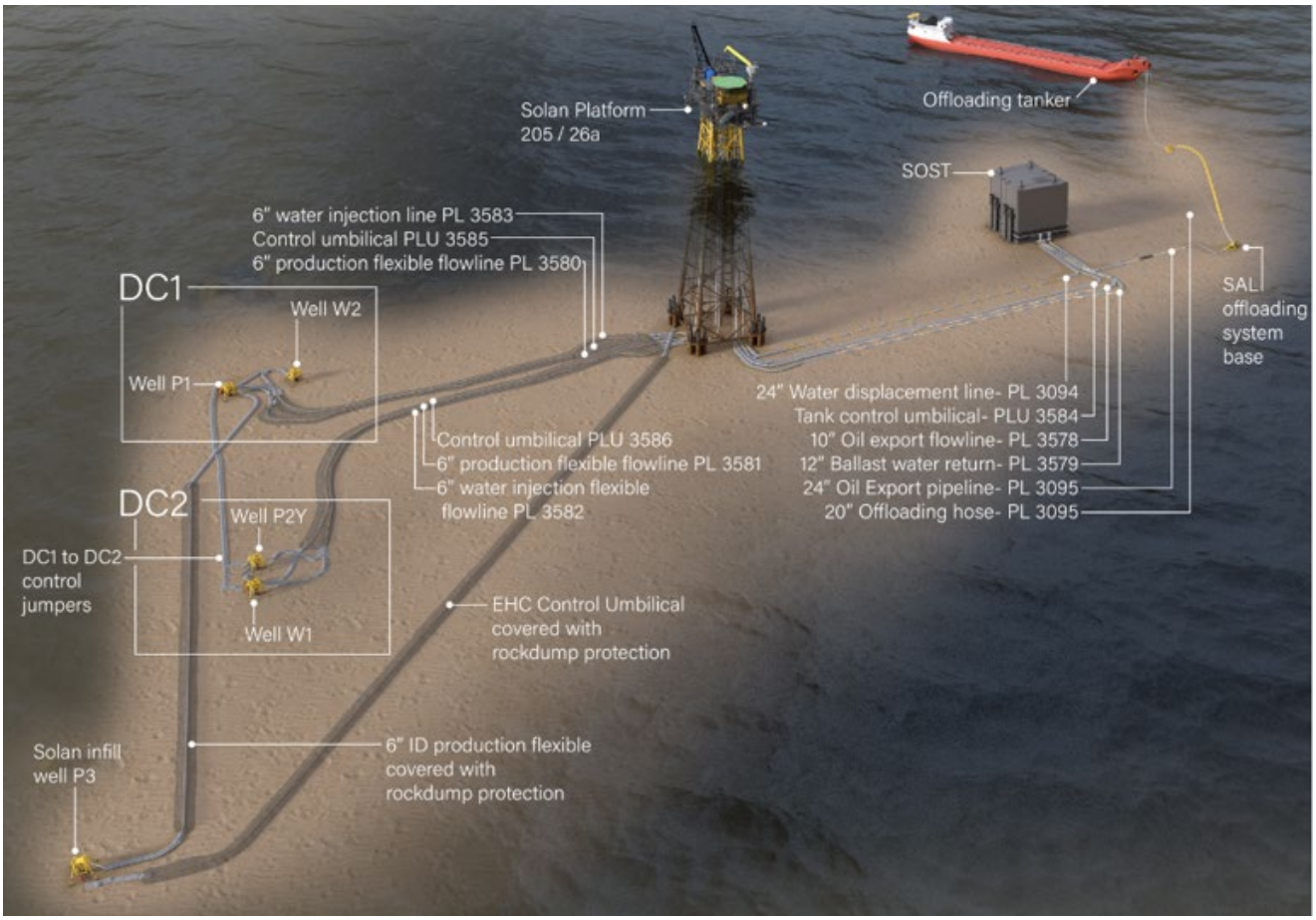
Premier Oil UK Limited



SOLAN

Decommissioning Programmes

Consultation Draft

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OPRED	1 electronic
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Figures and Tables

Table of Abbreviations

Table of Abbreviations	
Abbreviation	**Description**
~, approx.	Approximately
AB	Deprecated term 'Abandoned' (as per Rev 6 of the OGUK well decommissioning guidelines) but included in Table 2.6.1 to indicate extent to which wells have been decommissioned (Phase 1, Phase 2, etc.)
approaches	Refer to pipelines, flowlines, and umbilicals as they come nearer to the installations or pipeline structures.
CWC	Concrete Weight Coated applies to PL3094 and PL3095
DC1, DC2	Drill Centre 1 (well P1 and well W2), Drill Centre 2 (well P2 and well W1)
DP	Decommissioning Programme (document)
EDPM	Ethylene Propylene Diene Monomer (rubber)
EL	Elevation
ESDV	Emergency Shutdown Valve
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.
flexible flowline	Flexible pipeline constructed with layers of various materials including steel and plastics typically used to transport products from production wells or to water injection wells.
FPAL	First Point Assessment Limited
FPSO	Floating, Production, Storage and Offloading
GMG	Global Marine Group
GSPU	Glass Syntactic Polyurethane
Harbour Energy	In 2021 through a reverse takeover, Chrysaor Holdings Limited merged with Premier Oil plc to create Harbour Energy plc.
HSE	Health & Safety Executive
ID	Identifier. Usually, a number provided by the Oil and Gas Authority for pipelines, umbilicals, and electrical cables. An ID is applied for using the Pipeline Works Authorisation (PWA) application process.
in	Inch; 25.4 millimetres
infrastructure	Includes Solan platform, Subsea Oil Storage Tank, Single Anchor Loading system, Drill Centre 1, Drill Centre 2, Well P3, all WHPS and all pipelines, flowlines and umbilicals associated with the Solan field.
JUWB	Jack Up Work Barge
Kg	Kilogramme
Km	Kilometre
LAT	Lowest Astronomical Tide
m	metre, 1000mm
MAT	Master Application Template
MCV	Marine Construction Vessel
mm	millimetre

Table of Abbreviations	
Abbreviation	**Description**
N	North (Table 1.6.1)
N/A	Not Applicable
No.	Number (of)
NFFO	National Federation of Fishermen's Organisation
NIFPO	Northern Ireland Fish Producers Organisation
NNW	North North-West (Table 1.6.1)
NORM	Naturally Occurring Radioactive Material
NSTA	North Sea Transition Authority
OD	Outside diameter (used for flowlines, umbilicals, and cables)
OEUK	Offshore Energies UK (formerly Oil and Gas UK, rebranded in early 2022)
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')
P1, P2, P3	Production Well P1, Production Well P2, Production Well P3
pipeline(s)	Collective term for pipelines, flowlines, and umbilicals
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
Premier Oil	Premier Oil UK Limited (Company number SC048705)
PWA	Pipeline Works Authorisation
SAL	Single Anchor Loading
SAT	Supplementary Application Template
∑ (Sigma)	Greek symbol meaning summation or total
SFF	Scottish Fishermen's Federation
SLV	Single Lift Vessel (in this context a crane vessel)
SOST	Subsea Oil Storage Tank
SSCV	Semi-Submersible Crane Vessel
SUTU	Subsea Umbilical Termination Unit, located at DC1 (adjacent to well P1) or at well P3 were noted
Te	Metric Tonne, 1000 kilogrammes force
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.
W	West (Table 1.6.1)
WHPS	Wellhead Protection Structure
W1, W2	Water injection well W1, water Injection well W2
WI	Water Injection
WONS	Well Operations Notification System
x	Number, e.g. 9x = 9 of or number, or used to link dimensions of an object (Length, x Width, x Height)

1 EXECUTIVE SUMMARY

1.1 Combined Decommissioning Programmes

This document contains three Decommissioning Programmes, as per the notices served under Section 29 of the Petroleum Act 1998: one installation group and two pipeline groups. The Decommissioning Programmes address the following assets:

Solan associated installations and structures:

- Solan platform.
- Solan Subsea Oil Storage Tank (SOST).
- Single Anchor Loading (SAL) system.
- Wellheads and associated Wellhead Protection Structures (WHPS): Wells P1, W2, P2, W1 and P3.
- Two wet-stored trash caps.

Solan associated pipelines, flowlines and umbilicals including:

- Solan export and ballast pipelines: PL3094, PL3095, PL3578, PL3579 and PLU3584.
- Drill Centre 1 (DC1) and Drill Centre 2 (DC2) flowlines and umbilicals: PL3580, PL3581, PL3582, PL3583, PLU3585, PLU3586, PLU3585JW2, PLU3586JW1, PLU4204, PLU4205, PLU4206, PLU4207, PLU4208, and PLU4209.
- Well P3 flowlines and umbilicals: PL4971, PLU4972, PL4973, PL4974, PL4975, PLU4976 and PL4977.

The decommissioning of these installations and pipelines is being treated in this document as a standalone project. However, if possible, the operational phase will be carried out as part of a wider decommissioning campaign in the Northern North Sea. Premier Oil UK Limited (Premier Oil) 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 operator of the Solan installations, Premier Oil UK Limited (Table 1.4.2) is applying to the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) to obtain approval for decommissioning the installations detailed in Section 1.4.1 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 operator of the Solan pipelines, Premier Oil UK Limited (Table 1.4.4) is applying to OPRED to obtain approval for decommissioning the pipelines detailed in Section 1.4.2 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 schedule outlined in this document is for a decommissioning project which will commence in 2026, with decommissioning activities having been preceded by pipeline flushing followed by disconnection of the pipelines. Offshore decommissioning activities including the removal of installations, pipeline structures, and decommissioning of wells and pipelines will continue for a further 6 years until completion by end-2031.

1.3 Introduction

The Solan field is in the Northern North Sea in United Kingdom Continental Shelf block 205/26a, to the north of Scotland approximately 134 km north-north-west of Kirkwall in the Orkney Islands and ~158.8 km west of Lerwick in the Shetland Islands. The water depth at the Solan platform is ~136m relative to Lowest Astronomical Tide (LAT).

The Solan development was originally designed as a standalone not permanently attended installation comprising an SOST, a four-legged jacket substructure, topside facilities, and an oil offloading system, although Solan is currently operating as a permanently manned installation. The Solan development has been producing hydrocarbons since 2016. Solan was developed in two phases with the Drill Centres DC1 and DC2 being completed in 2013, followed by well P3 in 2020. All three production wells are supported by water injection wells W2 and W1. Crude oil is stored in the SOST before periodically being offloaded to a tanker via a Single Anchor Loading (SAL) system.

