x 1219OD25mm piles, 24.4m long. Refer Figure 2.2.3 & Figure 2.2.4
Shaped and fronded grout bags (1.4 x 1.2 x 0.9m)	27	40.5	As above	As above	Refer Figure A.4.1. Status unknown but seabed sediment is likely to be at least partially trapped within the fronds

NOTES

1. No details have been found for the 2x 'pin piles' retrofitted to anchor the WHPS at Q2.
2. All concrete mattresses are believed to be exposed, but their status will be confirmed at the time decommissioning works are executed.

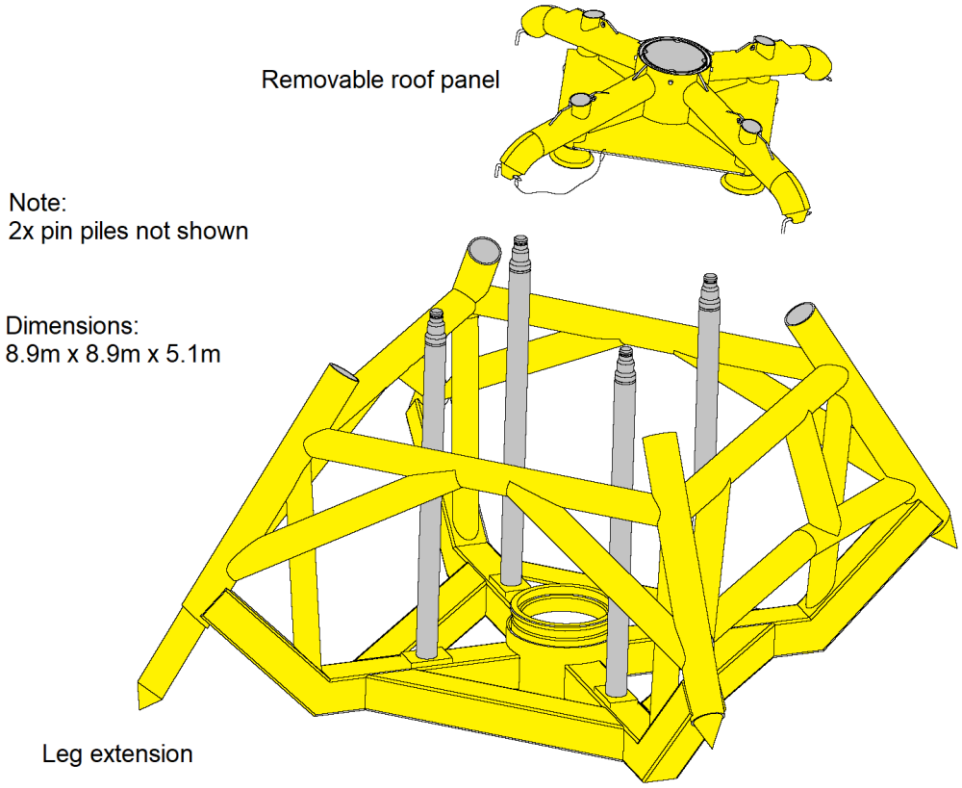


Figure 2.2.5: Schematic of Millom Q2 WHPS (not directly piled but furnished with 'pin piles')

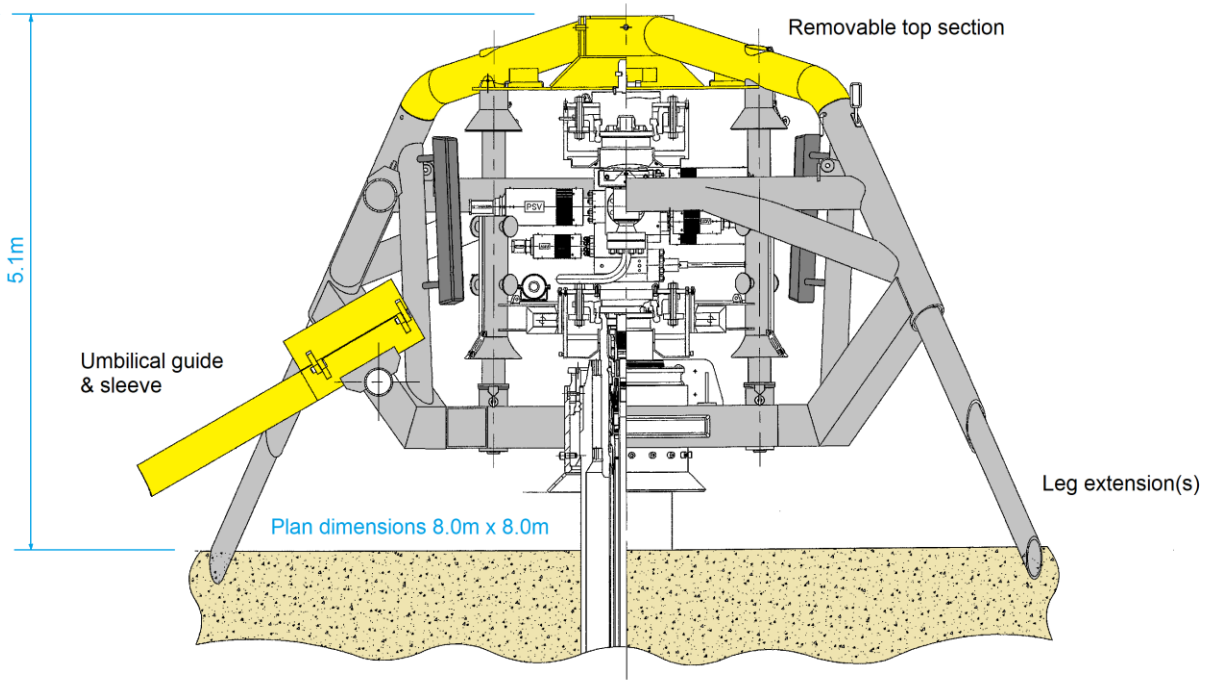


Figure 2.2.6: Schematic of Millom Q3 WHPS (not piled)

2.3 Pipelines including stabilisation features

Table 2.3.1 Calder pipeline/flowline/umbilical/cable information									
Description	Pipeline Number (as per PWA)	Diameter (NB) (inches)[1]	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points[2]	Burial Status	Pipeline Status	Current Content
Hydrocarbon pipeline	PL1965	24in	42.660	Coated steel pipeline with 2.3mm 3LPP and CWC	Unprocessed production gas	Calder platform pig launcher to MLWM	Buried with exposures	Operating	As product conveyed
Methanol pipeline	PL1966	3in	42.630	Coated steel pipeline with 2.1mm 3LPP	H,S&CI	MLWM to MeOH ESDV on Calder platform	Buried with exposures	Operating	As product conveyed
Electrical & fibre optic cable	PL6340	62mm	7.597	11kV Electric power cable	N/A	CPP1 to Calder	Buried	Operating	n/a

NOTES

1. If diameter is expressed in mm it refers to outside diameter of umbilical.
2. For brevity, the description of the end-to-end points may differ slightly from those consented.
3. Reference Pipeline Works Authorisation (PWA) 22/W/02 (PL1965, PL1966) and 123-V-23 (PL6340).
4. Note that decommissioning of the onshore section of pipeline PL1965 and PL1966 beyond MLWM is not addressed in this DP as OPRED has a regulatory remit that only extends as far as MLWM. Regulatory responsibility of the onshore section of pipeline beyond MLWM lies with the Local Planning Authority under the Town and Country Planning Act. At the time of writing, the decommissioning plan for the onshore sections of the pipelines out to the MLWM has not been fully defined, but please refer Appendix B.1.

Table 2.3.2 Dalton pipeline/flowline/umbilical/cable information									
Description	Pipeline Number (as per PWA)	Diameter (NB) (inches)[1]	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points[3]	Burial Status	Pipeline Status	Current Content
Hydrocarbon pipeline	PL1668	12in	7.165	Steel pipeline coated with 2.5mm 3LPP; a short length near the	Wet sweet gas	Dalton PLEM up to (but not including) cut point B at DPPA. A 3m long section has been	Buried	Out of use	Filled with seawater

Table 2.3.2 Dalton pipeline/flowline/umbilical/cable information									
Description	Pipeline Number (as per PWA)	Diameter (NB) (inches)[1]	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points[3]	Burial Status	Pipeline Status	Current Content
				PLEM coated in 0.45mm GFE		removed from cut points A and B at DPPA			
Hydrocarbon pipeline	PL1669	6in/8in	0.979	Steel pipeline coated with 2.5mm 3LPP; short lengths near WHPS and the PLEM coated in 0.45mm GFE	Wet sweet gas	Well R2 Xmas tree to Dalton PLEM Header. A 3m long section has been removed from cut points A and B at R2	Buried	Out of use	Filled with seawater
Hydrocarbon pipeline	PL1670	6in/8in	0.083	Steel pipeline coated with 2.5mm 3LPP; short lengths near WHPS and the PLEM coated in 0.45mm GFE	Wet sweet gas	Well R1 Xmas tree to Dalton PLEM Header. A 3m long section has been removed from cut points A and B at R1	Surface laid	Out of use	Filled with seawater
Chemical injection umbilical	PL1671.1 thru PL1671.5	5x19.1mm (Note 2)	7.170	Umbilical c/w 5x19.1mm flexible hoses	H,S&CI	North Morecambe TUTU to Dalton PLEM	Buried	Out of use	Filled with seawater
Chemical injection umbilical	PL1672.1 thru PL1672.2	2x19.1mm (Note 2)	1.007	Umbilical c/w 2x19.1mm flexible hoses	H,S&CI	UTDA at Dalton PLEM to Well R2 Xmas Tree, disconnected from R2	Buried	Out of use	Filled with seawater
Chemical injection umbilical	PL1673.1 thru PL1673.2	2x19.1mm (Note 2)	0.078	Umbilical c/w 2x19.1mm flexible hoses	H,S&CI	UTDA at Dalton PLEM to Well R1 Xmas Tree, disconnected from R1	Buried	Out of use	Filled with seawater

NOTES

1. If diameter is expressed in mm it refers to outside diameter of umbilical.
2. Outside diameters of umbilicals for Dalton and Millom are as follows: main umbilical - 113mm, umbilical jumpers - 100mm.
3. For brevity, the description of the end-to-end points may differ slightly from those consented.
4. The riser section of PL1668 at DPPA are out of scope.
5. Reference PWA 1/W/99 and 324/V/22.

Table 2.3.3 Millom pipeline/flowline/umbilical/cable information									
Description	Pipeline Number (as per PWA)	Diameter (NB) (inches)[1]	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points[2]	Burial Status	Pipeline Status	Current Content
Hydrocarbon pipeline	PL1674	12in	8.779	Steel pipeline coated with 2.5mm 3LPP; a short length near the PLEM coated in 0.45mm GFE	Wet sweet gas	Millom East PLEM to (but not including) cut point B at DPPA. A 3m long section has been removed between cut points A and B at DPPA.	Buried	Out of use	Filled with seawater
Hydrocarbon pipeline	PL1675	12in	6.26	Steel pipeline coated with 2.5mm 3LPP; a short length near the PLEM coated in 0.45mm GFE	Wet sweet gas	Millom West platform to Millom East PLEM	Buried	Out of use	Filled with seawater
Methanol pipeline	PL1676	2.5in	6.260	Steel pipeline coated with 2.5mm 3LPP; a short length near the PLEM coated in 0.45mm GFE	H,S&CI	Millom East PLEM UTDA to MeOH ESDV on Millom West Platform	Buried	Out of use	Filled with seawater
Hydrocarbon pipeline	PL1677	6in/8in	0.110	Steel pipeline coated with 2.5mm 3LPP; a short length near the PLEM coated in 0.45mm GFE	Wet sweet gas	Disconnected at both ends. Ends left adjacent to Q1 Xmas tree exit flange and Millom East PLEM Header	Surface laid	Out of use	Inhibited water c/w 2% DCA-22001
Chemical injection umbilical	PL1678.1 thru PL1678.5	5x19.1mm (Note 2))	8.800	Umbilical c/w 2x12.7mm flexible hoses	H,S&CI	DPPA TUTU to UTDA at Millom East PLEM	Buried	Out of use	As product conveyed
Umbilical jumper	PLU1678JQ3	111mm	0.247	Umbilical	H,S&CI	Millom East PLEM UTDA to Q3 Tree stab plate	Surface laid	Out of use	As product conveyed

Table 2.3.3 Millom pipeline/flowline/umbilical/cable information									
Description	Pipeline Number (as per PWA)	Diameter (NB) (inches)[1]	Length (km)	Description of Component Parts	Product Conveyed	From – To End Points[2]	Burial Status	Pipeline Status	Current Content
Chemical injection umbilical	PL1679.1 thru PL1679.2	2x19.1mm (Note 2)	0.074	Umbilical c/w 2x19.1mm flexible hoses	H,S&CI	Disconnected at both ends. Left *in situ* with ends left adjacent to Millom East PLEM and Q1 stab plate	Surface laid	Out of use	Inhibited water c/w 2% DCA-22001
Electric Cable	PL6352	58mm	15.327	11kV electric cable	n/a	DPPA to Millom West	Buried	Operating	n/a
Hydrocarbon pipeline	PL1873	6in/8in	0.142	Steel pipeline coated in 0.45mm GFE	Wet sweet gas	Disconnected at both ends. Left *in situ* with ends left adjacent to Q2 tree exit flange and Millom East PLEM Header	Surface laid	Out of use	Inhibited water c/w 2% DCA-22001
Chemical injection umbilical	PLU1874	100mm	0.164	Umbilical	H,S&CI	Disconnected at both ends. Left *in situ* with ends adjacent to Millom East PLEM and Q2 stab plate	Surface laid	Out of use	Inhibited water c/w 2% DCA-22001
Hydrocarbon flowline	PL1980	8in/6in	0.248	Flexible flowline; composite materials, mostly steel	Wet sweet gas	Q3 to Millom East PLEM Header	Surface laid	Out of use	Filled with seawater

NOTES

1. If diameter is expressed in mm it refers to outside diameter of umbilical.
2. Outside diameters of the main umbilicals are 113mm nominal diameter; the umbilical jumpers are 100mm nominal diameter.
3. For brevity, the description of the end-to-end points may differ slightly from those consented.
4. Reference PWA 1/W/99; 35/V/03 (PLU1678JQ3, PL1980), 324/V/22, 384/V/22 and 165/V/23 (PL6352).
5. PL1677, PL1679.1, PL1679.2, PL1873 and PLU1874 are out of use and subject to Disused Pipeline Notifications under the Interim Pipeline Regime. Also refer PWA variation 220/V/18.
6. The riser section of PL1674 at DPPA is out of scope.

Table 2.3.4 Calder pipeline protection & stabilisation features				
Stabilisation Feature	Total Number	Total Mass (Te)	Location	Exposed/Buried/Condition
CALDER PIPELINE & CABLE MATTRESSES & GROUT BAGS (AT CALDER)				
Concrete mattresses, 6m x 3m x 0.15m and 6m x 3m x 0.3m	51	287.7	On PL1965, PL1966 & PL6340 on approaches. Please refer Figure A.1.1.	Assume exposed, resting on the seabed.
Grout bags (25kg), nominal quantity	125	3.1	As above.	As above.
PL1965 & PL1966 - ISLE OF MAN INTERCONNECTOR CROSSING				
Concrete mattresses, mostly 6m x 3m x 0.15m	29	146.06	At pipeline crossing over Isle of Man Interconnector cable. Please refer Figure A.1.2.	Assume exposed, resting on the seabed
Grout bags (25kg), nominal quantity	125	3.1	As above.	As above.
CALDER PIPELINE & CABLE MATTRESSES & GROUT BAGS AT CPP1				
Concrete mattresses, 6m x 3m x 0.15m	5	24.5	On approach to scour protection ramp at CPP1. Please refer Figure A.7.1.	Assume exposed, resting on the seabed.
Grout bags (25kg), nominal quantity	125	3.1	As above.	As above.

NOTES

1. According to the documentation review no grout bags were installed. However, that some grout bags may have been used cannot be ruled out, so a nominal quantity has been included to allow for this possibility. No other protection and stabilisation feature have been used apart from those noted in this table.
2. Burial status will be determined when decommissioning activities are being carried out.

Table 2.3.5 Dalton pipeline protection & stabilisation features				
Stabilisation Feature	Total No.	Total Mass (Te)	Location	Exposed/Buried/Condition
DALTON PIPELINE & UMBILICAL PROTECTION AT NORTH MORECAMBE DPPA				
Concrete mattresses, 6m x 3m x 0.15m	27	140	On PL1668 & PL1671 on approach to DPPA. Please refer Figure A.6.1.	Assume exposed, resting on the seabed.
Grout bags (25kg)	125	3.125	As above.	As above.
DALTON WELL R1 & PLEM PIPELINE & CABLE MATTRESSES & GROUT BAGS				
Concrete mattresses, 6m x 3m x 0.15m	73	368.2	On various Dalton pipelines on approach to R1 and PLEM. Please refer Figure A.2.1.	Assume exposed, resting on the seabed.
Grout bags (25kg), nominal quantity	125	3.1	As above.	As above.
DALTON WELL R2 PIPELINE & CABLE MATTRESSES & GROUT BAGS				
Concrete mattresses, 6m x 3m x 0.15m	31	151.9	On various Dalton pipelines on approach to R2 and PLEM. Please refer Figure A.3.1.	Assume exposed, resting on the seabed.
Grout bags (25kg), nominal quantity	125	3.1	As above.	As above.
NOTES 1. According to the documentation review no grout bags were installed. However, that some grout bags may have been used cannot be ruled out, so a nominal quantity has been included to allow for this possibility. No other protection and stabilisation feature have been used apart from those noted in this table. 2. Burial status of the concrete mattresses and pipeline protection covers will be determined when decommissioning activities are being carried out.				

Table 2.3.6 Millom pipeline protection & stabilisation features				
Stabilisation Feature	Total No.	Total Mass (Te)	Location	Exposed/Buried/Condition
MILLOM PIPELINE PROTECTION AT NORTH MORECAMBE DPPA				
Concrete mattresses, 6m x 3m x 0.15m	50	260.4	On various Millom pipelines on approach to DPPA. Refer Figure A.6.1.	Assume exposed, resting on the seabed.
Grout bags (25kg)	125	3.125	As above.	As above.
PIPELINE & CABLE MATTRESSES & GROUT BAGS NEAR MILLOM PLEM				
Concrete mattresses and fronded concrete mattresses, 6m x 3m x 0.15m.	161	800.8	On various pipelines, etc. near Millom PLEM. Refer Figure A.4.1.	Assume exposed, resting on the seabed.
Fronded grout bag (1.4 x 1.2 x 0.9m)	1	1.5	On PL1674 at Millom PLEM. Refer Figure A.4.1.	Assume exposed, resting on the seabed.
Grout bags (25kg), nominal quantity	250	6.3	As above & PL1675.	As above.
MILLOM EAST Q3 PIPELINE PROTECTION AT Q3 WHPS				
Concrete pipeline protection covers, each 6.4m x 3m x 3m, 7.9m x 3m x 3m, and 7.9m x 3m x 1m respectively, as detailed in Figure A.4.1.	3	3	On Q3 approaches at WHPS. Refer Figure A.4.1.	Assume exposed, resting on the seabed.
MILLOM EAST Q3 PIPELINE PROTECTION NEAR MILLOM PLEM				
Concrete pipeline protection covers, each 5.8m x 3m x 1.6m as detailed in Figure 2.3.1.	2	2	On Q3 approaches at PLEM. Refer Figure A.4.1.	Assume exposed, resting on the seabed.
MILLOM PIPELINE PROTECTION AT MILLOM WEST				
Concrete mattresses, 6m x 3m x 0.15m, as detailed in Figure 2.3.2.	19	93.1	On approaches to Millom West. Refer Figure A.5.1.	Assume exposed, resting on the seabed
Grout bags (25kg)	125	3.125	As above.	As above.
NOTES 1. According to the documentation review no grout bags were installed. However, that some grout bags may have been used cannot be ruled out, so a nominal quantity has been included to allow for this possibility. No other protection and stabilisation feature have been used apart from those noted in this table. 2. Burial status of the concrete mattresses and pipeline protection covers will be determined when decommissioning activities are being carried out.				

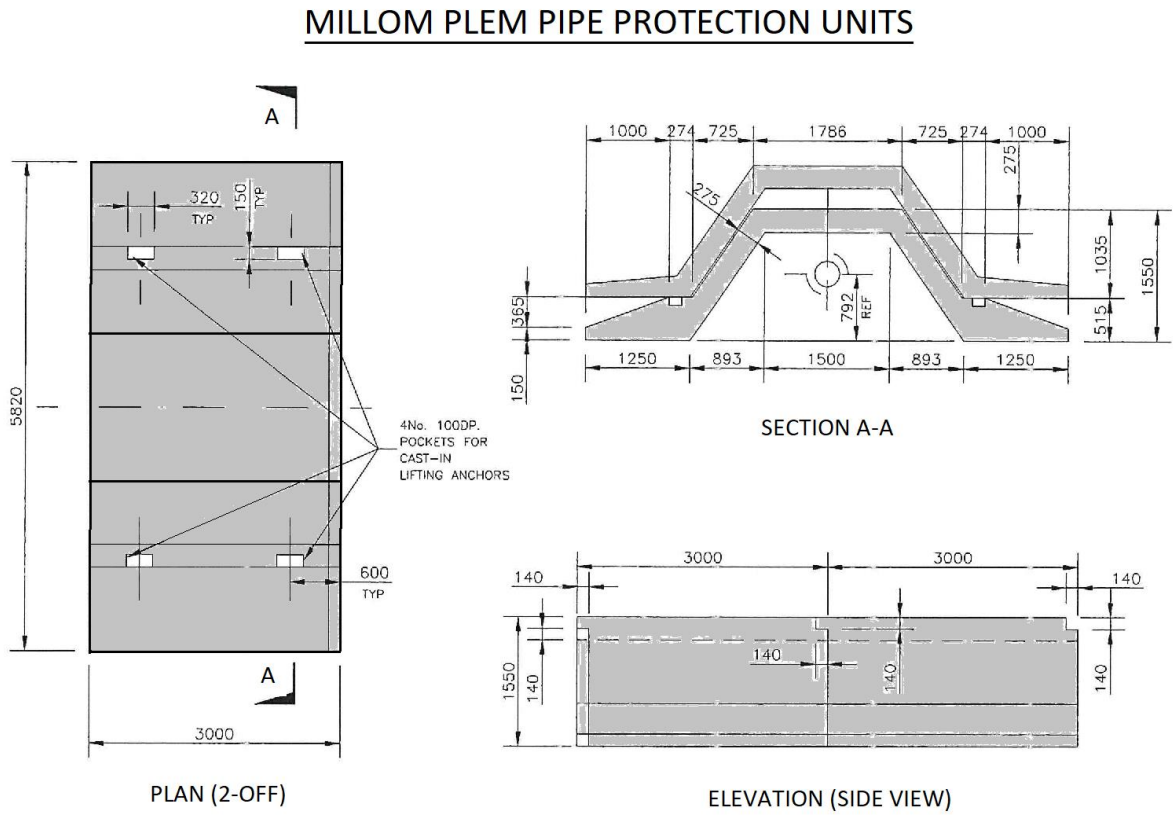


Figure 2.3.1: Millom PLEM Pipeline Protection Units

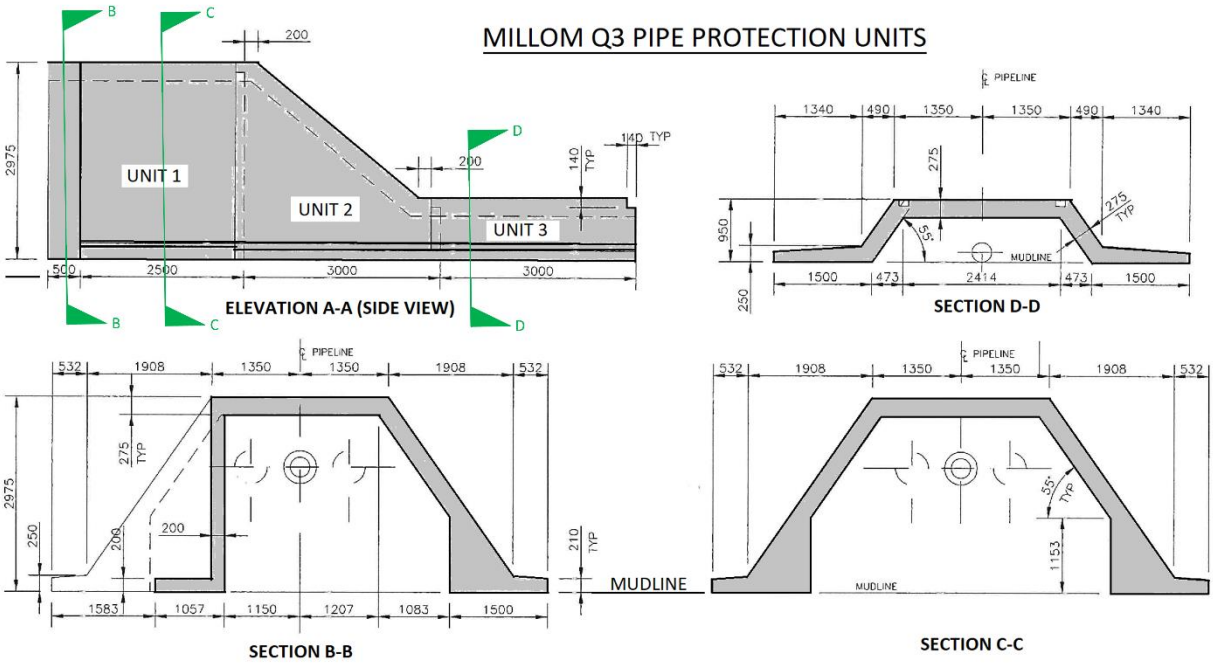


Figure 2.3.2: Millom Q3 Pipeline Protection Units

2.4 Pipeline crossings

Table 2.4.1 Calder pipeline crossings		
Pipeline description	Location	Protection / comment
ISLE OF MAN INTERCONNECTOR CABLE		
PL1965 & PL1966 cross over the Isle of Man Interconnector Cable	KP15.992 469549.78 E 5968680.71 N	Concrete mattresses. Refer Table 2.3.4 and Figure A.1.2.
WINDFARM CABLE CROSSINGS		
Walney 3 windfarm cable crossing	KP23.2	Deposited rock between KP23.229 - KP23.202
Walney 3 windfarm cable crossing	KP23.3	Deposited rock between KP23.322 - KP23.347
Walney 3 windfarm cable crossing	KP23.6	Deposited rock between KP23.616 - KP23.646
Walney windfarm cable crossing	KP27.6	Deposited rock between KP31.551 - KP31.578
West of Duddon Sands windfarm cable crossing	KP35.6	Deposited rock between KP35.586 - KP35.608
West of Duddon sands windfarm cable crossing	KP35.7	Deposited rock between KP35.683 - KP35.707
Ormonde offshore windfarm cable crossing	KP35.9	Deposited rock between KP35.898 - KP35.937
NOTES 1. All windfarm cables cross over PL1965 & PL1966. 2. KP measured from the start of the pipeline at Calder platform. 3. The KP for windfarm crossings are estimates, based on acoustic monitoring survey data.		

Table 2.4.2 Dalton pipeline crossings			
Pipeline description	KP		Protection / comment
NORTH MORECAMBE DPPA 500M ZONE			
PL1668 & PL1671 are crossed over by Rhyl PL2969	~KP7.2		Concrete mattresses and probably grout bags. Refer Figure A.6.1
OUTSIDE NORTH MORECAMBE 500M ZONE			
IOM Interconnector Cable crosses over PL1668 (Note)	~KP7.47	455654.62 E 5978710.60 N	3x 5m x 2.5m x 0.15m concrete mattresses
IOM Interconnector Cable crosses over PL1671 (Note)	~KP0.8	455663.31 E 5978716.60 N	5x 5m x 2.5m x 0.15m concrete mattresses (3x inside trench, buried,2x on seabed)
NOTES The Isle of Man Interconnector was installed after the Dalton infrastructure. According to the documentation reviewed the seabed was excavated to the top of the pipeline and umbilical and 3x mattresses were installed inside the trench to provide a minimum 300mm separation between the IOM Interconnector Cable and the 12in pipeline and umbilical. For the umbilical 2x concrete mattresses were installed on the seabed as 'gateway' markers. The KP locations are approximate and based on the UTM Coordinates of North Morecambe relative to the 12in pipeline and umbilical.			

Table 2.4.3 Millom pipeline crossings		
Pipeline description	KP	Protection / comment
MILLOM EAST 500M ZONE		
PL1873 & PLU1874 cross over PL1678 near Millom PLEM	Millom East 500m zone	Refer Figure A.4.1. Both sets of pipelines are dealt with in this Decommissioning Programme document.
PL1873 & PLU1874 cross over PL1674 near Millom PLEM	Millom East 500m zone	Refer Figure A.4.1. Both sets of pipelines are dealt with in this Decommissioning Programme document.
PL1980 and PLU1678JQ3 over PL1674 near Millom East PLEM	Millom East 500m zone	Refer Figure A.4.1. Both sets of pipelines are dealt with in this Decommissioning Programme document.
PL1980 and PLU1678JQ3 over PL1678 near Millom East PLEM	Millom East 500m zone	Refer Figure A.4.1. Both sets of pipelines are dealt with in this Decommissioning Programme document.

2.5 Well information

2.5.1 Exploration wells

Table 2.5.1 Crossans well information			
Well ID	Designation	Status	Category of Well
110/02b-10	Exploration	Decommissioned, AB1	SS-3-4-2

Table 2.5.2 Darwen well information			
Well ID	Designation	Status	Category of Well
110/08a-4	Exploration	Decommissioned, AB1	SS-4-0-2
110/08c-6	Appraisal	Decommissioned, AB3	n/a
110/08c-6Z	Appraisal	Decommissioned, AB3	n/a
NOTES: For details of well categorisation please refer the latest version of the OEUK Well Decommissioning Guidelines [18].			

2.5.2 Production wells

Table 2.5.3 Calder well information			
Well ID	Designation	Status	Category of Well
110/07a-T1	Production	Decommissioned, AB1	PL-0-0-2
110/07a-T1Z	Production	Operating	PL-3-0-2
110/07a-T2	Production	Operating	PL-3-0-2
110/07a-T3	Production	Operating	PL-3-0-2
NOTES: Refer note in Table 2.5.1.			

Table 2.5.4 Dalton well information			
Well ID	Designation	Status	Category of Well
110/02b-R1	Production	Completed, Shut-in	SS-3-0-2
110/02b-9 (R2)	Production	Completed, Shut-in	SS-3-0-2
110/02b-R3	Production	Decommissioned, AB3	n/a
110/02b-R3Y	Production	Decommissioned, AB3	n/a
110/02b-R3Z	Production	Decommissioned, AB3	n/a
NOTES: Refer note in Table 2.5.1.			

Table 2.5.5 Millom well information			
Well ID	Designation	Status	Category of Well
113/26a-2	Appraisal	Decommissioned, AB3	n/a
113/26a-P1	Production	Completed, Shut-in	PL-3-0-2
113/26a-P2	Production	Completed, Shut-in	PL-3-0-2
113/26a-P2Y	Production	Completed, Shut-in	PL-3-0-2
113/26a-P2Z	Production	Decommissioned, AB1	PL-3-0-2
113/26a-P3	Production	Completed, Shut-in	PL-3-0-2
113/26a-P3Z	Production	Completed, Shut-in	PL-3-0-2
113/26a-P4	Production	Completed, Shut-in	PL-4-0-2
113/26a-P4X	Production	Completed, Shut-in	PL-4-0-2

Table 2.5.5 Millom well information			
Well ID	Designation	Status	Category of Well
113/26a-P4Y	Production	Decommissioned, AB1	PL-4-0-2
113/26a-P4Z	Production	Completed, Shut-in	PL-4-0-2
113/27a-4	Production	Decommissioned, AB1	SS-0-0-2
113/27a-5	Appraisal	Decommissioned, AB3	n/a
113/27a-4Z (Q1)	Production	Completed, Shut-in	SS-3-0-2
113/27a-Q2	Production	Completed, Shut-in	SS-3-0-2
113/27a-Q2Y	Production	Completed, Shut-in	SS-3-0-2
113/27a-Q2Z	Production	Completed, Shut-in	SS-3-0-2
113/27a-Q3	Production	Completed, Shut-in	SS-3-0-2
NOTES: Refer note in Table 2.5.1.			