The Solan platform itself comprises an integrated topsides supported by a symmetrical 4-legged jacket substructure anchored to the seabed using a total of 16 piles, four at each leg. The jacket itself is 158.5m high, measuring 20m x 20m at the top and 45m x 45m at the base.

Production wells P1 and P2 each export directly to the Solan platform using flexible flowlines PL3580 and PL3581 respectively. The Solan platform provides seawater for water injection to well W1 and W2 using flexible flowlines PL3582 and PL3583 respectively. Solan provides electrical power, chemicals, and hydraulic fluids to well P1 and well P2 using umbilicals PLU3585 and PLU3586 respectively, and from the Subsea Umbilical Termination Unit (SUTU) and controls to W2 (nearest well P1) and W1 (nearest well P2) using jumpers PLU3585JW2 and PLU3586JW1. Over time, the electrical and communication components of both PLU3586 and PLU3586JW1 were found to be damaged. They were therefore partly disconnected and replaced by PLU4204 and PLU4205, PLU4206, PLU4207, PLU4208 and PLU4209.

Production from well P3 is sent to well P1 using flexible flowline PL4971, and onwards to the Solan platform. The controls for the well P1 wing valve and the electrical submersible pump serving well P3 are interlocked so that production from P1 and P3 to Solan cannot occur simultaneously. The Solan platform provides electrical power, chemicals, and hydraulic fluids to well P3 using PLU4972 that is routed to the local SUTU and distributed to the various connection points at the wellhead using umbilical jumpers and electrical or hydraulic fly leads (PL4973, PL4974, PL4975, PLU4976 and PL4977).

The produced crude oil is exported from the Solan platform to the SOST using flexible flowline PL3578. As oil accumulates from the top of the SOST, the ballast water is displaced from the bottom of the tank back to the platform using flexible flowline PL3579. Periodically, crude oil is exported from the SOST to an oil tanker via the SAL using the displacement method. This involves pumping seawater from the Solan platform using PL3094 into the SOST, forcing the oil out of the storage tank towards the tanker using PL3095. Solan provides electrical power, chemicals, and hydraulic fluids to the control valves at the SOST using PLU3584. This is routed from the platform through a dedicated J tube.

The Solan field is expected to become sub-economic late 2024, after which production from the field will cease. As no further in-situ re-use or re-purposing opportunities have been identified for the Solan installations and pipelines, these will require to be decommissioned in compliance with international obligations and those set out in the Petroleum Act 1998.

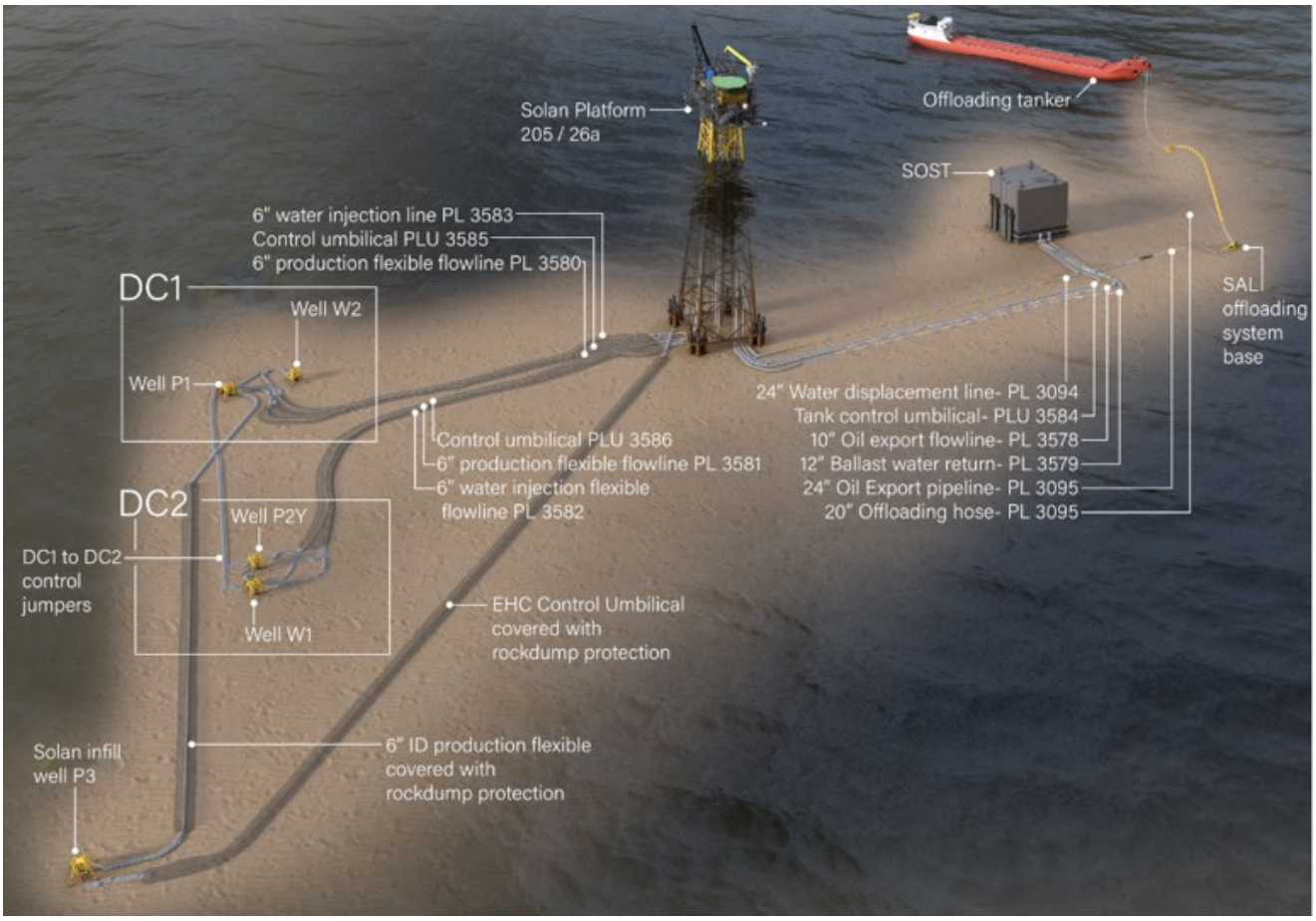

Figure 1.3.1: Overview of the Solan platform, tiebacks, SOST and SAL looking east

1.3.1 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 [1]. The Decommissioning Programmes explain the principles of the removal activities and are supported by an Environmental Appraisal [4]. The Decommissioning Programme for the pipelines is supported by a Comparative Assessment [3].

During 2022, Premier Oil engaged with the North Sea Transition Authority (NSTA) regarding the submission of Cessation of Production (CoP) documentation for the Solan field. On the 1st November 2022, the NSTA confirmed licensees are no longer required to complete and submit a CoP report. Instead, the NSTA work on a targeted stewardship basis through routine engagement with operators.

1.4 Decommissioning Overview

1.4.1 Installations

Table 1.4.1 Installations being decommissioned			
Field	Solan	**Production Type (Oil/Gas/Condensate)**	Oil
Water Depth (m)	136	**UKCS block**	205/26a
Surface Installation(s)			
Number	**Type**	**Topsides Weight (Te)**	**Jacket Weight (Te)**
1	Platform	5,204	7,981 Note 1
Subsea Installation(s)		**Number of Wells**	
Number	**Type**	**Platform**	**Subsea**
6	1x SOST Note 2 5x WHPS 2x Trash Caps	0	8 Note 3
Distance to Median		**Distance from Nearest UK Coastline**	
km		**km**	
52 km (Faroe) 333 km (Norway)		134 km (NNW of Kirkwall)	

NOTES:

1. The mass of the jacket excluding piles is 7,981Te. The overall mass of the piles is 7,565Te. Including the mass of piles above 3m below seabed, the mass of the jacket is 10,624Te.
2. Excluding the piles more than 3m below the seabed, the mass of the SOST is 12,276Te. This includes an allowance for residual sediments inside the tank compartments. The overall mass of the SOST including the full length of the piles is 14,040Te.
3. There are eight top hole locations /final well bores, six of which require to be decommissioned, see Table 2.6.1.
4. All weights quoted exclude marine growth.

Table 1.4.2 Installation Section 29 Holder Details		
Section 29 Notice Holder	**Registration Number**	**License Equity Interest (%)**
Chrysaor Holdings Limited	FC027988	0.0%
Chrysaor Limited	06418649	0.0%
Harbour Energy PLC	SC234781	0.0%
Premier Oil UK Limited	SC048705	100.0%

1.4.2 Pipelines

Table 1.4.3 Solan pipelines and umbilicals being decommissioned	
Number of pipelines, flowlines	9
Total length of pipelines, flowlines	6.70 km
Number of umbilicals	17
Total length of umbilicals	4.01 km

NOTES:
1. Scope of Section 29 includes pipeline listed on pipeline works authorisation (PWA) **7/W/13** varied by the following PWAs: **86/V/14**: PL3094, PL3095, PL3578, PL3579, PL3580, PL3581, PL3582, PL3583, PLU3584, PLU3585, PLU3585JW2. **82/V/17**: PLU3586, PLU3586JW1, PLU4204, PLU4205, PLU4206, PLU4207, PLU4208, PLU4209. **109/V/20**: PL4971, PLU4972, PL4973, PL4974, PL4975, PLU4976, and PL4977.

There are two Section 29 pipeline groups, as follows:

- Group 1: PL3094, PL3095, PL3578, PL3579, PL3580, PL3581, PL3582, PL3583, PLU3584, PLU3585, PLU3586, PLU3585JW2, PLU3586JW1;
- Group 2: PLU4204, PLU4205, PLU4206, PLU4207, PLU4208, PLU4209, PL4971, PLU4972, PL4973, PL4974, PL4975, PLU4976, and PL4977.