Table 2.5.6 Other well information			
Well ID	Designation	Status	Category of Well
110/02b-11	Exploration	Decommissioned, AB3	n/a
110/07-1	Exploration	Decommissioned, AB3	n/a
110/07-2	Exploration	Decommissioned, AB3	n/a
110/07-3	Exploration	Decommissioned, AB3	n/a
110/07a-4	Appraisal	Decommissioned, AB3	n/a
110/07a-5	Exploration	Decommissioned, AB3	n/a
110/07a-7	Exploration	Decommissioned, AB3	n/a
110/07a-8	Appraisal	Decommissioned, AB3	n/a
110-07b-6	Exploration	Decommissioned, AB3	n/a
110/08-3	Exploration	Decommissioned, AB3	n/a
110/08a-5	Exploration	Decommissioned, AB3	n/a
110/09-1	Exploration	Decommissioned, AB3	n/a
110/09a-3	Exploration	Decommissioned, AB3	n/a
110/11-1	Exploration	Decommissioned, AB3	n/a
110/11-2	Exploration	Decommissioned, AB3	n/a
110/12a-1	Exploration	Decommissioned, AB3	n/a
110/14-2	Exploration	Decommissioned, AB3	n/a
110/14-4	Exploration	Decommissioned, AB3	n/a
110/14-5	Exploration	Decommissioned, AB3	n/a
113/22-1	Exploration	Decommissioned, AB3	n/a
113/22-1Z	Exploration	Decommissioned, AB3	n/a
113/26-1	Exploration	Decommissioned, AB3	n/a
113/27-1	Exploration	Decommissioned, AB3	n/a
113/27-2	Exploration	Decommissioned, AB3	n/a
113/27-3	Exploration	Decommissioned, AB3	n/a

2.6 Material inventory estimates

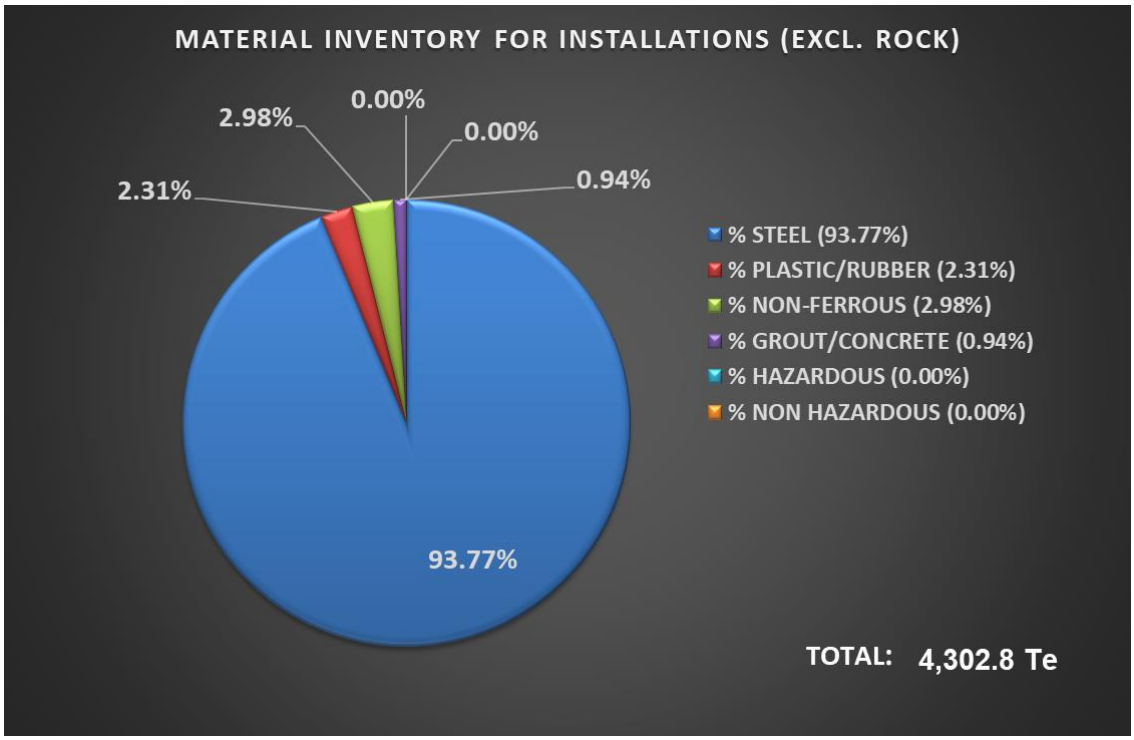


Figure 2.6.1: Pie-chart of material inventory for Calder, Dalton & Millom installations[7]

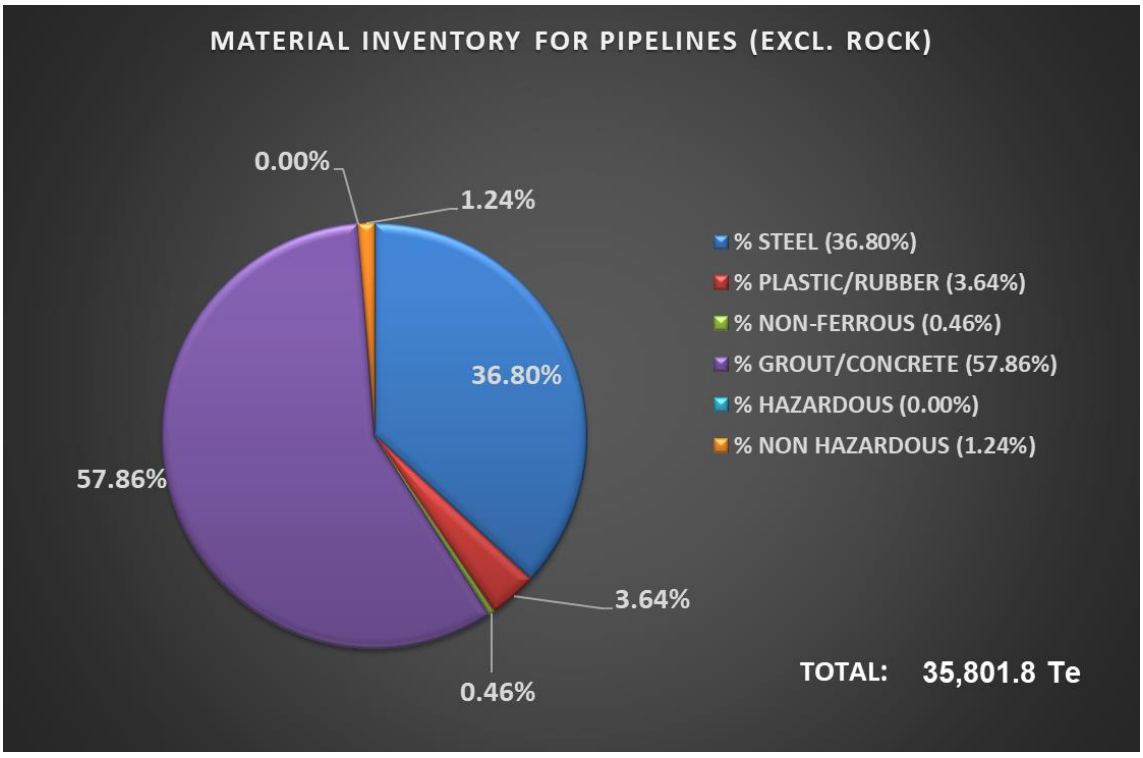


Figure 2.6.2: Pie-chart of material inventory for Calder, Dalton & Millom pipelines

[7] Quantity excludes deposited rock used as scour protection around the Calder & Millom West platforms.

3 Removal and disposal methods

3.1 Introduction

Waste will be dealt with in accordance with the Waste Framework Directive. The reuse of an installation or pipelines (or parts thereof) is first in the order of preferred decommissioning options. However, given the age of the installations and infrastructure, it is unlikely that reuse opportunities will be realised [12]. Waste generated during decommissioning will be segregated by type and periodically transported to shore in an auditable manner through licensed waste contractors.

Geographic locations of potential disposal yard options may require the consideration of Trans Frontier Shipment of Waste (TFSW), including hazardous materials. Early engagement with the relevant waste regulatory authorities will ensure that any issues with TFSW are addressed.

Steel and other recyclable metal are estimated to account for the greatest proportion of the materials inventory. Refer to the Environmental Appraisal [8] for further details concerning disposal of waste.

To explore synergistic opportunities and efficiencies in operational activities and cost, subject to timing, it is possible that the Calder assets will be decommissioned at the same time as other assets in the area, such as North Morecambe, and the South Morecambe Hub.

3.2 Surface installations

The Calder and Millom West platforms are Self-Installing Platforms (SIPs) that are a proprietary design that has been used for several small platforms, most of which can be found in the Netherlands Continental Shelf. They are designed to be transported to location on a barge before the legs are extended towards the seabed and the suction piles installed. The suction piles attain a degree of penetration into the seabed before water inside the top of the suction pile is pumped out, causing the pile to be sucked into the seabed. The topsides are then jacked into position at the appropriate height.

Theoretically, removal of the platform is the reverse of the installation process, although occasionally difficulties can be encountered. For example, due to the topside clamps being grouted into position onto the legs, or because the jacking systems have seized and are no longer operable. When this occurs, the topsides is severed and removed separately from the legs, and the legs are each removed separately.

Note the photos of a SIP in Figure 3.2.1 Figure 3.2.2 are of a similar platform.

Reverse installation

Figure 3.2.1: F3-FA SIP being transported on transport barge (photo credit unknown)

Topsides & legs removed separately

Figure 3.2.2: F3-FA SIP topsides & legs removed separately (photo credit Ocean Energy Resources)

Preparation / Cleaning: The methods that will be used to purge and vent the topsides prior to removal to shore are summarised in Table 3.2.1.

Table 3.2.1: Cleaning of topsides for removal		
Waste type	**Composition of waste**	**Disposal route**
Hydrocarbons	Process fluids	Vessels and pipework will be nitrogen purged, vented and made liquid free.
Produced solids	Sand, NORM	Any pipeline debris captured in filter packages, will be returned to shore for disposal. Any solids remaining in vessels will be removed and disposed of during the dismantlement of the topsides onshore.
Diesel	Bunkered Diesel fuel	Bunkered diesel will be drained and returned onshore for re-use or disposal.
Lubricating oils	Lubricants for equipment e.g. gearboxes, pumps, pedestal crane compressor skid	Lubricating oils will be drained and returned onshore for re-use or disposal.

3.2.1 SIP removal methods

Table 3.2.2: Removal methods for Calder & Millom West SIP	
The following ticked boxes reflect the options or methods taken forward after an initial screening exercise. 1) Reverse install topsides together with substructure ☑; 2) Topsides and legs recovered separately ☑	
Method	**Description**
Reverse installation	Removal of topsides and substructure as a complete unit using a method that is the reverse of the installation followed by recovery to shore for re-use, recycling, and disposal as appropriate.
Topsides removed as a single lift followed by recovery of the legs using SSCV / MCV / SLV	Removal of topsides as a single unit separately from the legs, with the legs being removed individually. Assuming there are no re-use opportunities for an ageing platform, all materials recovered to shore for re-use, recycling, energy recovery and final disposal to landfill as appropriate.
Summary	
Preferred removal method and disposal route	**The preferred method of removal will be determined by feasibility study, taking account the experience of other similar projects. Preferentially, and subject to satisfactory contractual agreement the topsides will be re-used, but otherwise all materials recovered to shore for re-use, recycling, energy recovery and final disposal to landfill as appropriate.** **The removal method will be independently verified by a marine warranty surveyor.**

3.3 Surface installation stabilisation features

Table 3.3.1: Calder platform - stabilisation features			
Stabilisation feature	No.	Option	Disposal route (if applicable)
Fronded mattresses	23	Complete removal if exposed, otherwise leave *in situ*.	Leave *in situ* otherwise return to shore for recycling.
Deposited rock	As Table 2.1.1	Leave *in situ.*	n/a
Other	n/a		
NOTE The 1.75m high deposited rock will need to be assessed for overtrawlability and re-profiled if necessary.			

Table 3.3.2: Millom West platform - stabilisation features			
Stabilisation feature	No.	Option	Disposal route (if applicable)
Fronded mattresses	18	Complete removal if exposed, otherwise leave *in situ*.	Leave *in situ* otherwise return to shore for recycling.
Deposited rock	As Table 2.1.1	Leave *in situ.*	n/a
NOTE The 2m high deposited rock will need to be assessed for overtrawlability and re-profiled if necessary.			

3.4 Subsea installations & stabilisation features

Table 3.4.1: Dalton subsea installations & stabilisation features			
Subsea installations incl. stabilisation features	No.	Option	Disposal route (if applicable)
Dalton R1 WHPS	1	Complete removal. 4x piles cut 3m below seabed unless agreed otherwise	Return to shore for reuse or recycling
Concrete mattresses (R1)	7	Complete removal.	Return to shore for reuse or recycling
Dalton R2 Dual WHPS	1	Complete removal. 4x piles cut 3m below seabed unless agreed otherwise	Return to shore for reuse or recycling
Concrete mattresses (R2)	8	Complete removal.	Return to shore for reuse or recycling
Dalton PLEM	1	Complete removal. 2x piles cut 3m below seabed unless agreed otherwise	Return to shore for reuse or recycling
NOTE Assuming there would be no technical issues the piles will be cut from within, 3.0m below the seabed. Should any difficulties be encountered in accessing the piles internally such that an external excavation will be required, OPRED will be consulted before the piles are cut.			

Table 3.4.2: Millom East subsea installations & stabilisation features			
Subsea installations Incl. stabilisation features	No.	Option	Disposal route (if applicable)
Millom Q1 WHPS	1	Complete removal. 4x piles cut 3m below seabed unless agreed otherwise.	Return to shore for reuse or recycling.
Concrete mattresses (Q1)	8	Complete removal.	Return to shore for reuse or recycling.
Millom Q2 WHPS	1	Complete removal. 2x pin piles cut 3m below seabed unless agreed otherwise.	Return to shore for reuse or recycling.
Millom Q3 WHPS	1	Complete removal.	Return to shore for reuse or recycling.
Concrete / fronded mattresses (Q3)	9	Complete removal.	Return to shore for reuse or recycling.
Millom PLEM	1	Complete removal. 2x piles cut 3m below seabed unless agreed otherwise	Return to shore for reuse or recycling
Grout bags (fronded, shaped)	27	Complete removal	Return to shore for reuse or recycling
NOTE Assuming there would be no technical issues, the piles will be cut from within, 3.0m below the seabed. Should any difficulties be encountered in accessing the piles internally such that an external excavation will be required, OPRED will be consulted before the piles are cut.			

3.5 Pipelines

Although PL1965 has been identified by NSTA as a candidate for CCUS [3][4], there is an implicit assumption that options for re-use of the pipelines will have been exhausted before facilities and infrastructure move into the decommissioning phase and comparative assessment. Therefore, the re-use option has been excluded from the comparative assessment. Except for the Calder trunklines (PL1965 & PL1966), none of the infrastructure has been found to be exposed along the buried sections meaning that the decommissioning options can be limited to the following:

- **Complete removal** – this would involve the complete removal of the pipelines by whatever means most practicable and acceptable from a technical perspective.
- **Partial removal or remediation (PL1965 & PL1966 only)** – this would involve removing exposed or potentially unstable sections of pipelines or carrying out remedial work to make the remaining pipeline safe for leaving *in situ.* This applies to the Calder trunklines PL1965 and PL1966 near KP16 (the IOM Interconnector crossing) and between ~KP31.0 and the end of the pipeline at Mean Low Water Mark (MLWM) at KP42.424. The burial status would be confirmed via future surveys.
- **Leave *in situ*** – this would involve leaving the pipeline(s) *in situ* with no remedial works but verifying their burial status via future surveys.

All surface laid equipment including pipelines that have not been trenched or buried will be completely recovered from the seabed up to the point where they are buried and taken to shore for re-use or recycling or final disposal. Table 3.5.1, Table 3.5.2 and Table 3.5.3 summarise the lengths of pipelines and pipespools being removed, thereby removing potential snagging hazards.

The decommissioning options summarised herein are supported by a comparative assessment where each decommissioning option was comparatively assessed against technical feasibility and efficacy, safety concerns, environmental and societal impact, and cost [7].

Note that PL1965 PL will remain in a state available for re-use as a CCUS transport pipeline until such time as a decision has been agreed with NSTA. If re-use of PL1965 is not feasible the recommended decommissioning option for the pipeline will proceed. Liaison will continue until the fate of PL1965 and its potential for reuse has been determined and agreed with NSTA.

Table 3.5.1: Calder pipeline decommissioning proposals

Pipeline or Group	Recommended option	Justification
PL1965 & PL1966	Leave most of the pipelines *in situ*. Remove surface laid sections near Calder (total length of each pipeline ~212m), but otherwise leave *in situ*. Refer Figure A.1.1. Remediate the exposed sections of Calder pipelines PL1965 & PL1966 either by removing the exposed sections or by covering them with rock. Check the status of PL1965 & PL1966 near the IOM Interconnector crossing. In 2017 an unsupported section of the pipelines – although covered with mattresses - was observed in 2014 (25m long), 2017 (7.2m long) and 2022 (18m long) and this is thought to be attributed to local scour. The pipelines may be sufficiently protected by mattresses with no further action. Remedial works may be required or may have already been conducted under the operator's IRM (Inspection, Repair, Maintenance) procedures by the decommissioning works are undertaken. Potentially a short section of pipeline may need to be removed. The ends will be left buried under mattresses. Bury the exposures near the wind farm cable crossings under deposited rock (e.g. sporadically between KP35.5 and KP36.4, total length ~250m c.f. 206m observed in 2017) while removal of the exposed sections of pipelines between KP36.55 and KP41.02 (minimum length ~1,023m) would result in all the exposures documented in 2017 as being remediated. The total length to be remediated will be confirmed by combined 2022 (up to KP36.3) and 2023 (between KP36.3 and MLWM) survey data. Assuming a total length ~1.3km, the amount of rock required to bury the exposed sections around the windfarm crossings is estimated at ~15,000Te. The quality of rock estimated as being required for spot rock deposits on thirty-two cut pipeline ends is ~800Te. Any excavations near Calder will be left to backfill naturally.	Complies with OPRED guidance notes and reflects the outcome of the comparative assessment.
PL6340, electrical & fibre optic cable	Leave the electric and fibre-optic cable *in situ*. Remove the surface laid section near CPP1 (total length ~100m), but otherwise leave *in situ*. Refer Figure A.7.1. Remove surface laid section near Calder (total length ~141m), but otherwise leave *in situ*. Refer Figure A.1.1.	As above.

Table 3.5.1: Calder pipeline decommissioning proposals		
Pipeline or Group	Recommended option	Justification
NOTES 1. Removal of all surface-laid materials includes removal of protection and stabilisation materials. 2. All materials that are removed will be returned to shore for re-use, recycling, or disposal as appropriate, using the Waste Framework Directive described in section 3.1.		

Table 3.5.2: Dalton pipeline decommissioning proposals		
Pipeline or Group	Recommended option	Justification
PL1668	Leave (most of) the pipeline *in situ*. Remove surface laid section near Dalton PLEM (total length ~114m), but otherwise leave *in situ*. Refer Figure A.2.1. Remove surface laid section near DPPA (total length ~105m), but otherwise leave *in situ*. Refer Figure A.6.1.	Complies with OPRED guidance notes and reflects the outcome of the comparative assessment.
PL1669	Leave (most of) the pipeline *in situ*. Remove surface laid section near Dalton R2 (total length ~90m), but otherwise leave *in situ*. Refer Figure A.3.1 Remove surface laid section near Dalton PLEM (total length ~96m), but otherwise leave *in situ*. Refer Figure A.2.1.	As above. Refer PL1668.
PL1670	This surface laid pipeline will be completely removed. Total length ~86m. Refer Figure A.2.1.	Complies with OPRED guidance notes and reflects the outcome of the comparative assessment.
PL1671	Leave (most of) the umbilical *in situ*. Remove surface laid section near DPPA (total length ~148m), but otherwise leave *in situ*. Refer Figure A.6.1. Remove surface laid section near Dalton PLEM (total length ~75m), but otherwise leave *in situ*. Refer Figure A.2.1.	As above. Refer PL1668.
PL1672	Leave (most of) the umbilical *in situ*. Remove surface laid section near Dalton PLEM (total length ~78m), but otherwise leave *in situ*. Refer Figure A.2.1. Remove surface laid section near Dalton R2 (total length of each pipeline ~69m), but otherwise leave *in situ*. Refer Figure A.3.1.	As above. Refer PL1668.
PL1673	This surface laid pipeline will be completely removed. Total length ~78m. Refer Figure A.2.1.	As above. Refer PL1670.
NOTE: Refer notes in Table 3.5.1.		

Table 3.5.3: Millom pipeline decommissioning proposals		
Pipeline or Group	Recommended option	Justification
PL1674	Leave (most of) the pipeline *in situ*. Remove surface laid section near Millom PLEM (total length ~110m), but otherwise leave *in situ*. Refer Figure A.4.1. Remove surface laid section near DPPA (total length ~132m), but otherwise leave *in situ*. Refer Figure A.6.1.	Complies with OPRED guidance notes and reflects the outcome of the comparative assessment.

Table 3.5.3: Millom pipeline decommissioning proposals		
Pipeline or Group	Recommended option	Justification
PL1675 & PL1676	Leave (most of) the pipelines *in situ*. Remove surface laid sections near Millom West (total length ~85m), but otherwise leave *in situ*. Refer Figure A.5.1. Remove surface laid sections near Millom PLEM (total length ~112m), but otherwise leave *in situ*. Refer Figure A.4.1.	
PL1677	This surface laid pipeline will be completely removed. Total length ~110m. Figure A.4.1.	Complies with OPRED guidance notes and reflects the outcome of the comparative assessment.
PL1678	Leave (most of) the umbilical *in situ*. Remove surface laid section near DPPA (total length ~120m), but otherwise leave *in situ*. Refer Figure A.6.1. Remove surface laid sections near Millom PLEM (total length ~204m), but otherwise leave *in situ*. Refer Figure A.4.1.	As above. Refer PL1674.
PLU1678JQ3	This surface laid umbilical will be completely removed. Total length ~257m. Figure A.4.1	As above. Refer PL1677.
PL1679.1 & PL1679.2	This surface laid umbilical will be completely removed. Total length ~74m. Figure A.4.1.	As above. Refer PL1677.
PL6352	Leave (most of) the electric and fibre-optic cable *in situ*. Remove surface laid section near DPPA (total length ~82m), but otherwise leave *in situ*. Refer Figure A.6.1. Remove surface laid section at Millom West (total length ~85m), but otherwise leave *in situ*. Refer Figure A.5.1.	As above. Refer PL1674.
PL1873	This surface laid pipeline will be completely removed. Total length ~141.5m. Figure A.4.1.	As above. Refer PL1677.
PLU1874	This surface laid umbilical will be completely removed. Total length ~164m. Figure A.4.1.	As above. Refer PL1677.
PL1980	This surface laid flexible flowline will be completely removed. Total length ~257m. Figure A.4.1.	As above. Refer PL1677.
NOTE: Refer notes in Table 3.5.1**.**		

3.6 Pipeline stabilisation features

Table 3.6.1: Calder pipeline protection & stabilisation features			
Asset Description	No.	Description	Disposal route (if applicable)
PIPELINE & CABLE MATTRESSES & GROUT BAGS AT CALDER			
Concrete mattresses	51	Refer Table 2.3.4 & Figure A.1.1.	Fully remove to shore for re-use, recycling, or disposal.
Grout bags (25kg)	125	Refer Table 2.3.4 & Figure A.1.1.	Refer Notes 1, 2
PL1965 & PL1966 - ISLE OF MAN INTERCONNECTOR CROSSING			
Concrete mattresses	29	Refer Table 2.4.1, Table 2.3.4 & Figure A.1.2.	Leave *in situ,* undisturbed, subject to overtrawl.
Grout bags (25kg)	125	Refer Table 2.4.1, Table 2.3.4 & Figure A.1.2.	As above.
PL6340 AT CPP1			
Concrete mattresses, 6m x 3m x 0.15m, as detailed in Figure A.7.1.	5	Refer Table 2.3.4 and Figure A.7.1.	Fully remove to shore for re-use, recycling, or disposal.
Grout bags (25kg), nominal quantity	125	Refer Table 2.3.4 and Figure A.7.1.	As above.
NOTE: 1. The number of grout bags is not specified within the as-built data. The numbers quoted here are based on engineering judgement but will need to be confirmed during decommissioning activities. 2. Remove all grout bags to shore for recycling & disposal.			

Table 3.6.2: Dalton pipeline protection & stabilisation features			
Asset Description	No.	Description	Disposal route (if applicable)
PIPELINE & UMBILICAL PROTECTION AT NORTH MORECAMBE DPPA			
Concrete mattresses	27	Refer Table 2.3.5, Figure A.6.1.	Fully remove to shore for re-use, recycling, or disposal.
Grout bags (25kg)	125	Refer Table 2.3.5, Figure A.6.1	Refer Note 1.
WELL R1 & PLEM PIPELINE & CABLE MATTRESSES & GROUT BAGS			
Concrete mattresses	73	Refer Table 2.3.5, Figure A.2.1.	Fully remove to shore for re-use, recycling, or disposal.
Grout bags (25kg)	125	Refer Table 2.3.5, Figure A.2.1.	Refer Note 1.
WELL R2 PIPELINE & CABLE MATTRESSES & GROUT BAGS			
Concrete mattresses	31	Refer Table 2.3.5, Figure A.3.1.	Fully remove to shore for re-use, recycling, or disposal.
Grout bags (25kg)	125	Refer Table 2.3.5, Figure A.3.1.	Refer Note 1.
NOTE: 1. Remove all grout bags to shore for recycling & disposal.			

Table 3.6.3: Millom pipeline protection & stabilisation features			
Asset Description	Number	Description	Disposal route (if applicable)
PIPELINE & CABLE MATTRESSES & GROUT BAGS NEAR NORTH MORECAMBE DPPA			
Concrete mattresses.	50	Refer Table 2.3.6 and Figure A.6.1.	Fully remove to shore for re-use, recycling, or disposal.
Grout bags (25kg)	125	As above.	As above.
PIPELINE & CABLE MATTRESSES & GROUT BAGS NEAR MILLOM PLEM			
Concrete mattresses	161	Refer Table 2.3.6, Figure A.4.1.	Fully remove to shore for re-use, recycling, or disposal.
Fronded grout bag (1.4 x 1.2 x 0.9m)	1	Refer Table 2.3.6, Figure A.4.1.	As above.
Grout bags (25kg)	250		Refer Note 1
MILLOM PIPELINE PROTECTION AT MILLOM WEST			
Concrete mattresses.	19	Refer Table 2.3.6, Figure A.5.1	Fully remove to shore for re-use, recycling, or disposal.
Grout bags (25kg)	125	As above.	As above.
PIPELINE PROTECTION COVERS AT Q3 WHPS			
Concrete pipeline protection covers	3	Refer Table 2.3.6, Figure 2.3.2 and Figure A.4.1.	Fully remove all pipeline protection covers to shore for re-use, recycling, or disposal.
PIPELINE PROTECTION FOR Q3 AT PLEM			
Concrete pipeline protection covers	2	Refer Table 2.3.6, Figure 2.3.1 and Figure A.4.1.	Fully remove all pipeline protection covers to shore for re-use, recycling, or disposal.
NOTE: 1. Remove all grout bags to shore for recycling & disposal.			

3.7 Well decommissioning

Table 3.7.1: Well decommissioning
Two exploration wells that were originally to have been tied back to Calder have been partially decommissioned: Crossans: 110/2b-10, Darwen: 110/8a-4. The Calder, Dalton and Millom inventories consists of a total of twenty-two wellbores (twelve separate surface penetrations, owing to sidetracks/multilaterals in some wells): Calder: 110/07a-T1, 110/07a-T1Z, 110/07a-T2, 110/07a-T3; Dalton: 110/2b-R1, 110/2b-9 (R2); Millom East: 113/27a-4, 113/27a-4Z (Q1), 113/27a-Q2, 113/27a-Q2Y, 113/27a Q2Z, 113/27a-Q3; Millom West: 113/26a-P1, 113/26a-P2, 113/26a-P2Y, 113/26a-P2Z, 113/26a-P3, 113/26a P3Z, 113/26a-P4, 113/26a-P4X, 113/26a-P4Y, 113/26a-P4Z. All the wells listed in section 2.5 (Table 2.5.1, Table 2.5.2, Table 2.5.3, Table 2.5.4, and Table 2.5.5) will be decommissioned, if not already, in accordance with latest version of the OEUK Well Decommissioning Guidelines [18]. A Master Application Template (MAT) and the supporting Subsidiary Application Template (SAT) will be submitted in support of works carried out. An application to decommission the wells will be made via the online Well Operations Notification System (WONS) on the NSTA Energy Portal. Well decommissioning at Millom West, Crossans and Darwen is currently scheduled to commence earliest Q4 2023. The remaining well decommissioning at Calder, Millom East and Dalton will align with the cessation of Calder production.

3.8 Waste streams

Table 3.8.1: Waste stream management method	
Waste stream	Removal and disposal method
Bulk liquids	Residual hydrocarbons will be removed from topsides. Further cleaning and decontamination will take place onshore prior to re-use or recycling.
Marine growth	Where necessary and practicable, to allow access some marine growth will be removed offshore. The remainder will be brought to shore and disposed of according to guidelines and company policies and under appropriate permit.
NORM	Tests for NORM will be undertaken offshore by the Radiation Protection Supervisor. and recorded. Any NORM encountered onshore will be dealt with and disposed of in accordance with guidelines and company policies and under appropriate permit.
Asbestos	It is unlikely that asbestos will be present in the section of jacket structure that is being recovered to shore. However, should any such material be found it will be dealt with and disposed of in accordance with guidelines and company policies.
Chromium VI	Given the age of the platforms Chromium VI paints may have been used for corrosion protection. Checks will be done to confirm whether Chromium IV is present on the platform using the correct PPE taking account of COSHH Regulations 2002. The material will be disposed of according to guidelines and company policies and under appropriate permit.
Other hazardous wastes	Other hazardous waste will be recovered to shore and disposed of according to guidelines and company policies and under appropriate permit.
Onshore dismantling sites	Appropriate licensed sites will be selected. The dismantling site must demonstrate proven disposal track record and waste stream management throughout the deconstruction process and demonstrate their ability to deliver re-use and recycling options.

Table 3.8.2: Inventory disposition				
Asset	Inventory	Total inventory (Te)	Planned mass to shore (Te)	Planned mass decommissioned *In situ* (Te)
Calder	Installations	1,910	1,910	0
	Pipelines	29,859	402	29,457
	Deposited rock	5,866	0	5,866
Dalton	Installations	370	293	77
	Pipelines	1,865	730	1,135
	Deposited rock	0	0	0
Millom	Installations	2,023	1,909	113
	Pipelines	4,078	1,149	2,929
	Deposited rock	12,728	0	12,728
Sub-total:	**Excl. rock**	**40,105**	**6,393**	**33,711**
Sub-total:	**Incl. rock**	**58,699**	**6,393**	**52,305**

NOTE:
1. Totals - Installations: 4,303Te, Pipelines: 35,802Te.
2. There may be slight discrepancies due to rounding. The figures have not been adjusted to allow for this.

4 Environmental Appraisal Overview

4.1 Environmental sensitivities

The key environmental and societal sensitivities in the project area are summarised in Table 4.1.1. For detailed refer to the Environmental Appraisal [8].

Table 4.1.1: Environmental and societal sensitivities
Conservation Interests and Sites
The EIS project area is located within or close to several species and habitats of conservation importance. The Shell Flat and Lune Deep Special Area of Conservation (SAC) features Annex I reef habitat. The reef habitat represents a good example of boulder and bedrock reef, with the largest proportions of rock found along the unique kettle hole feature known as Lune Deep. According to the habitat distribution maps provided in The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR (2010), there is also a small area of 'seapens and burrowing megafauna communities' in the EIS, with a large concentration between the Isle of Man (IOM) and the Irish Coast. The West of Walney Marine Conservation Zone (MCZ), located 10 km from Millom West, was designated in 2016 for the features 'A5.2 Subtidal sand', 'A5.3 Subtidal mud' and 'Sea-pen and burrowing megafauna communities'. There are several designated conservation sites surrounding the project area, these are: Liverpool Bay/Bae Lerpwl (Special Protection Area (SPA)), West of Copeland (MCZ), West of Walney (MCZ), Fylde (MCZ), Shell Flat and Lune Deep (SAC), Morecambe Bay and Duddon Estuary (SPA), Morecambe Bay (SAC), Ribble and Alt Estuaries (SPA) and Wyre-Lune (MCZ).
Conservation Species
Harbour porpoise, bottlenose dolphin, minke whale and white-beaked dolphin have all been observed within the vicinity of the project. For all species but harbour porpoise, they are found in relatively low densities within the project area or have low abundance estimates. Harbour porpoises are common in the EIS and frequent the area throughout much of the year. They are thought to be found in the area at a density of 0.086 animals/km^2 which is relatively low compared to other areas of the UKCS. Minke whales are found to the north-west of the project site at a density of 0.017 animals/km^2 and bottlenose dolphins at a density of 0.008 animals/km^2. No estimate is available for white-beaked dolphin. All the cetacean species listed are both European Protected Species ('EPS') and are covered by the UK Biodiversity Action Plan (UK BAP). Both grey and harbour seals are protected by the Conservation of Seals Act (1970) but are not expected to be present in significant numbers. Harbour seals are unlikely to occur in the area and grey seals may be present at low densities ranging between 5 and 10 individuals per 25km^2. Cod (*Gadus morhua*) are an OSPAR listed species and are listed as vulnerable on the International Union for Conservation of Nature (IUCN) red list. They use the project area as a nursery and for spawning.
Benthic Environment
The seabed type around the EIS infrastructure is primarily classified under the EUNIS habitat complex MD52 (Atlantic offshore circalittoral sand) with areas of MD62 (Atlantic offshore circalittoral mud), MD42 (Atlantic offshore circalittoral mixed sediment) and MD32 (Atlantic offshore circalittoral coarse sediment). A total of 344 taxa were identified across the survey area during a pre-decommissioning environmental survey. Based on photographic evidence, the most frequently observed fauna associated with the sediments were