Table 1.4.4 Pipeline Section 29 Holder Details – Group 1		
Section 29 Notice Holder	**Registration Number**	**License Equity Interest (%)**
Chrysaor Holdings Limited	FC027988	0.0%
Chrysaor Limited	06418649	0.0%
Harbour Energy PLC	SC234781	0.0%
Premier Oil UK Limited	SC048705	100.0%

Table 1.4.5 Pipeline Section 29 Holder Details – Group 2		
Section 29 Notice Holder	**Registration Number**	**License Equity Interest (%)**
Harbour Energy PLC	SC234781	0.0%
Premier Oil UK Limited	SC048705	100.0%

1.5 Summary of Proposed Decommissioning Programmes

Table 1.5.1 Summary of Decommissioning Programmes	
Proposed decommissioning solution	**Reason for selection**
1. Topsides	
Complete removal and reuse or recycle. The topsides will be removed and recovered to shore and recycled, with reuse opportunities for topsides items such as power generation equipment to be pursued. Environmental permit applications required for work associated with removal of the topsides will be applied for.	To comply with OSPAR requirements and maximises re-use and recycling of materials.
2. Substructure	
Complete removal and reuse or recycle. The jacket will be completely removed with the piles (16x) cut to a target depth of 3m below the average natural seabed level. OPRED will be consulted if any technical difficulties are encountered achieving the target depth. The materials will be recovered to shore for reuse and recycling. Environmental permit applications required for work associated with removal of the substructures will be applied for.	To comply with OSPAR requirements, leaving the seabed unobstructed. Removes a potential obstruction to fishing operations and maximises recycling of materials.
3. Subsea installations	
The SOST, WHPS (5x), trash caps (x2) and the SAL will be completely removed, taken to shore, dismantled, and recycled unless alternative reuse options are found to be viable and more appropriate. The piles associated with SOST (8x), and SAL (1x) will be cut to a target depth of 3m below the average natural seabed level and recovered to shore for recycling. OPRED will be consulted if any technical difficulties are encountered achieving the target depth. Environmental permit applications required for work associated with decommissioning of the subsea installations will be applied for.	To comply with OSPAR requirements leaving unobstructed seabed. Removes a potential obstruction to fishing operations and maximises recycling of materials.
4. Pipelines, flowlines, and umbilicals	
All pipelines and chemical cores of the umbilicals will be flushed and cleaned with seawater. All concrete coated pipelines (PL3094 & PL3095), flowlines, and umbilicals along with the associated concrete mattresses, sandbags and grout bags will be completely removed. Any associated deposited rock will be dispersed to allow access to the pipelines buried within. Deposited rock will otherwise be left *in situ*. Environmental permit applications required for work associated with decommissioning of the pipelines will be applied for.	Removal of surface laid pipelines in accordance with mandatory requirements. Complete removal is the preferred option following comparative assessment.
5. Risers	
All risers fixed to the Solan topsides or jacket will be completely removed along with the jacket. Flexible risers and umbilicals routed inside caissons or J-tubes will be completely removed along with the jacket.	To comply with OSPAR requirements, leaving the seabed unobstructed.
6. Pipeline crossings	
All surface laid pipeline crossings adjacent to the Solan platform will be completely removed.	Surface laid infrastructure removed in accordance with mandatory requirements.

Table 1.5.1 Summary of Decommissioning Programmes	
7. Well decommissioning	
All wells will be decommissioned in accordance with the latest version of Oil and Gas UK[1] Well Decommissioning Guidelines and in compliance with HSE "Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996".	Meets the NSTA and HSE regulatory requirements.

1.6 Field Location Including Field Layout and Adjacent Facilities

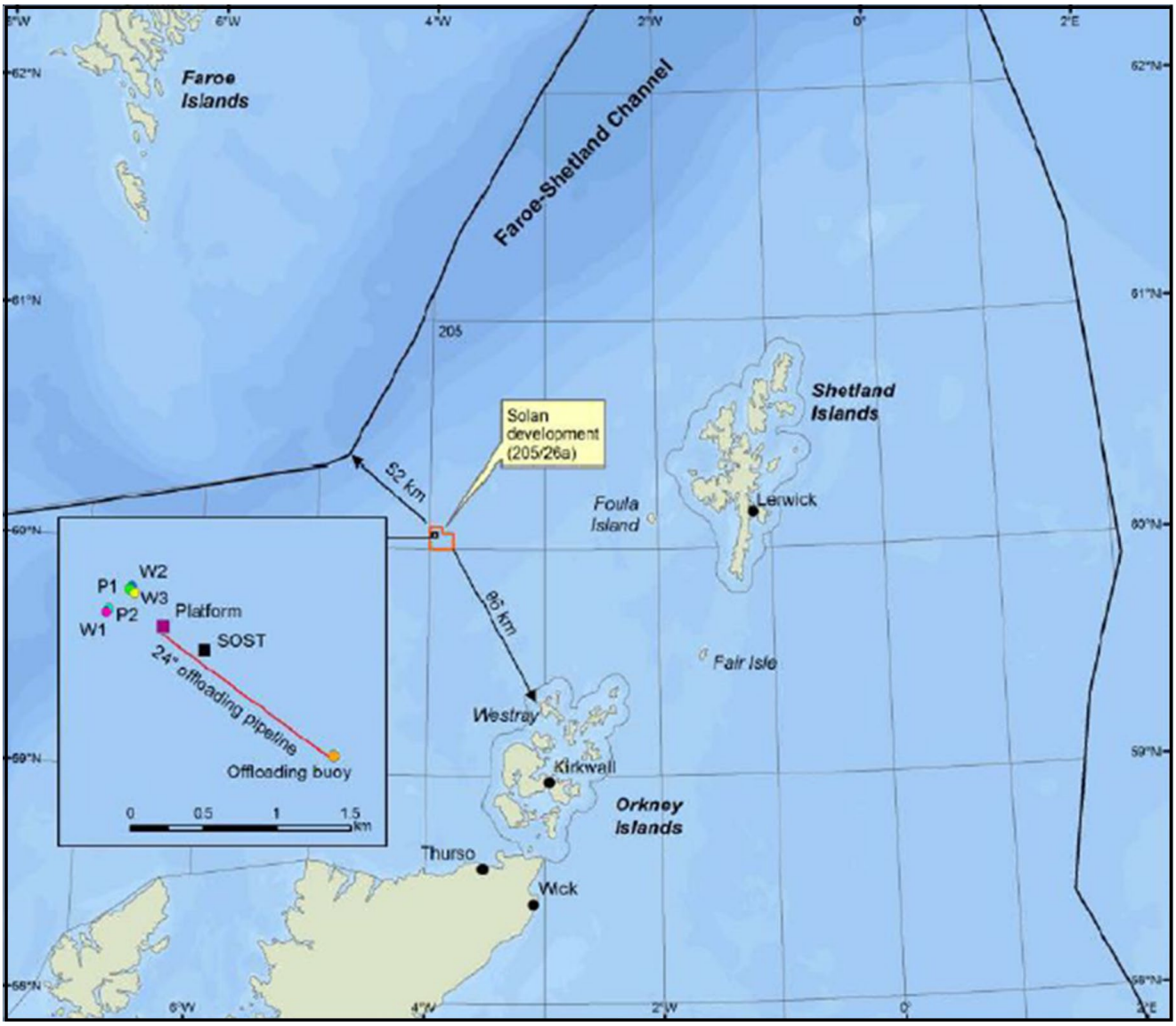

Figure 1.6.1: Location of Solan installations and infrastructure in UKCS

[1] Oil and Gas UK changed its name to Offshore Energies UK in early 2022.

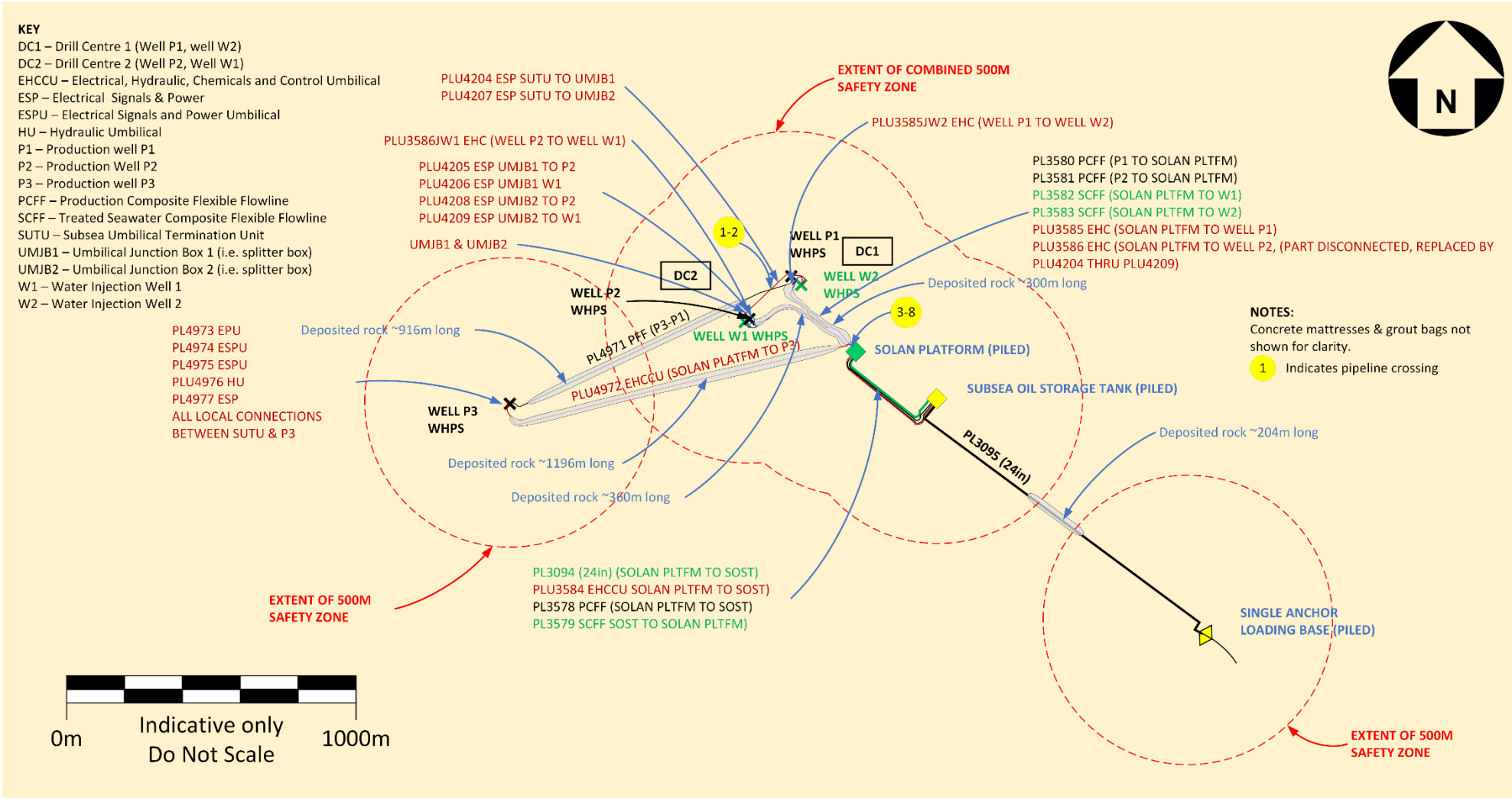
KEY
DC1 – Drill Centre 1 (Well P1, well W2)
DC2 – Drill Centre 2 (Well P2, Well W1)
EHCCU – Electrical, Hydraulic, Chemicals and Control Umbilical
ESP – Electrical Signals & Power
ESPU – Electrical Signals and Power Umbilical
HU – Hydraulic Umbilical
P1 – Production well P1
P2 – Production Well P2
P3 – Production well P3
PCFF – Production Composite Flexible Flowline
SCFF – Treated Seawater Composite Flexible Flowline
SUTU – Subsea Umbilical Termination Unit
UMJB1 – Umbilical Junction Box 1 (i.e. splitter box)
UMJB2 – Umbilical Junction Box 2 (i.e. splitter box)
W1 – Water Injection Well 1
W2 – Water Injection Well 2
N
PLU4204 ESP SUTU TO UMJB1
PLU4207 ESP SUTU TO UMJB2
EXTENT OF COMBINED 500M SAFETY ZONE
PLU3585JW2 EHC (WELL P1 TO WELL W2)
PLU3586JW1 EHC (WELL P2 TO WELL W1)
PLU4205 ESP UMJB1 TO P2
PLU4206 ESP UMJB1 W1
PLU4208 ESP UMJB2 TO P2
PLU4209 ESP UMJB2 TO W1
PL3580 PCFF (P1 TO SOLAN PLTFM)
PL3581 PCFF (P2 TO SOLAN PLTFM)
PL3582 SCFF (SOLAN PLTFM TO W1)
PL3583 SCFF (SOLAN PLTFM TO W2)
PLU3585 EHC (SOLAN PLTFM TO WELL P1)
PLU3586 EHC (SOLAN PLTFM TO WELL P2, (PART DISCONNECTED, REPLACED BY PLU4204 THRU PLU4209)
UMJB1 & UMJB2
1-2
WELL P1 WHPS
DC1
DC2
WELL W2 WHPS
Deposited rock ~300m long
WELL P2 WHPS
3-8
PL4973 EPU
PL4974 ESPU
PL4975 ESPU
PLU4976 HU
PL4977 ESP
ALL LOCAL CONNECTIONS BETWEEN SUTU & P3
Deposited rock ~916m long
PL4971 PFF (P3-P1)
WELL W1 WHPS
PLU4972 EHCCU (SOLAN PLATFM TO P3)
SOLAN PLATFORM (PILED)
NOTES:
Concrete mattresses & grout bags not shown for clarity.
1 Indicates pipeline crossing
SUBSEA OIL STORAGE TANK (PILED)
WELL P3 WHPS
PL3095 (24in)
Deposited rock ~204m long
Deposited rock ~1196m long
Deposited rock ~360m long
PL3094 (24in) (SOLAN PLTFM TO SOST)
PLU3584 EHCCU SOLAN PLTFM TO SOST)
PL3578 PCFF (SOLAN PLTFM TO SOST)
PL3579 SCFF SOST TO SOLAN PLTFM)
EXTENT OF 500M SAFETY ZONE
SINGLE ANCHOR LOADING BASE (PILED)
EXTENT OF 500M SAFETY ZONE
0m
Indicative only
Do Not Scale
1000m