Table 4.1.1: Environmental and societal sensitivities
brittlestars (*Ophiuroidea*), hermit crabs (*Paguridae*), flatfish (*Pleuronectiformes*), and starfish (*Asteroidea* including *Asteropecten irregularis*). Although epifauna and mobile fauna across the survey area were sparse, bioturbation was evident, with burrows (3cm to 15cm) observed at all stations, indicating a thriving infaunal community. Sea pens were absent across all survey sites and burrows were 'frequent' or 'abundant', indicating 'Sea pens and burrowing megafauna community' is potentially present in all survey areas.
Fish
The EIS area is located within an area of high intensity spawning for plaice and sole. The following species are also known to use the area for spawning: ling (*Molva molva)*, lemon sole (*Microstomus kitt*), mackerel (*Scomber scombrus),* nephrops (*Nephrops norvegicus),* plaice (*Pleuronectes platessa*), sandeels (*Ammodytes marinus*), sprat (*Sprattus sprattus*), sole (*Solea solea*) and Whiting (*Merlangius merlangus)*. Additionally, the following species use the area as a nursery ground: anglerfish (*Lophius piscatorius*), cod, haddock (*Melanogrammus aeglefinus*), herring (*Clupea harengus*), lemon sole, mackerel, nephrops, plaice, sandeels, sole, spotted ray (*Raja montagui*), spurdog (*Squalus acanthias*), thornback ray (*Raja clavata*), tope shark (*Galeorhinus galeus*) and whiting. The area is an area of High nursery intensity for cod, herring, spurdog and whiting. Cod (*Gadus morhua)* uses the area for both high intensity nursery and spawning grounds. The probability of juvenile fish aggregations occurring is the area is low for anglerfish, blue whiting, European hake, haddock, herring, mackerel, horse mackerel, Norway pout, plaice, sprat, and whiting. Horse mackerel and sprat have a medium probability.
Seabirds
The Irish Sea provides important breeding and over-wintering areas for a wide variety of seabirds and coastal water birds. During the spring and summer months, almost half a million pairs of seabirds breed at locations (primarily on cliffs and islands) throughout the region. Coastal and offshore waters are also important for feeding and overwintering seabirds. The following species are present in the EIS area across the majority of the year: Black-headed gull (*Chroicocephalus ridibundus*), Black legged kittiwake (*Rissa tridactyla*), Common Guillemot (*Uria aalge*), Common gull (*Larus canus*), Common tern (*Sterna hirundo*), Cormorant (*Carbo carbo*), Gannet (*Morus*), Great black-backed gull (*Larus marinus*), Great skua (*Stercorarius skua*), Herring gull (*Larus smithsonianus*), Lesser black-backed gull (*Larus fuscus*), Little gull (*Hydrocoloeus minutus*), Manx Shearwater (*Puffinus Puffinus*), Northern fulmar (*Fulmarus glacialis*), Razorbill (*Alca torda*), Sandwich tern (*Thalasseus sandvicensis*) and Sooty shearwater (*Ardenna grisea*). UK breeding seabird population censuses dating back to the 1960s indicate a change in population trends over time. Black-legged kittiwake populations declined by 29% between 2000 and 2019. Northern fulmar and common tern populations have also declined by 33% and 3% respectively, in the same time frame. Conversely, razorbill, northern gannet, and black-headed gulls have seen populations increase over the same time. Black-legged kittiwake, having a maximum foraging range of 120km have been recorded nesting on offshore platforms before, as have herring gulls. Seabird sensitivity to oil within the area of the EIS infrastructure varies considerably throughout the year with it being highest in the months of October to December and January to March. Along both PL1965 and PL1966, sensitivity is variable and generally higher throughout the year compared to the area of installations. SOSI is highest approximately halfway along the pipelines to shore. Nearest to the coast sensitivity is highest between October and December, January to March and May.

Table 4.1.1: Environmental and societal sensitivities
Commercial Fishing
The EIS infrastructure (including PL1965 & PL1966) is in the International Council for the Exploration of the Seas ('ICES') statistical rectangle 37E6 and 37E6. Fisheries landings vary throughout the project area. Within the EIS area, in 2021 the catch was mostly shellfish, with shellfish fisheries landing 89% of the total value and 81% of the total weight of fish landed in ICES 37E6, and 97% of the total value and 98% of the total weight of fish landed in ICES 36E6 within 2021. Throughout 2017 – 2020, ICES rectangle 36E6 recorded a higher catch value than 37E6 with >£2,000,000 every year. Fishing activity is predominantly concentrated to the south, west and north of the installations with >100,000 kWh being recorded in several areas. However, to the east and in the immediate vicinity of both the installations and along PL1965 and PL1966, fishing activity is low with some areas having no data recorded. Trawls were the most used gear in both ICES, with otter and beam trawling being the favoured method. Other gear types used include traps and dredges.
Other Users
The EIS infrastructure is located within an area of extensive oil and gas development. There are twelve oil and gas surface structures within 40 km of the project area, the closest being 7km away. Shipping activity within Blocks 110/2, 110/3, 110/4, 110/7, 113/26 and 113/27 and 113/29 is high with Block 110/8 considered to be moderate. No data is present for Block 113/29. There are several cables running within proximity to the EIS project area. The closest being the Hibernia Atlantic telecommunication cable (active) running <1 km from the Calder platform. The LANIS 1 telecommunications cable (active) also runs within proximity to the Calder platform (3km). Finally, the IOM/UK Interconnector power cable (active) runs 2 km SE of the Millom West platform. The following windfarm areas are located close to the EIS area: Walney Wind Farm (active) 7 km North of Millom West; Ormonde Wind Farm (active) 26 km northwest of Millom West; Barrow Wind Farm (active) 27km northwest of Dalton; Gwynt y Môr Wind Farm (active) 36 km south of Calder and Burbo Bank Wind Farm (active) 39 km southeast of Calder. There are also 3 sites located within proximity of the EIS area that are currently registered as 'Preferred Projects' within Round 4 of the 'Offshore Wind Leasing Round'. Blocks 110/2, 110/3, 110/4, 110/7, 110/8, 113/26, 113/27 and 113/29 are of concern to the Ministry of Defence (MoD) as they lie within training ranges. There are seven non-dangerous wrecks within 20km of the EIS infrastructure. There is a single dangerous wreck (Ben Rein) 2km E from Millom West and there are 3 dangerous wrecks south of the Calder: Ben Cruachan (9km), Residu (10km) and Kilcoan (15km).

4.2 Potential environmental impacts and their management

As described below, there will be some planned environmental impacts arising from decommissioning of Calder, Dalton, and Millom. Long-term environmental impacts from the decommissioning operations are expected to be low. Incremental cumulative impacts and trans-boundary effects associated with the planned decommissioning operations are also expected to be low. For further details please refer Environmental Appraisal [8].

4.2.1 Impact assessment

This EA Report has been prepared in line with the OPRED Decommissioning Guidelines and with Decom North Sea's EA Guidelines for Offshore Oil and Gas Decommissioning. The OPRED Decommissioning Guidance states that an EA in support of a DP should be focused on the key issues related to the specific activities proposed;

and that the impact assessment write-up should be proportionate to the scale of the project and to the environmental sensitivities of the project area.

The EA has been informed by several different processes, including the identification of potential environmental issues through project engineer and marine environmental specialist review in an Environmental Identification (ENVID) screening workshop and consultation with key stakeholders.

The impact assessment screening identified ten potential impact areas based on the proposed EIS decommissioning activities:

- Atmospheric emissions
- Seabed disturbance
- Physical presence of infrastructure decommissioned *in situ*
- Physical presence of vessels in relation to other sea users
- Underwater noise
- Discharges to sea
- Resource use
- Waste
- Disturbance to nesting seabirds; and,
- Accidental events

Of these, the following three were screened in and taken forward for assessment based on the potential severity and/or likelihood of their respective environmental impact: seabed disturbance; physical presence of infrastructure decommissioned *in situ* and disturbance to nesting seabirds.

Disturbance to seabed was investigated further for potential impacts due to the nature of the proposed activities and the location of the EIS within proximity to conservation areas. The proposed decommissioning activities may impact a temporary (direct and indirect) area of 0.14km^2 of EIS seabed habitat, with an additional area of 0.004 km^2 of permanent impact associated with rock remediation. While the activities may result in the mortality of some individuals, many of the taxa within the EIS area are relatively resilient; sandy communities are comparatively quick to recover from disturbance. No decommissioning activity will be taking place in a protected area; therefore, it is highly unlikely that and habitat or species of conservation interest will be directly or indirectly affected. With regards to the sediment and benthic features within area, the EIS activities are unlikely to affect the natural physical processes of the area. Pipelines being decommissioned *in situ* are also unlikely to have an impact on these processes and their gradual degradation over time will have a negligible impact on the surrounding sediments. Overall, when considering the spatial and temporal scale of the disturbance, and accounting for the following mitigation measures, the impact of the decommissioning on the seabed was considered **not significant**.

- Cutting and lifting operations will be controlled by ROV to ensure accurate placement of cutting and lifting equipment and minimise any impact on seabed sediment.
- The requirements for further excavation will be assessed on a case-by-case basis and will be minimised to provide access only where necessary. Internal cutting will be used preferentially where access is available.
- Heavy lift vessels are most likely to be equipped with dynamic positioning rather than relying on anchors – which interact with the seabed, to remain in position.
- Rock mass will be carefully placed over the designated areas of the pipelines and seabed using an ROV. This will control the profile of the rock covering and accurate placement of rock over the pipeline and on the seabed to ensure rock is only placed within the planned footprint with minimal spread over adjacent sediment, minimising seabed disturbance.
- The profile of the rock-placement over the pipeline ends will enable fishing nets to trawl over the rock unobstructed. Suitably graded rock will be used to minimise the risk of snagging fishing gear.

- Survey data collected in the area will be reviewed for potential sensitive seabed habitats prior to the commencement of operations; and
- Post decommissioning debris clearance, surveys and monitoring shall be carried out using non-intrusive methodologies such as side scan sonar, using ROVs etc.

The physical presence of infrastructure decommissioned *in situ* was investigated as a potential impact on commercial fisheries. Of key importance was understanding the use of the EIS areas by commercial fisheries and the risk that infrastructure decommissioned *in situ* may pose as a gear snagging risk. Also addressed was the snag risk posed by seabed depressions.

The CA outcome has determined that any surface laid infrastructure and associated stabilisation material will be fully removed, and any buried pipeline/cable will be decommissioned *in situ* to minimise the snag risk their exposures present. There are only reportable exposures associated with the PL1965/PL1966 trunklines. These areas do not coincide with areas of high intensity trawling activity. Furthermore, due to the nature of the highly mobile surface sediments of the EIS, it is likely that seabed depressions will be naturally backfilled over time. Owing to the improbability of a snagging event occurring, and in consideration with the following mitigation measures, it has been concluded that the impact of the physical presence of infrastructure decommissioned *in situ* on commercial fisheries is **not significant**.

- The EIS subsea infrastructure is currently shown on Admiralty Charts and the FishSAFE system. Once decommissioning activities are complete, updated information on the EIS subsea area (i.e. which infrastructure remains *in situ* and which has been removed) will be made available to allow the Admiralty Charts and the FishSAFE system to be updated.
- All surface laid pipelines and associated stabilisation material will be removed. All buried pipelines will be decommissioned *in situ*.
- Any exposed/cut pipeline/umbilical ends will undergo remediation, as appropriate, to ensure they are overtrawlable to fishing gear. Remediation may entail rock placement or burial of ends using sediment.
- Evaluation of post-decommissioning surveys will identify the requirement for remediation of depressions generated through dredging around piles, although Metocean conditions are likely to be sufficient to naturally backfill any such depressions.
- Any objects dropped during decommissioning activities, or any existing debris identified will be removed from the seabed where appropriate.
- An appropriate vessel will be engaged to carry out survey work within the 500m safety exclusion zones to evaluate any potential snagging risks. Decommissioning activities will be complete subject to certification of seabed clearance and acceptance of the Decommissioning Close-out Report by OPRED. The existing 500m safety exclusion zones will then be removed; and
- Chrysaor recognises its commitment to monitor any infrastructure decommissioned *in situ* and therefore intends to set up arrangements to undertake post-decommissioning monitoring on behalf of the License Owners. The frequency of the monitoring will be agreed with OPRED, and future monitoring will be determined through a risk-based approach based on the findings from each subsequent survey. A monitoring strategy will be proposed in the decommissioning close out report. During the period over which monitoring is required, the status of the infrastructure decommissioned *in situ* would be reviewed and any necessary remedial action undertaken to ensure it does not pose a risk to other sea users.

Disturbance to nesting seabirds was scoped in owing to current stakeholder and regulatory interest. Legislative expectations and requirements determine the protection of wild birds, their eggs and nests in the offshore marine area, including offshore marine installations. Future surveys are proposed by Chrysaor and will be conducted prior to the commencement of decommissioning activities early in the breeding season (during Q2), the results of which will indicate bird presence/absence thereby informing subsequent mitigations and discussions with OPRED. Chrysaor will, in their bird management strategy, outline any proposed methods of deterrence. Disturbance of nesting seabirds is only anticipated if the deterrence methods fail. The overall impact of decommissioning

activities on nesting seabirds is currently considered **not significant** and any change in the wake of future survey effort will be communicated to OPRED.

The EA has considered the relevant Marine Plans, adopted by the UK Government to help ensure sustainable development of the marine area. Chrysaor considers that the proposed decommissioning activities are in alignment with its objectives and policies.

Having reviewed the project activities within the wider regional context and taking into consideration the mitigation measures to limit any potential impacts, the findings of this EA conclude that the activities do not pose any significant threat to environmental or societal receptors within the UKCS.

5 Interested party consultations

5.1 Consultation summary

Table 5.1.1: Summary of stakeholder comments		
Stakeholder	**Comment**	**Response**
INFORMAL CONSULTATIONS		
NFFO		
NIFPO		
SFF		
GMG		
STATUTORY CONSULTATIONS		
NFFO		
NIFPO		
SFF		
GMG		
Public		

6 Programme management

6.1 Project management and verification

Harbour Energy has established a UK Decommissioning organisation as a department to manage and execute decommissioning projects. Harbour Energy's existing processes for Operations, Planning, Project Management, Procurement, Health Safety and Environment, will be used and tailored to meet the specific requirements of decommissioning projects. Harbour Energy will manage all permitting, licences, authorisations, notices, consents, and consultations.

6.2 Post-decommissioning debris clearance and verification

A post decommissioning debris survey will be carried out within all 500m safety zones. Discussions are underway with OPRED regarding the level of appropriate coverage for pipeline corridor survey along each existing pipeline route. Oil and gas debris will be recovered for onshore disposal or recycling in line with existing disposal methods.

Identification and removal of oil and gas related debris along the remaining pipeline corridor of the infield pipeline sections subject to decommissioning works will be carried out in accordance with OPRED guidance in operation at the time those activities commence.

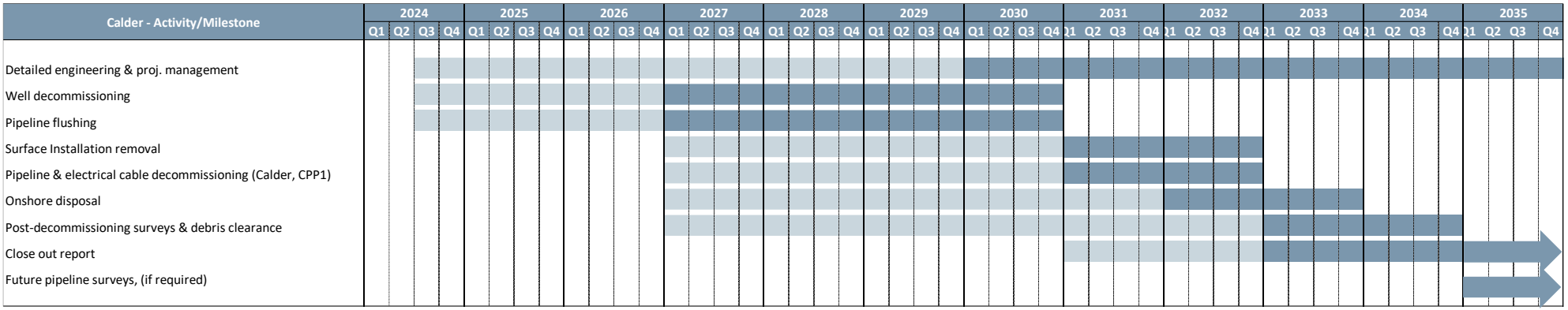
Verification of seabed state will be obtained. Whilst the worst-case seabed disturbance from overtrawl has been assessed, it is recognised that some of the decommissioning activities will be occurring in the Morecambe Bay and Duddon Estuary SPA, therefore different methods of determining debris clearance and snag risk may be required. The methods used for remediating the trunkline (PL1965 & PL1966) exposures will therefore be discussed and finalised with OPRED. This will be followed by a statement of clearance to all relevant governmental departments and statutory consultees.