Table 1.6.1 List of adjacent facilities					
Operator	**Name**	**Type**	**Distance / Direction**	**Information**	**Status**
Hurricane Energy	Lancaster	FPSO	NNE / 14.3 km	There is limited subsea infrastructure within a 2.2 km radius of the Aoka Mizu FPSO	Operating
BP Exploration	Foinaven	Subsea infrastructure	NW / 33.1 km	There is extensive subsea infrastructure within a 4 km radius of the former Foinaven FPSO, not listed here. Refer Foinaven FPSO DP. Approved April 2022.	Off-station
BP Exploration	Schiehallion	FPSO	NNW / 33.3 km	There is extensive subsea infrastructure within a 7.3 km radius of the Glen Lyon FPSO, not listed here.	Operating
Impacts of Decommissioning Proposals					
There are no direct impacts on adjacent facilities from the decommissioning works associated with the Solan installations and associated pipeline infrastructure. 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.					

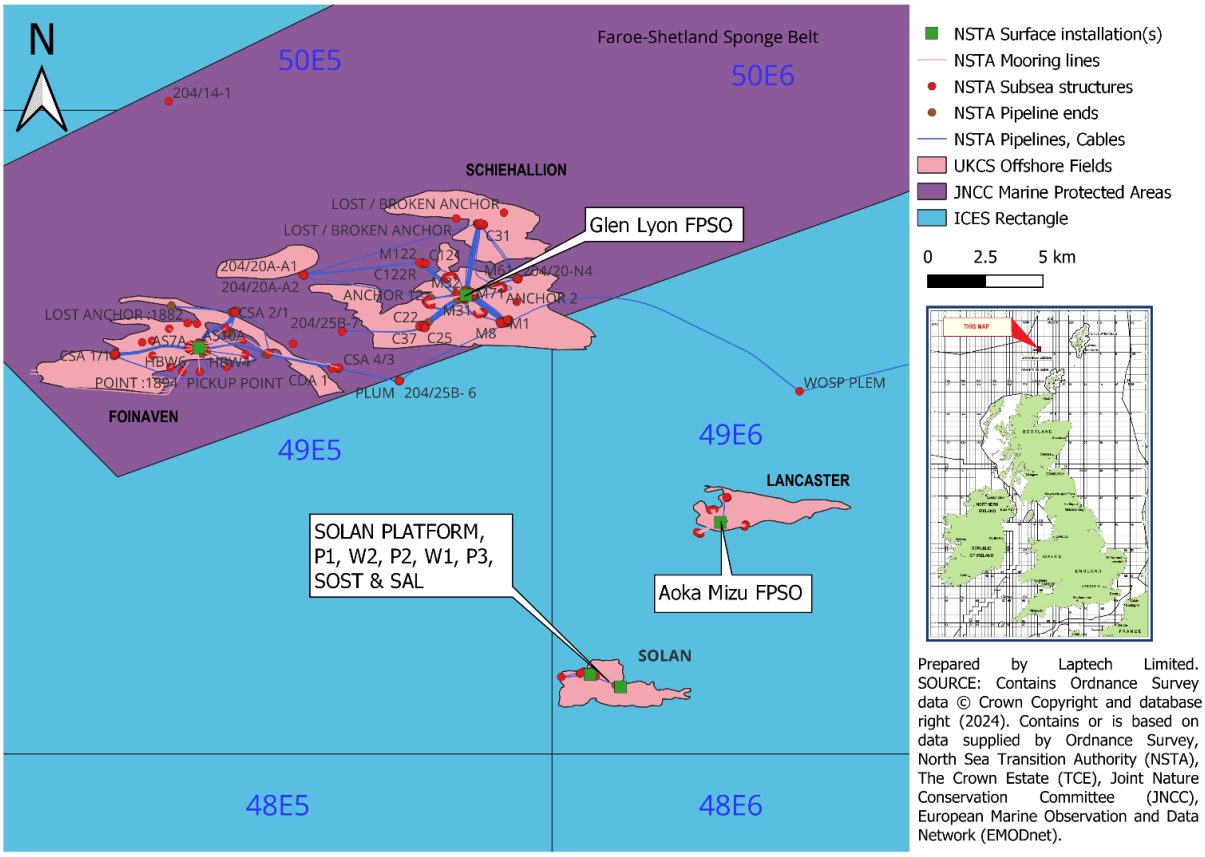

Figure 1.6.3: Adjacent facilities

1.7 Industrial Implications

It is Premier Oil'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 Premier Oil as Section 29 notice holder for the decommissioning of the Solan installations and associated pipelines are listed below:

1) The First Point Assessment (FPAL) database is the primary source for establishing tender lists for contracts or purchases valued at US$100,000 and above, although it is also used under this limit.
2) Premier Oil, through its parent company Harbour Energy, is committed to competitively tendering all its major contracts where possible and practicable. We are supporters of the UK Supply Chain Code of Practice and our performance in this regard has been acknowledged through Excellence Awards from Offshore Energies UK.
3) Premier Oil, through its parent company Harbour Energy, is an active participant in various industry initiatives including:
    a. Offshore Energies UK Supply Chain Forum.
    b. Inventory sharing initiative (Ampelius).
    c. NSTA Decommissioning Board - Supply Chain sub-group.

2 DESCRIPTION OF ITEMS TO BE DECOMMISSIONED

2.1 Surface Installations (Topsides & Substructure) & Stabilisation

Table 2.1.1 Surface installations & stabilisation

Description	Facility type	Location	Topsides / facilities		Jacket (if applicable)		
		WGS84 Decimal WGS84 Decimal Minute	Mass (Te)	Modules	Mass (Te)	No. of legs / piles	Mass of piles (Te)
Solan platform	Fixed steel jacket	60.06158° N 03.97121° W 60° 03.695' N 03° 58.273' W	5,204	1	7,981	4 / 16	7,565

NOTES:
1. Mass of piles includes full length of 16x piles varying in diameter and wall thickness from 2380Ø105WT to 2420Ø85, nominal length 80m.

Figure 2.1.1: Photograph of the Solan platform (east face)

2.2 Subsea Installations Including Stabilisation Features

Table 2.2.1 Solan subsea installation information					
Subsea installations incl. stabilisation features	No.	Mass (Te) / Size (m)	Location: WGS84 Decimal	Location: WGS84 Decimal Minute	Comments / status
SOST [Note 1]	1	14,040 / 55x45x25	60.06017° N 03.96617° W	60° 03.610' N 03° 57.970' W	8x piles (2420 Ø85) 68m long. Refer Figure 2.2.1, Figure 2.2.2 and Figure 2.2.3
Prod. well P1 WHPS	1	20.8 / 7.9x7.9x4.9	60.06388° N 03.97540° W	60° 03.833' N 03° 58.524' W	Not piled. Mass & overall height estimated. Refer Figure 2.2.4 & Figure 2.2.5
Prod. well P2 WHPS	1	28.7 / 9.3x8.8x6.9	60.06259° N 03.97792° W	60° 03.755' N 03° 58.675' W	Not piled. Refer Figure 2.2.6.
Prod. well P3 WHPS	1	13.0 / 6.1x5.7x4.6	60.05985° N 03.99278° W	60° 03.591' N 03° 59.567' W	Not piled.
WI well W1 WHPS	1	13.6 / 7.9x7.9x4.9	60.06242° N 03.97825° W	60° 03.745' N 03° 58.695' W	Not piled. Mass & overall height estimated. Refer Figure 2.2.4 & Figure 2.2.5
WI well W2 WHPS	1	28.7 / 9.3x8.8x6.9	60.06362° N 03.97480° W	60° 03.817' N 03° 58.488' W	Not piled. Refer Figure 2.2.6.
Trash Cap W1 [Note 4]	1	7 / 4.4x4.4x4.2	60.06253° N 03.97843° W	60° 03.752' N 03° 58.706' W	Not piled. Refer Figure 2.2.7.
Trash Cap W2 [Note 4]	1	7 / 4.4x4.4x4.2	60.06408° N 03.97534° W	60° 03.845' N 03° 58.521' W	Not piled. Refer Figure 2.2.7.

NOTES:

1. Mass includes mass of piles (3,390Te) as well as allowances for residual sediments inside the tank compartments.
2. These figures exclude marine growth. Marine growth might typically amount to ~5% of the overall mass of the SOST (744Te) and 10% of the overall mass of a subsea installation: WHPS (∑10.5Te).
3. All WHPS are integrated with the Xmas trees.
4. Following completion of the development drilling campaign in 2015, these trash caps were wet-stored within the DC1 and DC2 drill centre 500m zones for recovery at the time of field decommissioning.

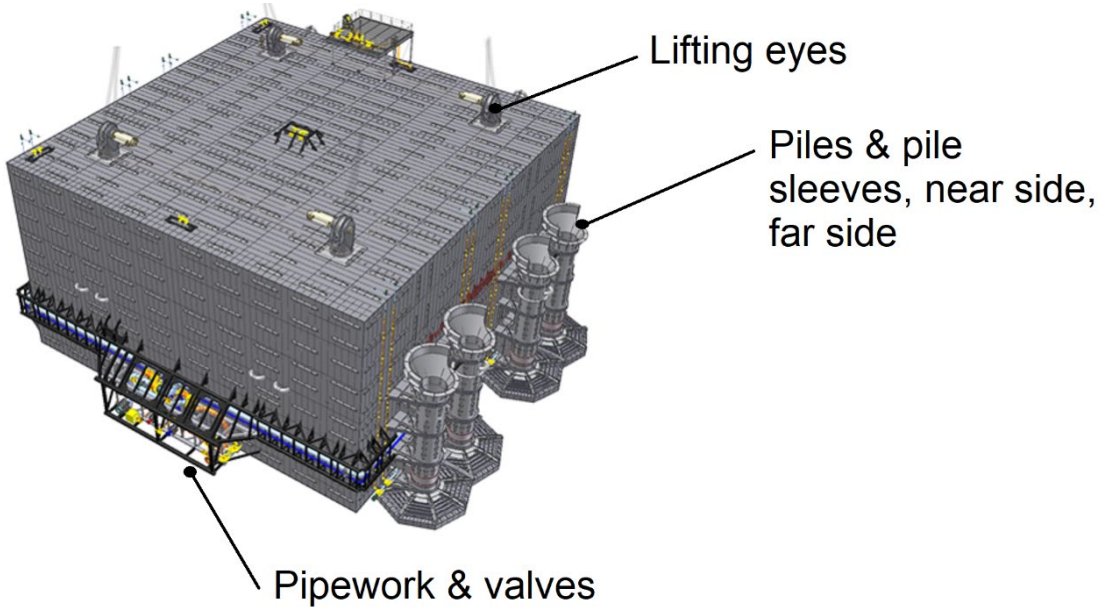

Figure 2.2.1: SOST 3D Schematic

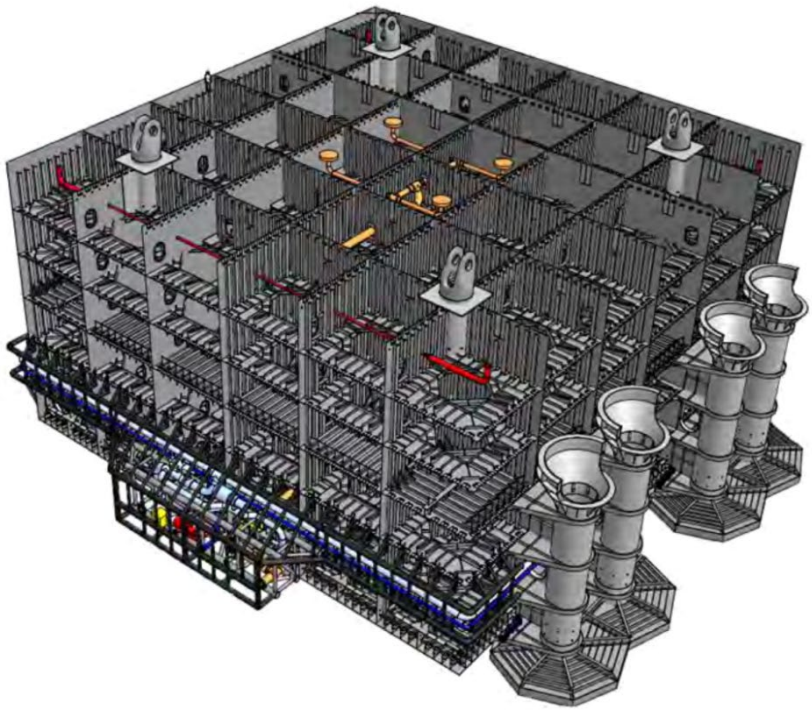

Figure 2.2.2: SOST 3D Internal structure schematic

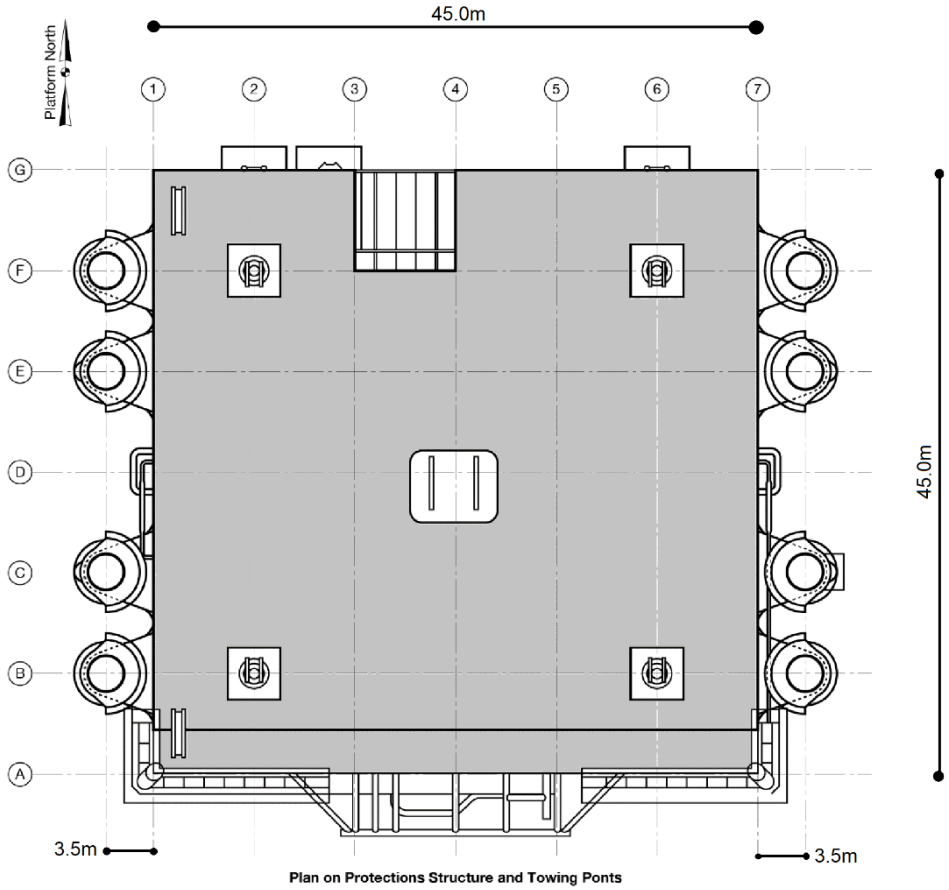

Figure 2.2.3: SOST plan view

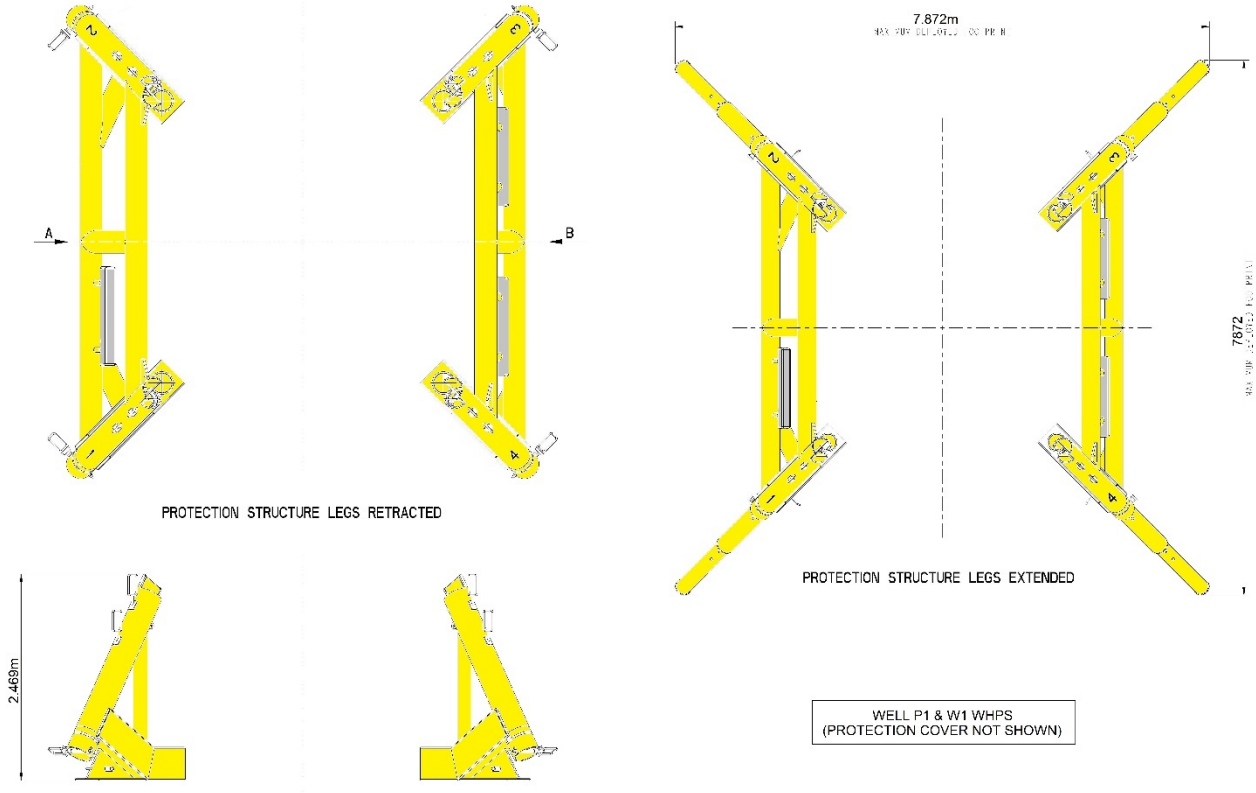

Figure 2.2.4: Plan view on WHPS for well P1 & W1 (protection cover not shown)