The outcomes of the clear seabed verification activities in the 500m zones and the alternative survey methods of the pipelines will be reported in the close out Report and sent to the Seabed Data Centre (Offshore Installations) at the Hydrographic Office.

6.3 Schedule(s)

Proposed decommissioning schedules for Calder, Dalton and Millom are provided in Figure 6.3.1, Figure 6.3.2 and Figure 6.3.3 respectively. The activities are subject to the acceptance of the Decommissioning Programmes presented in this document and any unavoidable constraints (e.g. vessel availability) that may be encountered while executing the decommissioning activities. Therefore, activity schedule windows have been included to account for this uncertainty.

The commencement of offshore decommissioning activities will depend on commercial agreements and commitments.



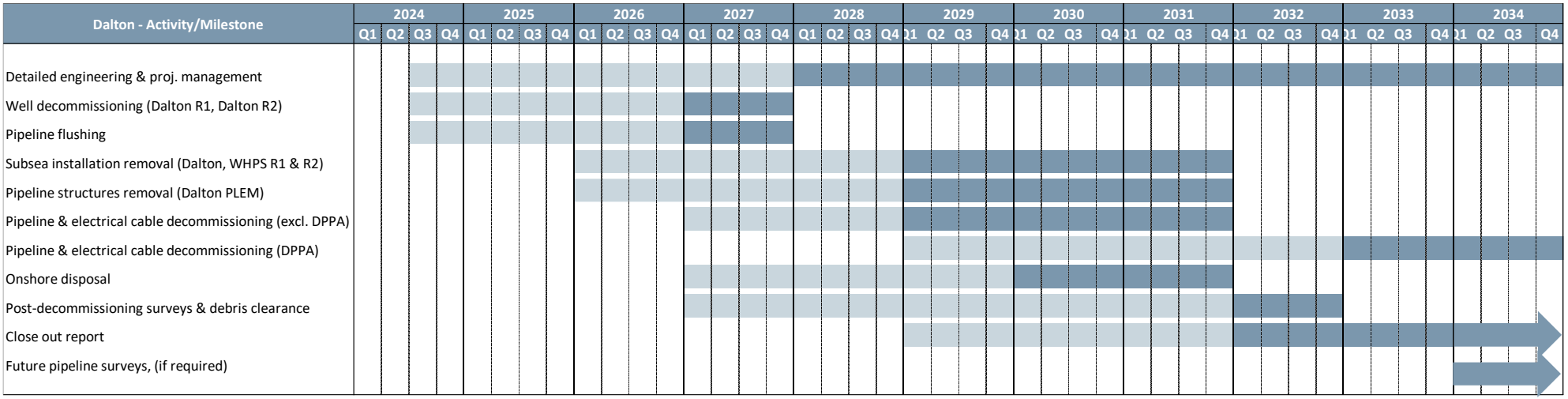
Notes / Key

Earliest potential activity

Activity window to allow commercial flexibility associated with decommissioning activities

1. If possible and subject to timing and commercial agreements, decommissioning activities will be carried out as part of a wider decommissioning campaign in the area;
2. Decommissioning of PL1640 at CPP1. This work will likely be scheduled to coincide with the decommissioning of CPP1;
3. The close out report will be prepared on completion of offshore activities. However, as decommissioning works at CPP1 will likely be timed to coincide with the decommissioning of these assets, timing and strategy for the close out report is to be agreed with OPRED as details become known;
4. The close out report will contain results of environmental surveys, debris survey (identification/removal) and clear seabed verification survey;
5. The close out report will explain the strategy based on risk assessments and results of post decommissioning surveys.

Figure 6.3.1: Gantt chart of project plan for Calder



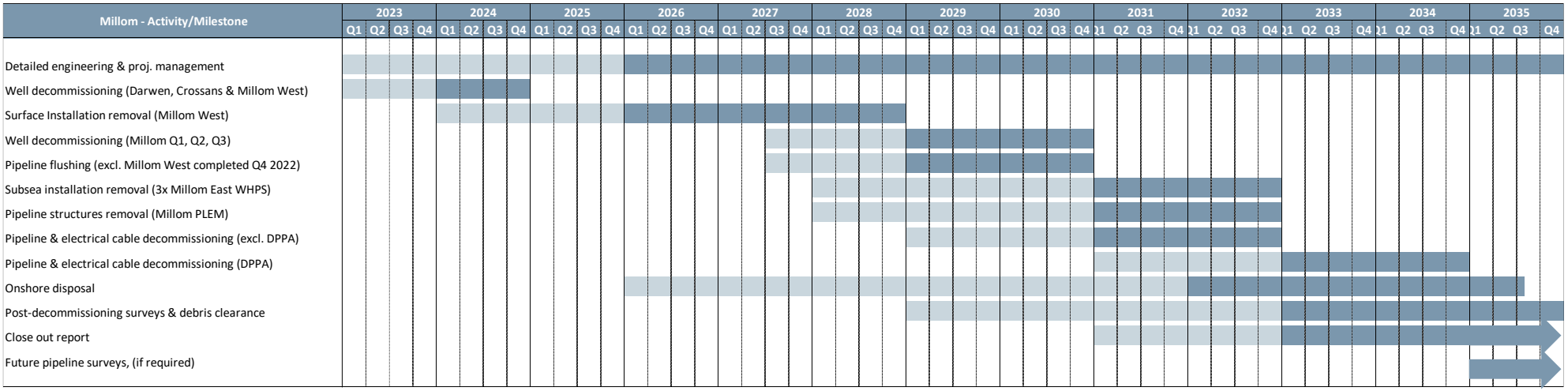
Notes / Key

Earliest potential activity

Activity window to allow commercial flexibility associated with decommissioning activities

1. If possible and subject to timing and commercial agreements, decommissioning activities will be carried out as part of a wider decommissioning campaign in the area;
2. The close out report will be prepared on completion of offshore activities. However, as decommissioning works at DPPA will likely be timed to coincide with the decommissioning of these assets, timing and strategy for the close out report is to be agreed with OPRED as details become known;
4. The close out report will contain results of environmental surveys, debris survey (identification/removal) and clear seabed verification survey;
5. The close out report will explain the strategy based on risk assessments and results of post decommissioning surveys.

Figure 6.3.2: Gantt chart of project plan for Dalton



Notes / Key

Earliest potential activity

Activity window to allow commercial flexibility associated with decommissioning activities

1. If possible and subject to timing and commercial agreements, decommissioning activities will be carried out as part of a wider decommissioning campaign in the area;
2. The close out report will be prepared on completion of offshore activities. However, as decommissioning works at DPPA will likely be timed to coincide with the decommissioning of these assets, timing and strategy for the close out report is to be agreed with OPRED as details become known;
3. The close out report will contain results of environmental sueveys, debris survey (identification/removal) and clear seabed verification survey;
4. The close out report will explain the strategy based on risk assessments and results of post decommissioning surveys.

Figure 6.3.3: Gantt chart of project plan for Millom

6.4 Costs

Decommissioning costs will be provided separately to OPRED.

6.5 Close Out

In accordance with OPRED guidelines, a close out report covering the completion of the offshore decommissioning scope of these Decommissioning Programmes will be submitted at time agreed by OPRED. The close out report will contain debris removal and verification of seabed clearance, the first post decommissioning environmental survey and explanation of any variations to the approved Decommissioning Programmes.

Decommissioning activities are required at Central Processing Platform (CPP1) and North Morecambe Production Platform Alpha (DPPA). At CPP1 for PL6340 and at DPPA for PL1668, PL1671, PL1674, PL1678 and PL6352. The timing of such works is subject to several factors such as contracting strategy, accessibility while the platforms remain operational and the timing of eventual decommissioning activities at these locations. As a result, there may be several years between completion of the works associated with the Decommissioning Programmes and the remainder of the works at CPP1 and DPPA. A strategy will be required for dealing with the close out report and this shall be agreed with OPRED as more details become known.

Any interim progress reports will include updates on the potential re-use of PL1965 for CCUS as discussed with NSTA.

6.6 Post decommissioning monitoring and evaluation

After decommissioning activities have been concluded, pipeline status surveys and environmental surveys will be completed with the findings being sent to OPRED in the close out report. The frequency and scope of future surveys will be agreed with OPRED and supported by a risk assessment. Residual liability will remain with the Section 29 holders identified in Table 1.4.6, Table 1.4.8 and Table 1.4.10.

PIPELINE RISK BASED MONITORING PROGRAMME

All pipeline systems covered within this Decommissioning Document scope will be subject to survey. The post decommissioning pipeline monitoring programme, to be agreed with OPRED, will:

- Begin with an initial baseline survey covering the full length of each pipeline.
- Be followed by a risk-based assessment for each pipeline (and associated stabilisation materials) which will inform the minimum agreed extent and frequency of future surveying. This will take account of pipeline burial, exposure and spanning data derived from the initial baseline survey, all available historical survey information and fisheries impact assessment.
- Provide a report of each required survey (with analysis of the findings, the impact on the risk-based assessment (RBA) and identification of the proposed timing of the next survey in accordance with the agreed RBA approach), for discussion and agreement of OPRED.
- Include provision for remediation in the framework where such a requirement is identified. Appropriate remediation will be discussed and agreed with OPRED.
- Where remediation has been undertaken, a follow up survey of the remediated section(s) will be required.
- In the event of a reported snagging incident on any section of a pipeline the requirement for any additional survey and/or remediation will be discussed and agreed with OPRED.
- Will include a further fisheries impact assessment following completion of the agreed survey programme.
- Monitoring will become reactive following completion of the agreed survey programme and OPRED agreement of the analysis of the outcomes.
- Require pipeline information to be recorded on Navigation charts and FishSAFE.

The monitoring programme will also include discussion with OPRED of the long-term pipeline degradation and potential risk to other users of the sea following conclusion of the planned survey programme.

7 References

Please note the link names presented below have been abbreviated.

[1] Barrow Offshore Wind Limited (2008) Barrow Offshore Wind Farm Post Construction Monitoring Report, First Annual Report. Weblink last accessed 11 Oct 2021: BOWind Ltd MR

[2] BEIS (2016) Morecambe Bay and Duddon Estuary SPA Citation. Weblink last accessed 16 Oct 2021: MB&DE SPA Citation.pdf

[3] BEIS (2019) Re-use of Oil and Gas Assets for Carbon Capture Usage and Storage Projects. Weblink last accessed: 10 June 2020: BEIS CCUSP Link

[4] BEIS (2019) Re-use of Oil and Gas Assets for Carbon Capture Usage and Storage Projects, Annex A. Weblink last accessed 10 June 2020: BEIS CCUSP Annex A Link

[5] BEIS (2021) Morecambe Bay & Duddon Estuary SPA Factsheet. Weblink last accessed 14 Oct 2021: MB&DE SPA Factsheet

[6] EIB Org (2005) Ormonde Offshore Wind Farm Environmental Impact Statement. Weblink last accessed 11 Oct 2021: Ormonde WF EIA

[7] Harbour Energy (2021) Calder, Dalton & Millom Pipelines Comparative Assessment, HBR-EIS-E-XX-P-HS-02-00001

[8] Harbour Energy (2021) Calder, Dalton & Millom Environmental Appraisal, HBR-EIS-E-XX-X-HS-02-00001

[9] HSE (Health and Safety Executive) (1997) The abandonment of offshore pipelines: Methods and procedures for abandonment. Offshore Technology report. HSE Books, Norwich. ISBN-7176-1421-2

[10] IMO (1989) Resolution A.672(16) Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone, adopted 19 October 1989. IMO A.672(16)

[11] JNCC (2021) Liverpool Bay / Bae Lerpwl SPA. Weblink last accessed 14 Oct 2021: JNCC Base Lerpwl SPA

[12] Kent (2022) Technical Note, Millom West Reuse Study, 5212661-100-TCN-ST-001, First published 07 Mar 2022

[13] Natural England (2019) European Site Conservation Objectives for Morecambe Bay & Duddon Estuary Special Protection Area Site Code: UK9020326. Weblink last accessed 14 Oct 2021: NE MB&DESPA CO

[14] NWIFCA (2015) Liverpool Bay/Bae Lerpwl Non-Occurring Activities. Weblink last accessed 15 Oct 2021: NWIFCA-LB-SPA-001_Non-Occurring-Activities.pdf

[15] NWIFCA (2015) Morecambe Bay and Duddon Estuary – Non-Occurring Activities. Weblink last accessed 15 Oct 2021: NWIFCA-MB-EMS-001_Non-Occurring-Activities.pdf

[16] NWIFCA (2015) Morecambe Bay and Duddon Estuary – Non-Occurring Activities. Weblink last accessed 15 Oct 2021: NWIFCA-MB-EMS-001A_Non-Occurring-Activities.pdf

[17] NWIFCA (2017) Light Otter Trawling. Weblink last accessed 14 Oct 2021: NWIFCA-MB-EMS-002_Light-Otter-Trawling

[18] OEUK (2022) Well Decommissioning Guidelines, Issue 7 published November 2022. OEUK Well Decom Guidelines

[19] OPRED (2018) Offshore Oil and Gas Decommissioning Guidance Notes. Weblink last accessed 27 Jan 2020: OPRED Guidance Notes Nov 2018

[20] OSPAR (1998) OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations. OSPAR Decision 98-3

[21] OSPAR (2006) OSPAR Recommendation 2006/5 on a Management Regime for Offshore Cuttings Piles

[22] Ørsted (2020) Our Offshore Wind Farms. Weblink last accessed 11 Oct 2021: Orsted WOWF Summary

[23] The National Archive (1998) The Petroleum Act https://www.legislation.gov.uk/ukpga/1998/17/contents

[24] Vattenfall (2021) Ormonde Offshore Wind Farm. Weblink last accessed 11 Oct 2021: Vattenfall OOWF