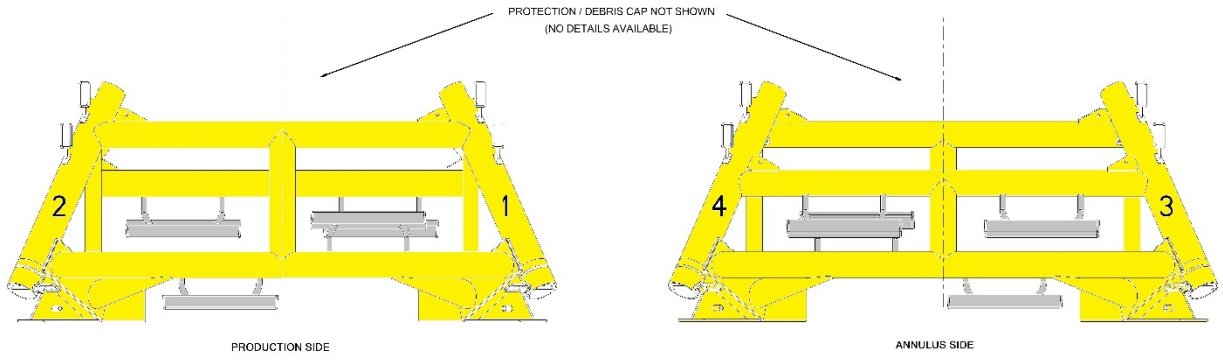

Figure 2.2.5: Elevation on WHPS for well P1 & W1 (protection cover not shown)

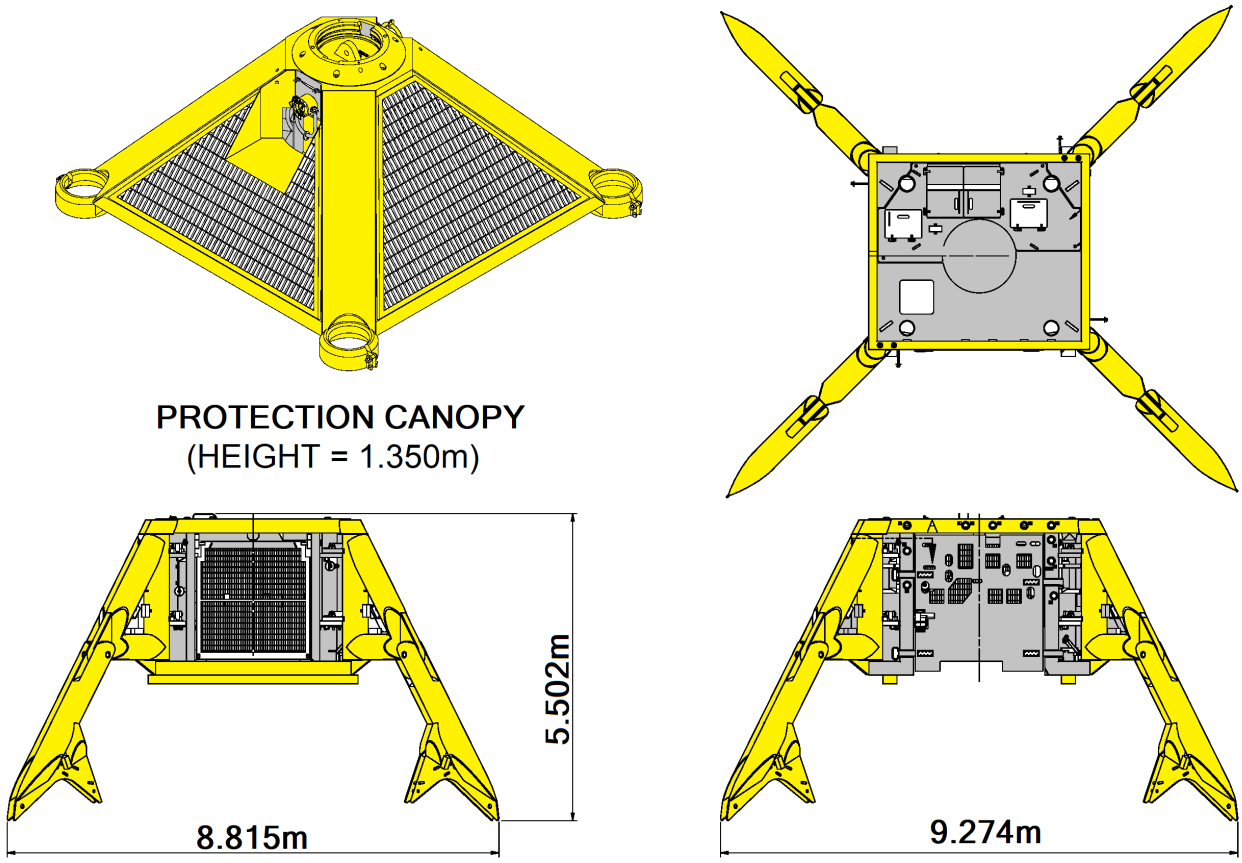

Figure 2.2.6: Overview of WHPS for well P2 & W2

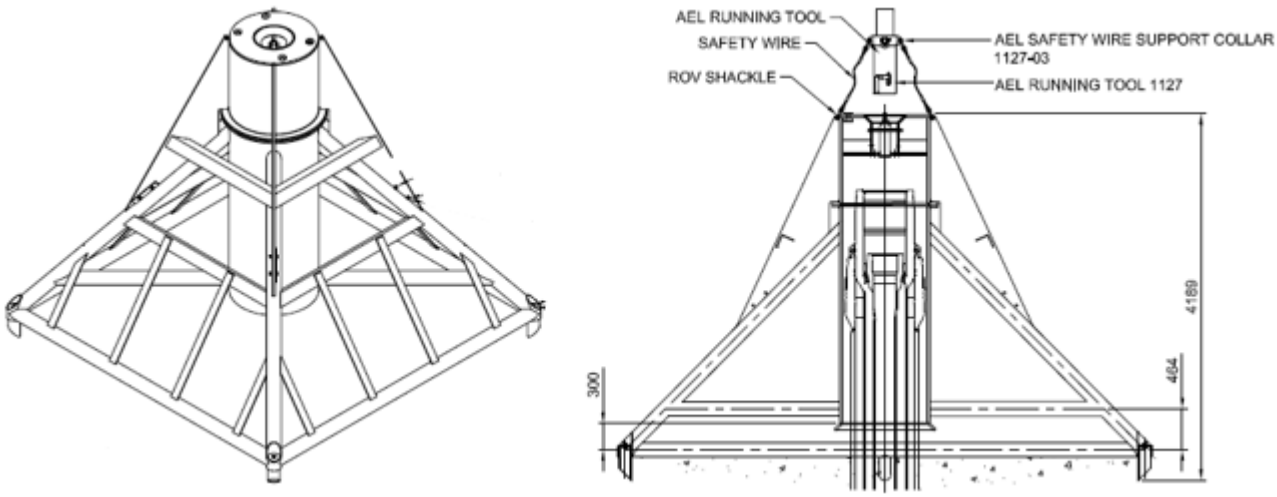

Figure 2.2.7: Overview of trash cap

2.3 Pipelines Including Stabilisation Features

Table 2.3.1 Solan pipeline/flowline/umbilical information

Description	Pipeline number (as per PWA)	Diameter (NB) (inches)[1]	Length (m)	Description of component parts	Product conveyed	From – To End points	Burial status	Pipeline status	Current content
24in tank displacement pipeline	PL3094	24	546	Steel pipeline coated in 3LPP. Neoprene coated riser 116m long. Main pipeline 263m long CWC.	Treated seawater	Solan platform to SOST	Part connected to jacket and part laid on seabed. Concrete mattresses distributed along its length.	Operational	As product conveyed
24/20in oil export pipeline & offloading hose	PL3095	24/20	1,521	Steel pipeline coated in 3LPP. Main pipeline 1100m long CWC. 20in offloading hose 276m long connected to SAL.	Stabilised crude oil	SOST to tanker offloading connection via SAL	Part laid on the seabed and part suspended in the water column. Part buried in rock 204m long.	Operational	As product conveyed
10in oil export flowline	PL3578	368mm	602	Composite flexible flowline 421m long with riser 172m long and tie-in spools.	Stabilised crude oil	Solan platform to SOST	Part connected to jacket and part laid on seabed.	Operational	As product conveyed

Table 2.3.1 Solan pipeline/flowline/umbilical information									
Description	**Pipeline number (as per PWA)**	**Diameter (NB) (inches)[1]**	**Length (m)**	**Description of component parts**	**Product conveyed**	**From – To End points**	**Burial status**	**Pipeline status**	**Current content**
12in water ballast flowline	PL3579	390mm	613	Composite flexible flowline 437.2m long with tie-in spools. Splits into 2x caissons 55m long at the Solan platform.	Treated seawater	SOST to Solan platform	Part connected to jacket and part laid on seabed.	Operational	As product conveyed
Well P1 6in production flowline	PL3580	268mm	538	Composite flexible flowline 360m long with riser 165m long and tie-in spools. Riser and tie-in spools coated in 28mm Vikotherm II	Produced fluids	Well P1 to Solan platform	Part connected to jacket and part laid on seabed. Part buried under rock 300m long.	Operational	As product conveyed
Well P2 6in production flowline	PL3581	268mm	596	Composite flexible flowline 416m long with riser 166m long and tie-in spools. Riser and tie-in spools coated in 28mm Vikotherm II	Produced fluids	Well P2 to Solan platform	Part connected to jacket and part laid on seabed. Part buried under rock 360m long.	Operational	As product conveyed