Appendix A Schematics

Appendix A.1 Calder & IOM cable crossing

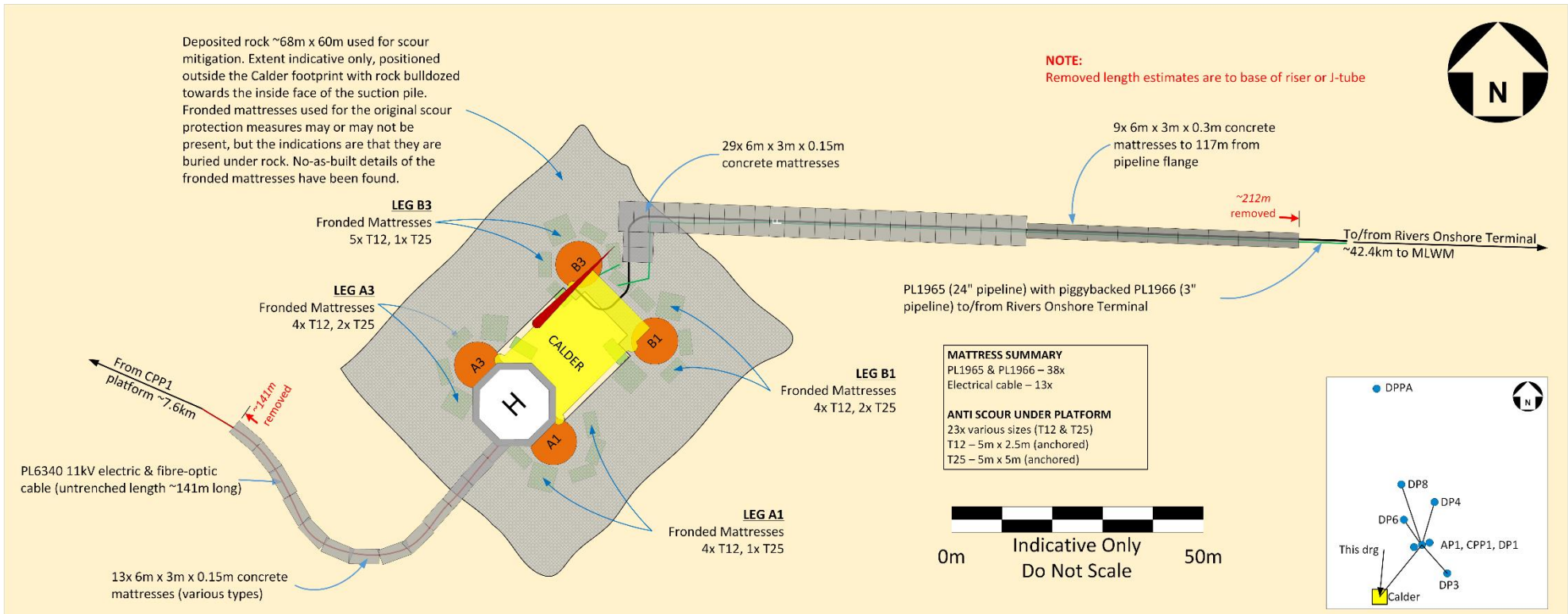


Figure A.1.1: Calder platform approach schematic

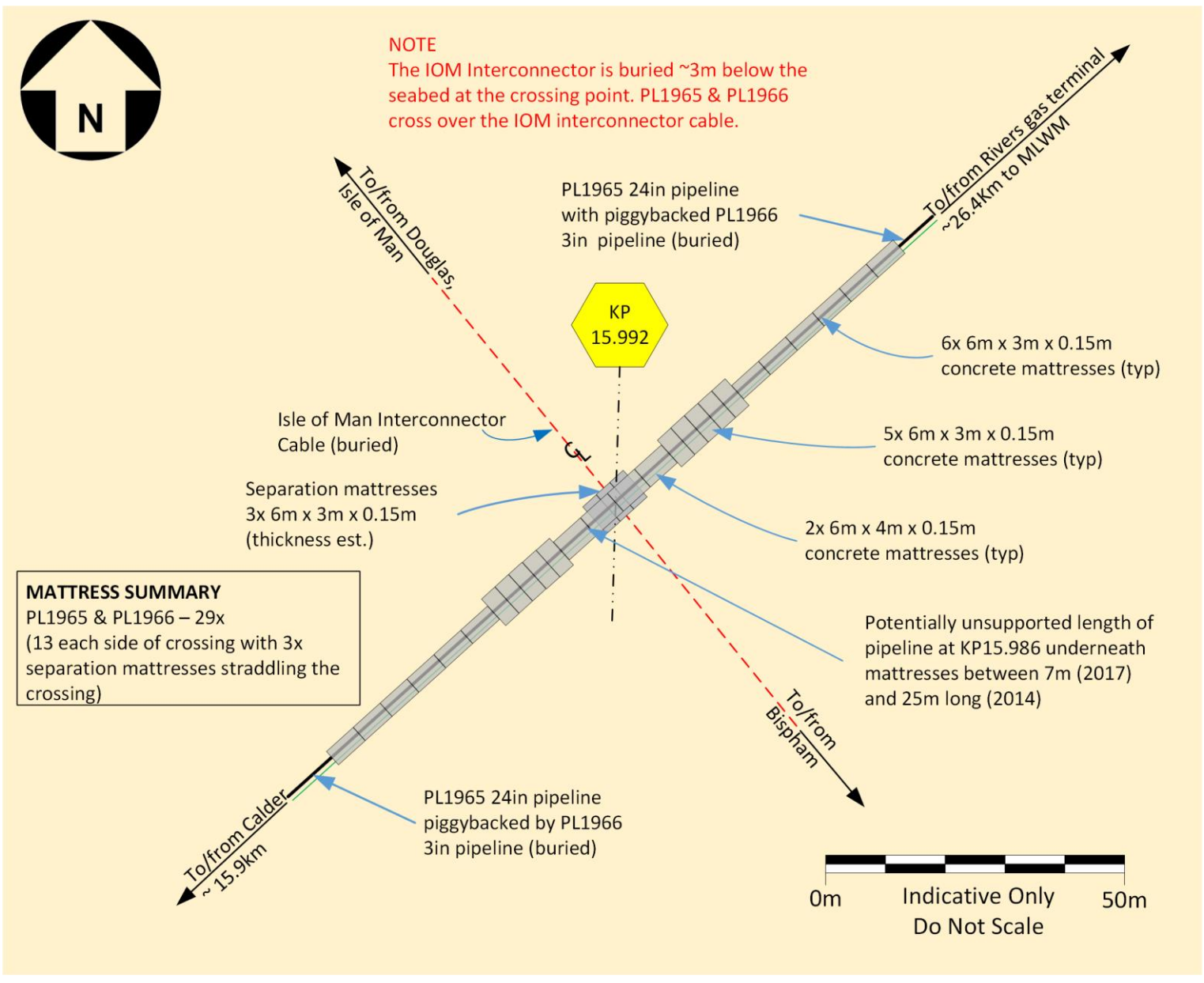


Figure A.1.2: IOM Interconnector crossing schematic

Appendix A.2 Dalton PLEM & R1

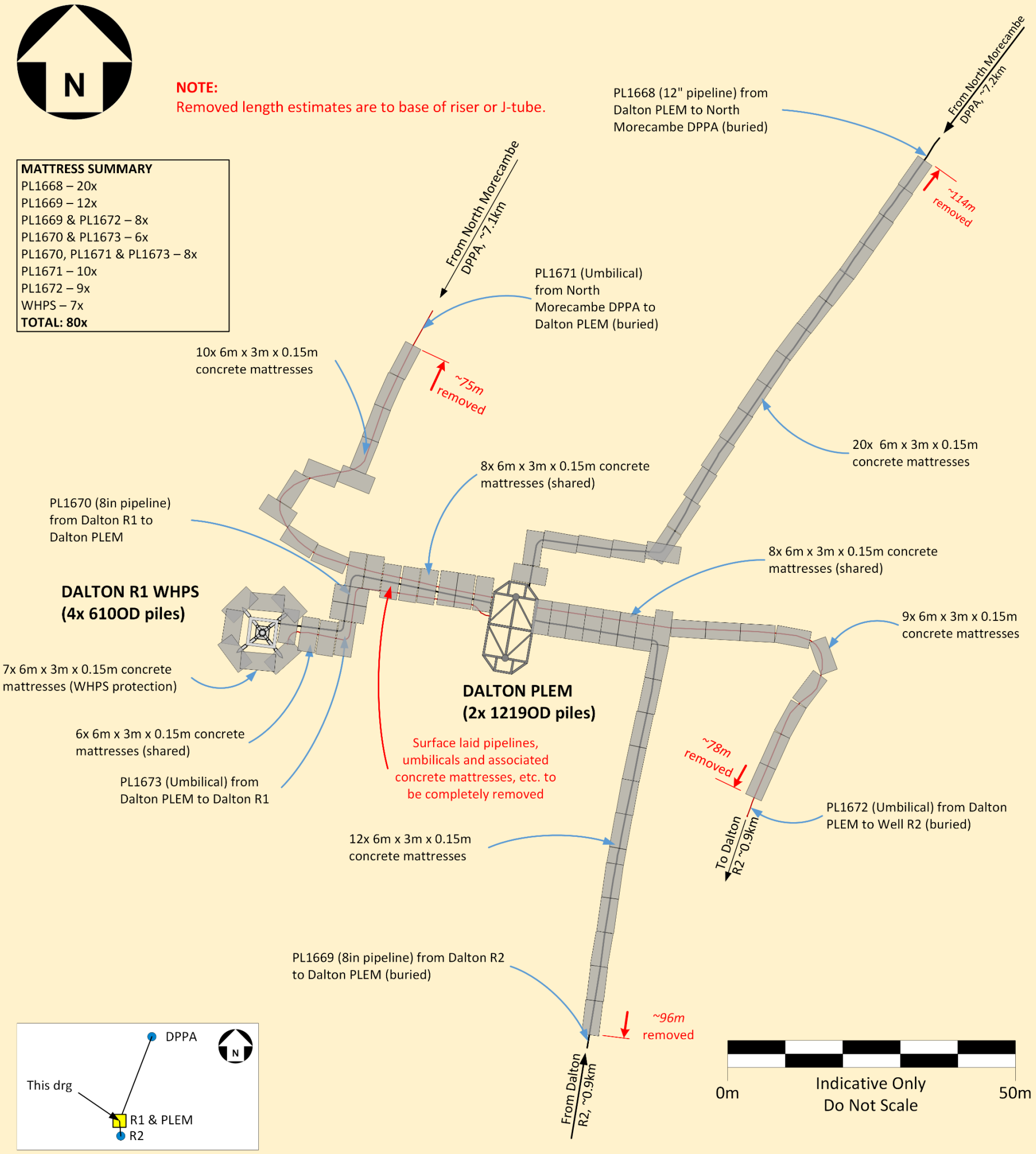


Figure A.2.1: Dalton PLEM & Well R1 approach schematic

Appendix A.3 Dalton R2

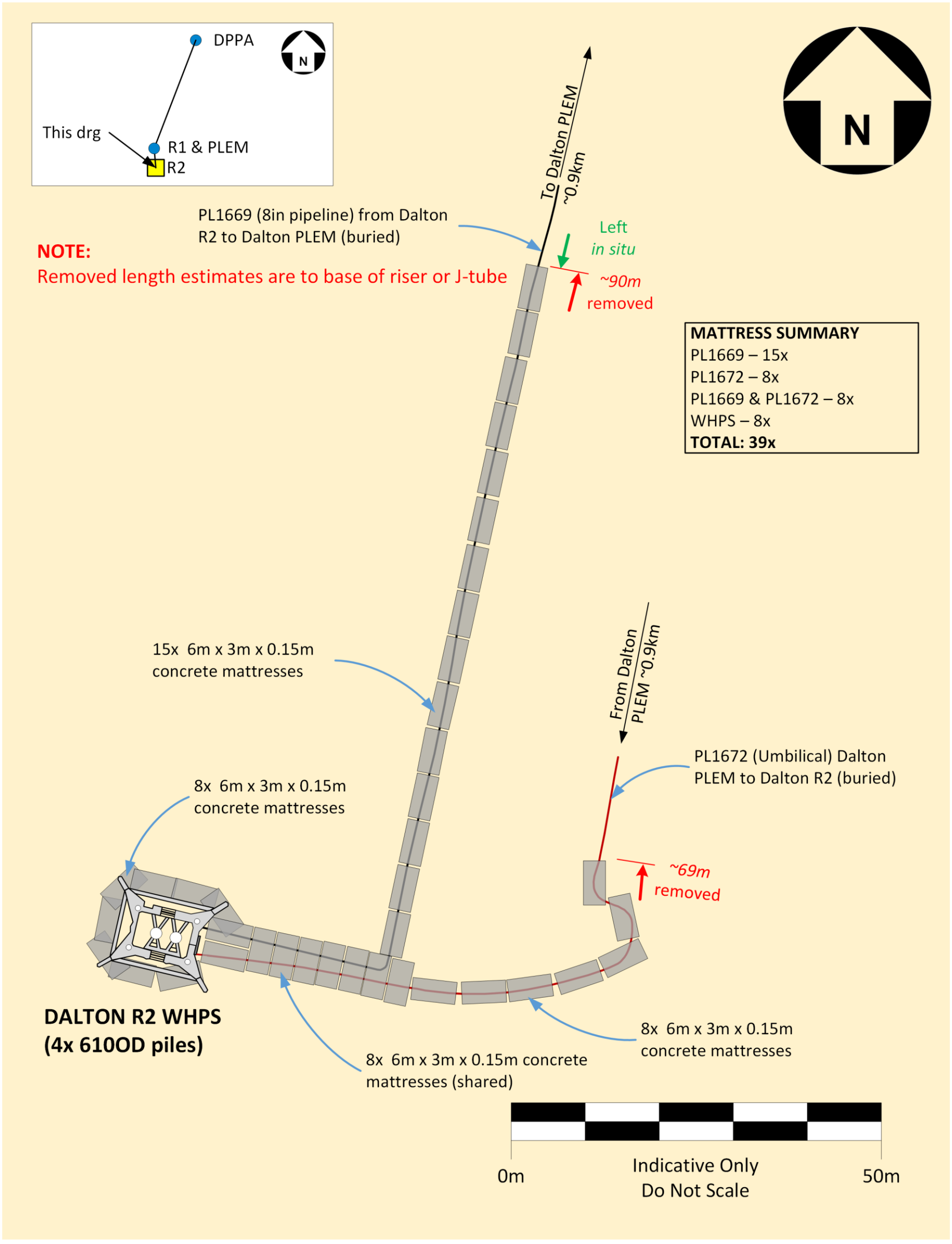


Figure A.3.1: Dalton Well R2 approach schematic

Appendix A.4 Millom PLEM, Q1, Q2 & Q3

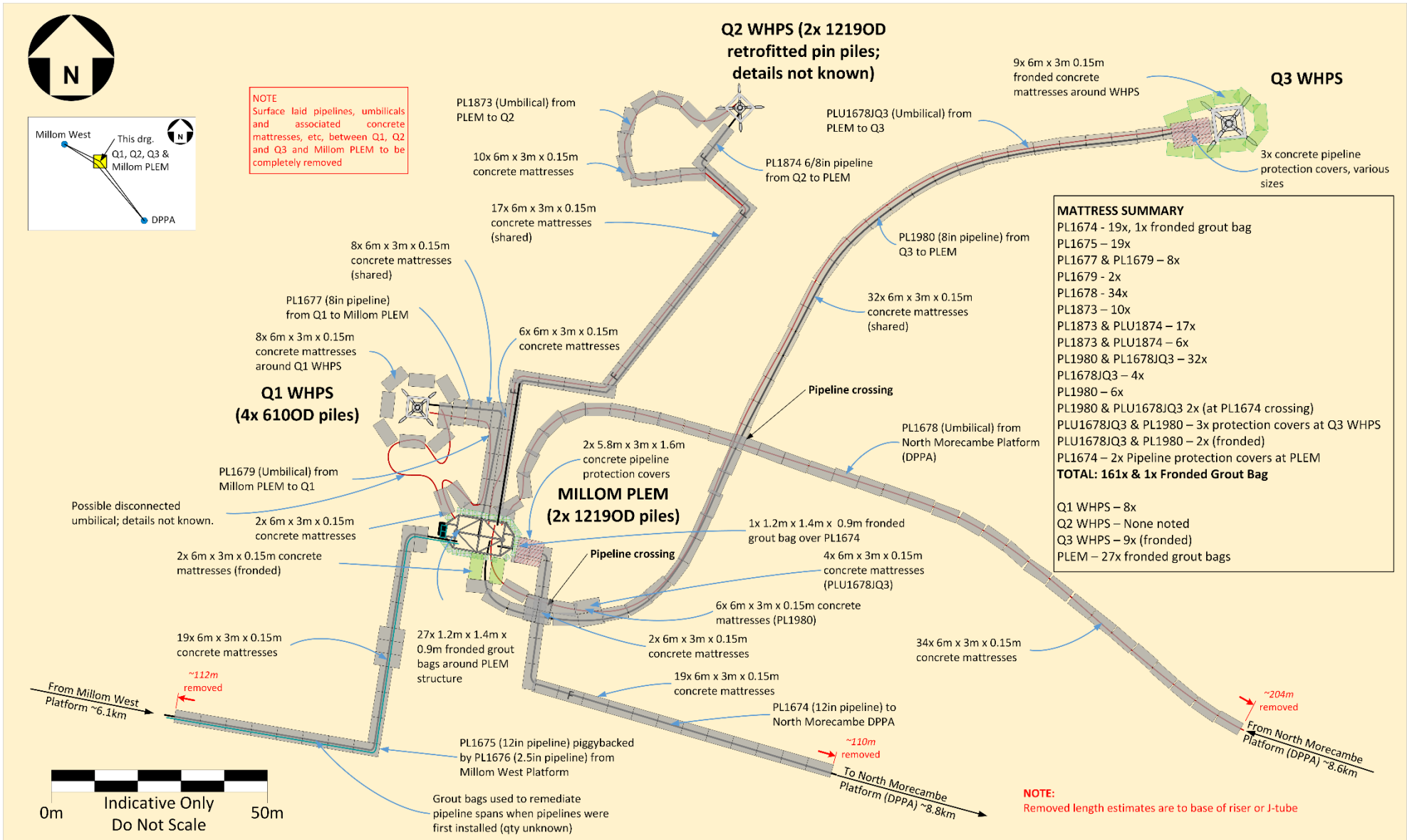


Figure A.4.1: Millom PLEM, Well Q1, Well Q2 & Q3 approach schematic

Appendix A.5 Millom West

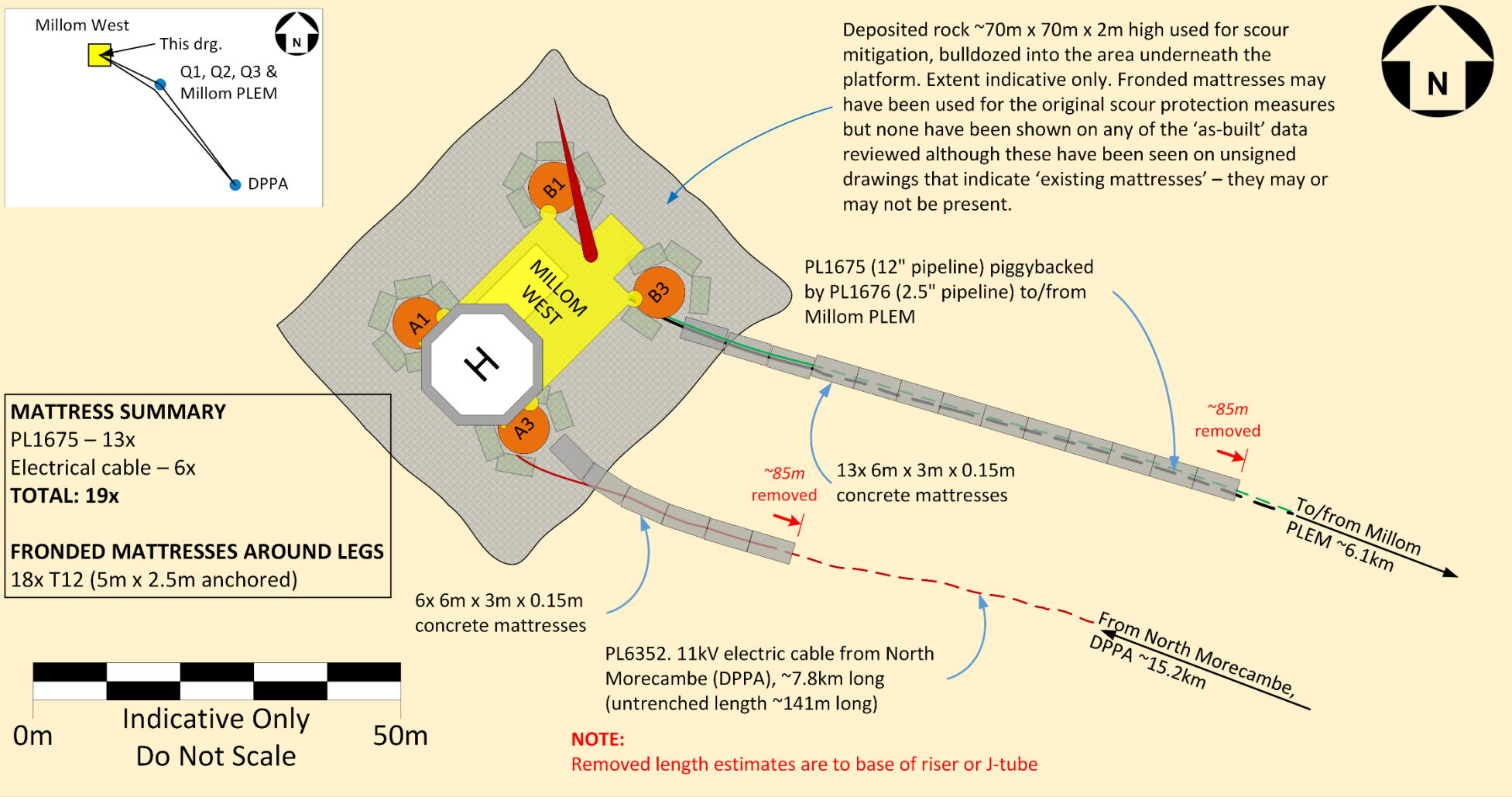


Figure A.5.1: Millom West platform approach schematic

Appendix A.6 North Morecambe DPPA

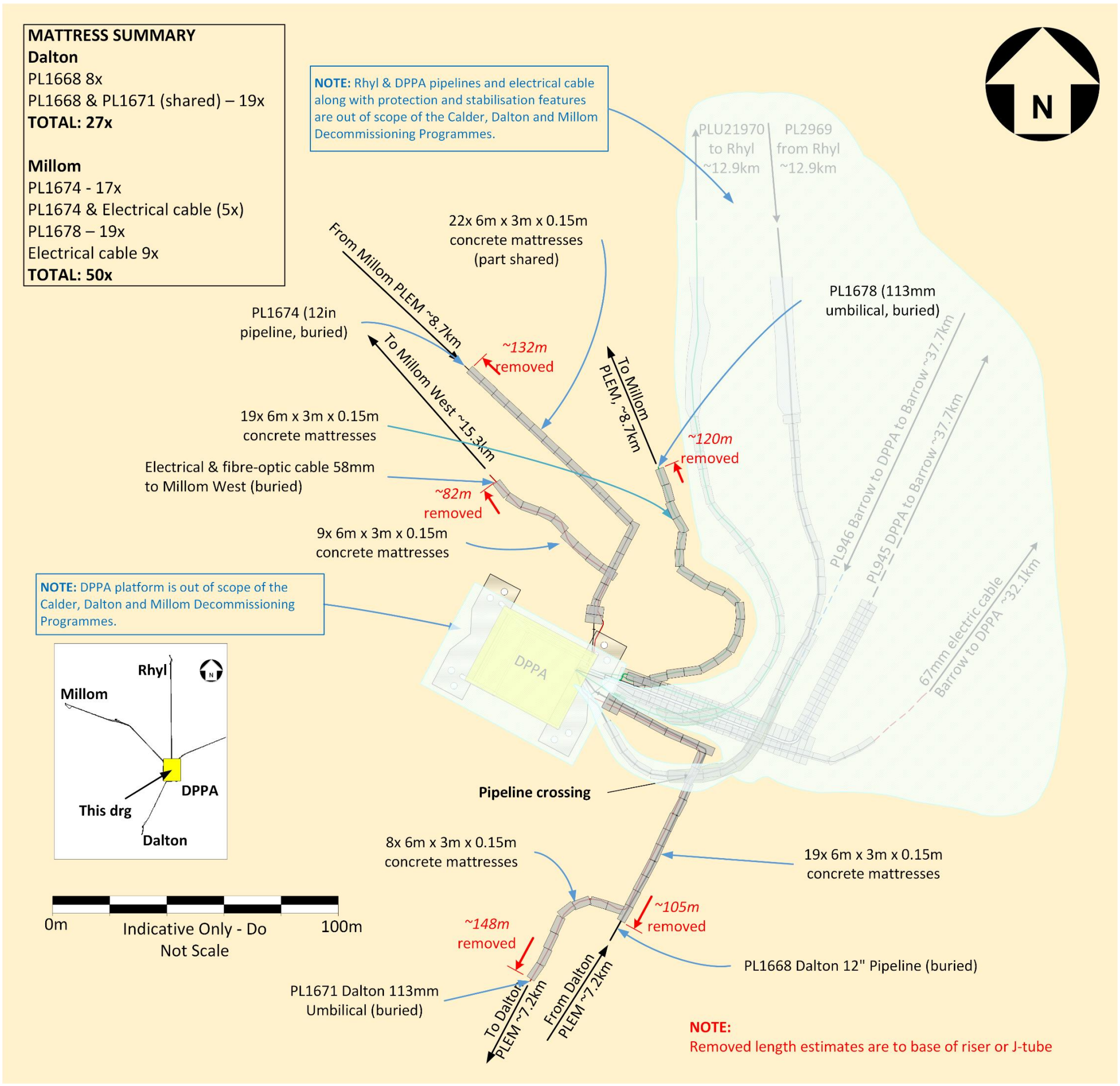


Figure A.6.1: North Morecambe (DPPA) approach schematic

Appendix A.7 South Morecambe Central Processing Platform CPP1

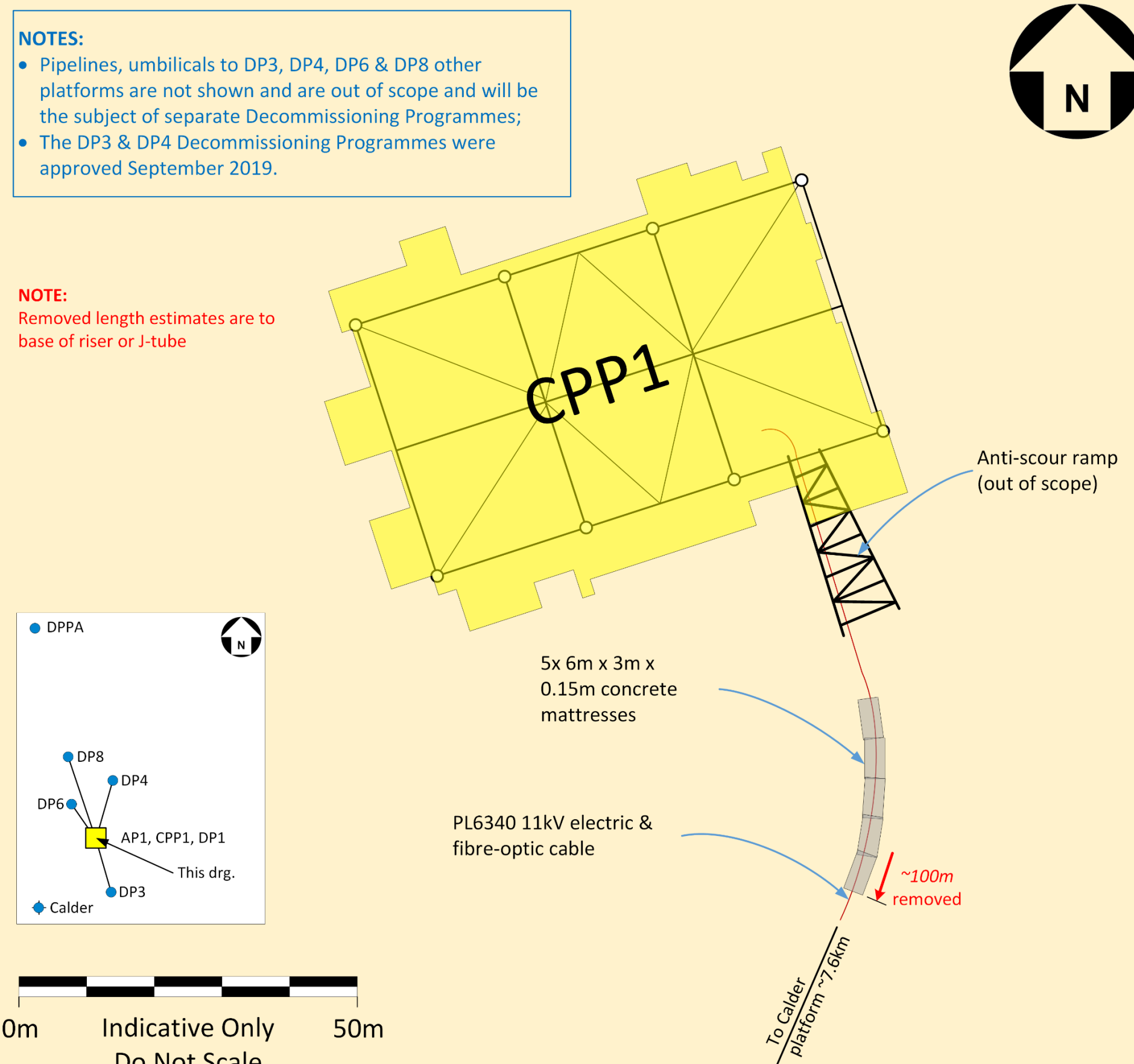


Figure A.7.1: South Morecambe CPP1 approach schematic

Appendix B Decommissioning onshore pipelines

Appendix B.1 Outline approach

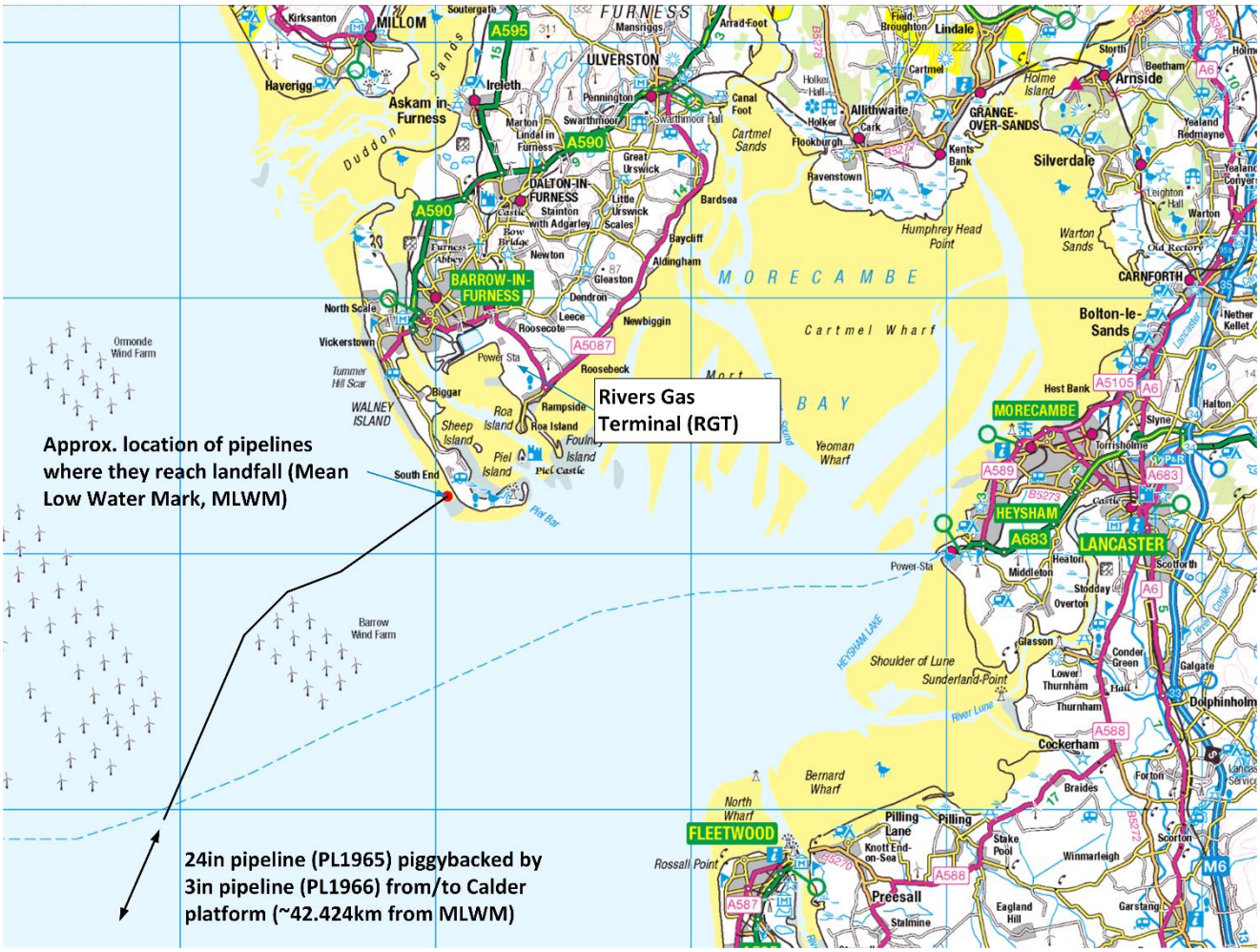


Figure B.1.1: Approx. location of Calder trunklines (PL1965 & PL1966) at landfall

The onshore pipelines will be decommissioned and abandoned in accordance with the Pipelines Act 1962, Regulations 25, the Pipelines Safety Regulations 1996, and the BSI Code of Practice for steel pipelines on land PD 8010-1:2015+A1:2016.

The pipelines will be flushed clean of hydrocarbons and toxic materials, then disconnected and sealed. The abandonment plan for the onshore sections of the pipelines out to the MLWM has not been fully defined. Where the pipelines are to be decommissioned *in situ*, they may be filled with a suitable filler and left buried. A record will be kept of all *in situ* pipelines indicating their contents, location, size, and depth of burial.