Table 2.3.1 Solan pipeline/flowline/umbilical information									
Description	**Pipeline number (as per PWA)**	**Diameter (NB) (inches)[1]**	**Length (m)**	**Description of component parts**	**Product conveyed**	**From – To End points**	**Burial status**	**Pipeline status**	**Current content**
Well W1 6in water injection flowline	PL3582	268mm	612	Composite flexible flowline 435m long with riser 164m long and tie-in spools. Riser and tie-in spools coated in 28mm Vikotherm II	Treated seawater	Solan platform to well W1	Part connected to jacket and part laid on seabed. Part buried under rock 300m long.	Operational	As product conveyed
Well W2 6in water injection flowline	PL3583	268mm	577	Composite flexible flowline 371m long with riser 193m long and tie-in spools. Riser and tie-in spools coated in 28mm Vikotherm II	Treated seawater	Solan platform to well W2	Part connected to jacket and part laid on seabed. Part buried under rock 300m long.	Operational	As product conveyed
SOST control umbilical	PLU3584	148mm	584	Umbilical manufactured from composite materials, steel & copper	Hydraulic oil, chemicals, electrical signals, and power	Solan platform to SOST	Part connected to jacket and part laid on seabed.	Operational	As product conveyed
Well P1 control umbilical	PLU3585	176mm	538	Umbilical manufactured from composite materials, steel & copper	Hydraulic oil, chemicals, electrical signals, and power	Solan platform to well P1	Part connected to jacket and part laid on seabed. Part buried under rock 300m long.	Operational	As product conveyed

Table 2.3.1 Solan pipeline/flowline/umbilical information									
Description	**Pipeline number (as per PWA)**	**Diameter (NB) (inches)[1]**	**Length (m)**	**Description of component parts**	**Product conveyed**	**From – To End points**	**Burial status**	**Pipeline status**	**Current content**
Well P2 control umbilical	PLU3586	176mm	594	Umbilical manufactured from composite materials, steel & copper	Hydraulic oil, chemicals, electrical signals, and power	Solan platform to well P2	Part connected to jacket and part laid on seabed. Part buried under rock 360m long.	Operational	As product conveyed
Well W2 control umbilical jumper	PLU3585JW2	n/a	40	Tied hose bundle manufactured from composite materials, steel & copper	Hydraulic oil, chemicals, electrical signals, and power	Well P1 to well W2	Laid on seabed covered by mattresses.	Operational	As product conveyed
Well W1 control umbilical jumper	PLU3586JW1	n/a	40	Tied hose bundle manufactured from composite materials, steel & copper	Hydraulic oil, chemicals, electrical signals, and power	Well P2 to well W1	Laid on seabed covered by mattresses.	Operational	As product conveyed
Replacement electrical umbilical	PLU4204	25mm	233	Electrical umbilical manufactured from composite materials, steel & copper	Electrical signals and power	SUTU to Umbilical Junction Box 1	Laid on seabed, covered by mattresses and buried under rock.	Operational	As product conveyed
Well P2 replacement electrical umbilical jumper	PLU4205	25mm	50	Electrical umbilical manufactured from composite materials, steel & copper	Electrical signals and power	Umbilical Junction Box 1 to well P2	Laid on seabed covered by mattresses.	Operational	As product conveyed

Table 2.3.1 Solan pipeline/flowline/umbilical information									
Description	**Pipeline number (as per PWA)**	**Diameter (NB) (inches)[1]**	**Length (m)**	**Description of component parts**	**Product conveyed**	**From – To End points**	**Burial status**	**Pipeline status**	**Current content**
Well W1 replacement electrical umbilical jumper	PLU4206	25mm	50	Electrical umbilical manufactured from composite materials, steel & copper	Electrical signals and power	Umbilical Junction Box 1 to well W1	Laid on seabed covered by mattresses.	Operational	As product conveyed
Replacement electrical umbilical	PLU4207	25mm	233	Electrical umbilical manufactured from composite materials, steel & copper	Electrical signals and power	SUTU to Umbilical Junction Box 2	Laid on seabed, covered by mattresses and buried under rock	Operational	As product conveyed
Well P2 replacement electrical umbilical jumper	PLU4208	25mm	50	Electrical umbilical manufactured from composite materials, steel & copper	Electrical signals and power	Umbilical Junction Box 2 to well P2	Laid on seabed covered by mattresses	Operational	As product conveyed
Well W1 replacement electrical umbilical jumper	PLU4209	25mm	50	Electrical umbilical manufactured from composite materials, steel & copper	Electrical signals and power	Umbilical Junction Box 2 to well W1	Laid on seabed covered by mattresses	Operational	As product conveyed
Well P3 6in flexible flowline	PL4971	244mm	1,097	Composite flexible flowline 1094m long with tie-in spools. Tie-in spools coated in 3mm EDPM 30mm GSPU	Produced fluids	Well P3 to well P1	Laid on seabed, covered by mattresses and buried under rock.	Operational	As product conveyed

Table 2.3.1 Solan pipeline/flowline/umbilical information									
Description	**Pipeline number (as per PWA)**	**Diameter (NB) (inches)[1]**	**Length (m)**	**Description of component parts**	**Product conveyed**	**From – To End points**	**Burial status**	**Pipeline status**	**Current content**
Well P3 control umbilical	PLU4972	205mm	1,463	Umbilical manufactured from composite materials, steel & copper	Hydraulic oil, chemicals, electrical signals, and power	Solan platform to well P3 SUTU	Laid on seabed, covered by mattresses and buried under rock.	Operational	As product conveyed
Well P3 1in electrical fly lead	PL4973	25mm	15	Umbilical manufactured from composite materials, steel & copper	Electrical power	Well P3 SUTU to well P3	Laid on seabed adjacent to WHPS Part protected by concrete mattresses.	Operational	As product conveyed
Well P3 1in electrical & communications fly lead	PL4974	25mm	20	Umbilical manufactured from composite materials, steel & copper	Electrical signals and power	Well P3 SUTU to well P3	Laid on seabed adjacent to WHPS. Part protected by concrete mattresses.	Operational	As product conveyed
Well P3 2in electrical & communications fly lead	PL4975	56mm	20	Umbilical manufactured from composite materials, steel & copper	Electrical signals and power	Well P3 SUTU to well P3	Laid on seabed adjacent to WHPS. Part protected by concrete mattresses.	Operational	As product conveyed
Well P3 6in hydraulic fluids fly lead	PLU4976	157mm	16	Umbilical manufactured from composite materials, steel & copper	Hydraulic oil	Well P3 SUTU to well P3	Laid on seabed adjacent to WHPS. Part protected by concrete mattresses.	Operational	As product conveyed

Table 2.3.1 Solan pipeline/flowline/umbilical information									
Description	**Pipeline number (as per PWA)**	**Diameter (NB) (inches)[1]**	**Length (m)**	**Description of component parts**	**Product conveyed**	**From – To End points**	**Burial status**	**Pipeline status**	**Current content**
Well P3 1in electrical & communications fly lead	PL4977	25mm	15	Umbilical manufactured from composite materials, steel & copper	Electrical signals and power	Well P3 SUTU to well P3	Laid on seabed adjacent to WHPS. Part protected by concrete mattresses.	Operational	As product conveyed

NOTES:
1. If diameter is expressed in mm it refers to outside diameter of flowline or umbilical.
2. Reference PWA 7/W/13 varied by 86/V/14, 82/V/17, and 109/V/20.

Table 2.3.2 Solan pipeline protection & stabilisation features				
Stabilisation Feature	**Total Number**	**Total Mass (Te)**	**Location**	**Exposed/Buried/Condition**
FLOWLINE & UMBILICAL PROTECTION FOR DC1, DC2 & WELL P3 INFRASTRUCTURE AT SOLAN PLATFORM				
Concrete mattresses (6m x 3m x 0.15m)	30	147	Infrastructure for DC1, DC2 and well P3 at Solan platform. Refer Figure 6.6.2.	Likely exposed, on the seabed. Burial status will be confirmed at the time of decommissioning works.
25kg sand or grout bags	273	6.8		
1Te grout bags	26	26		
PIPELINE PROTECTION INFIELD BETWEEN SOLAN PLATFORM, SOST & SAL				
Concrete mattresses (6m x 3m x 0.15m)	134	656.6	Infrastructure between Solan platform, SOST and SAL. Refer Figure 6.6.3 and Figure 6.6.4.	Likely exposed, on the seabed. Burial status will be confirmed at the time of decommissioning works.
Concrete mattresses (6m x 3m x 0.3m)	6	70.7		
Concrete mattresses (6m x 4m x 0.3m)	34	400.5		
25kg sand or grout bags	280	7.0		
1Te grout bags	32	32.0		
PIPELINE PROTECTION AT DC1 (WELL P1/W2), DC2 (WELL P2/W1) AND WELL P3				
Concrete mattresses (6m x 3m x 0.15m)	145	710.5	Infrastructure at and in-between DC1, DC2 and at well P3. Refer Figure 6.6.5 and Figure 6.6.6.	A few mattresses are buried under rock, but otherwise the protection and stabilisation features will likely be exposed, on the seabed.
25kg sand or grout bags	1,232	30.8		
DEPOSITED ROCK				
Deposited rock	204m	14,383	Between Solan SOST & SAL on PL3095. Refer Figure 6.6.1 and Figure 6.6.4.	Likely exposed, on the seabed. Burial status will be confirmed at the time of decommissioning works.
Deposited rock	300m	4,228	Between Solan platform and DC1 on PL3580, PL3583, PLU3585. Refer Figure 6.6.1	
Deposited rock	360m	5,117	Between Solan platform and DC2 on PL3581, PL3582, PLU3586. Refer Figure 6.6.1	
Deposited rock	916m	12,562	Between well P2 and well P1 on PL4971. Refer Figure 6.6.1 and Figure 6.6.5.	
Deposited rock	1,196m	6,935	Between Solan platform and well P3 on PLU4972. Refer Figure 6.6.1	

2.4 Pipeline Crossings

Table 2.4.1 Solan pipeline crossings			
ID	**Pipeline description**	**Location**	**Protection / comment**
SOLAN 500M SAFETY ZONE			
1-2	PL4971 over PLU4204 & PLU4207	Inside Solan combined 500m safety zone	Concrete mattresses, grout bags. Refer Figure 6.6.1, pipeline crossing ID 1-2.
3-8	PLU4972 over PL3580, PL3581, PL3582, PL3583, PLU3585 & PLU3586	Inside Solan combined 500m safety zone	Concrete mattresses, grout bags. Refer Figure 6.6.1, pipeline crossing ID 3-8.