The option to use a suitable filler material for the onshore abandoned *in situ* pipeline sections would be based on an option selection assessment, as well as comprehensive stakeholder engagement.

Structural degradation of the pipelines will be a long-term process caused by corrosion and the eventual collapse of the pipelines under their own weight, the weight of the pipeline coating material and that of the overlying soil or substrate. It is anticipated that failure of the pipelines due to through-wall degradation would

only begin to occur after many decades (i.e. 60 to 100 years) and is expected to take several hundred years to fully degrade.

During this process, degradation products derived from the exterior and interior of the pipe will breakdown and potentially become bioavailable in the immediate vicinity. Pathways from the pipelines to the receptors would be via the interstitial spaces in substrate.

The release of degradation products is expected to occur at a slow rate and therefore expected to have a minimal impact on the surrounding environment. The area that could be biologically impacted would likely be limited to a few metres on either side of the pipeline.

The primary degradation products will originate from the following pipeline components:

- Pipeline scale
- Steel
- Sacrificial anodes
- Coal tar enamel coating
- Concrete coating; and
- Plastic coating.

Complete failure of water filled buried pipelines has a potential for subsidence of the overlying substrate.

The Local Planning Authority is Barrow Borough Council.

Appendix C Public & Consultee Correspondence

Appendix C.1 Public Notices

Appendix C.2 Correspondence from Statutory Consultees

Appendix D Letters of Support