2.5 Pipeline Structures

Table 2.5.1 Solan subsea pipeline structure information					
Subsea pipeline structures incl. stabilisation features	No.	Mass (Te) / Size (m)	Location: WGS84 Decimal	Location: WGS84 Decimal Minute	Comments / status
SAL	1	218.8 / 12x5x4.2	60.05340° N 03.95043° W	60° 03.204' N 03° 57.026' W	SAL anchored to seabed using 1x pile 1835Ø51, 20.3m long Refer Figure 2.5.2 and Figure 2.5.3.
SAL hose pick-up system	1	118.9 / 205x0x0	60.05340° N 03.95043° W	60° 03.204' N 03° 57.026' W	Mass excludes the mass of upper and lower hoses that form part of PL3095. Refer Figure 2.5.1 and Figure 2.5.4.
Anode skids at Solan platform	2	1.2 (each) / 2.3x2.3x0.5	60.06158° N 03.97121° W	60° 03.695' N 03° 58.273' W	South & west of Solan platform (Type I skid). Refer Figure 2.5.5.
Anode skid at SOST	1	1.2 / 2.3x2.3x0.5	60.06017° N 03.96617° W	60° 03.610' N 03° 57.970' W	At SOST (Type I skid). Refer Figure 2.5.5
Anode skid at well P1	1	0.6 / 2.3x1.1x0.5	60.06388° N 03.97540° W	60° 03.833' N 03° 58.524' W	At well P1 (Type II skid). Refer Figure 2.5.5.
Anode skid at well P2	1	0.6 / 2.3x1.1x0.5	60.06259° N 03.97792° W	60° 03.755' N 03° 58.675' W	At well P2 (Type II skid). Refer Figure 2.5.5.
Anode skid at well W1	1	0.6 / 2.3x1.1x0.5	60.06242° N 03.97825° W	60° 03.745' N 03° 58.695' W	At well W1 (Type II skid). Refer Figure 2.5.5.
Anode skid at well W2	1	0.6 / 2.3x1.1x0.5	60.06362° N 03.97480° W	60° 03.817' N 03° 58.488' W	At well W2 (Type II skid). Refer Figure 2.5.5.

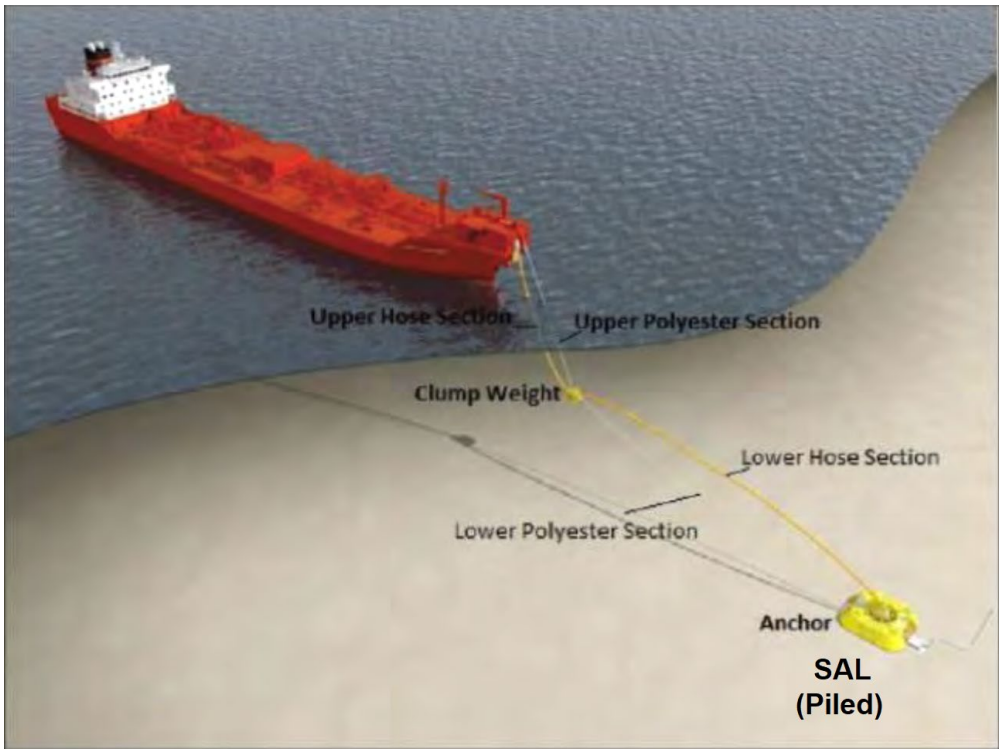

Figure 2.5.1: SAL system schematic

Figure 2.5.2: SAL base

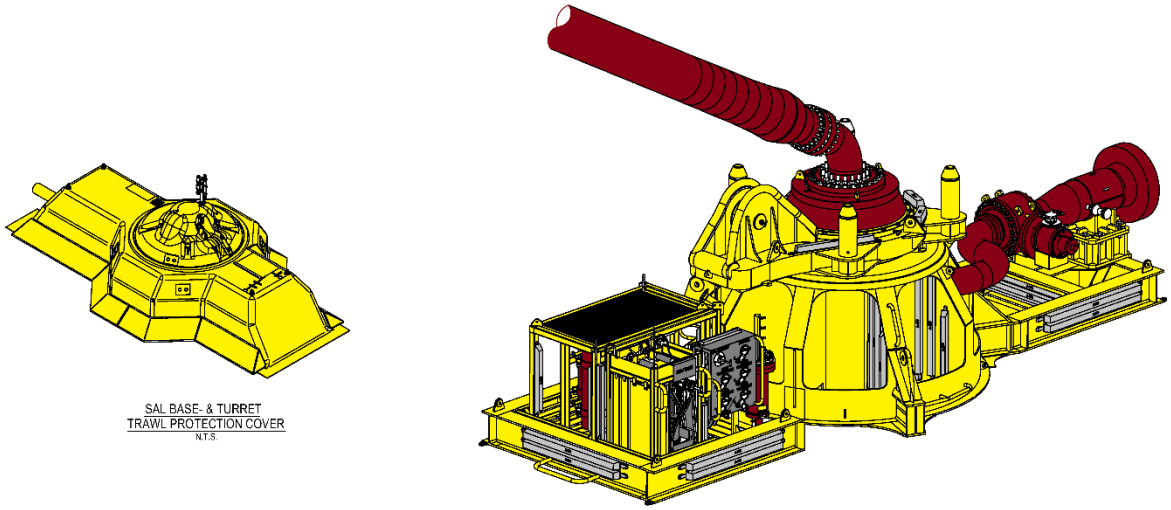

Figure 2.5.3: SAL base schematic

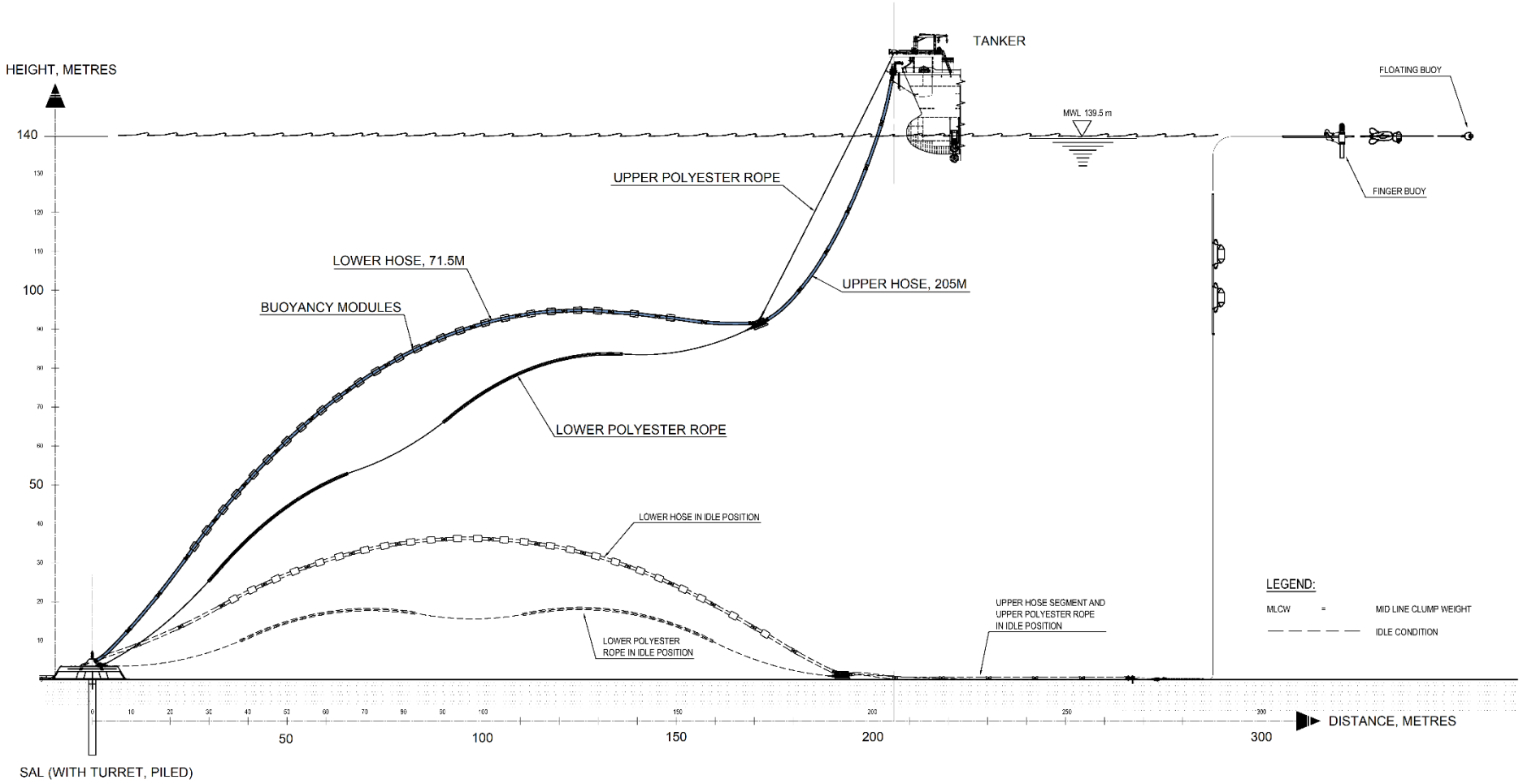

Figure 2.5.4: SAL hose pickup system

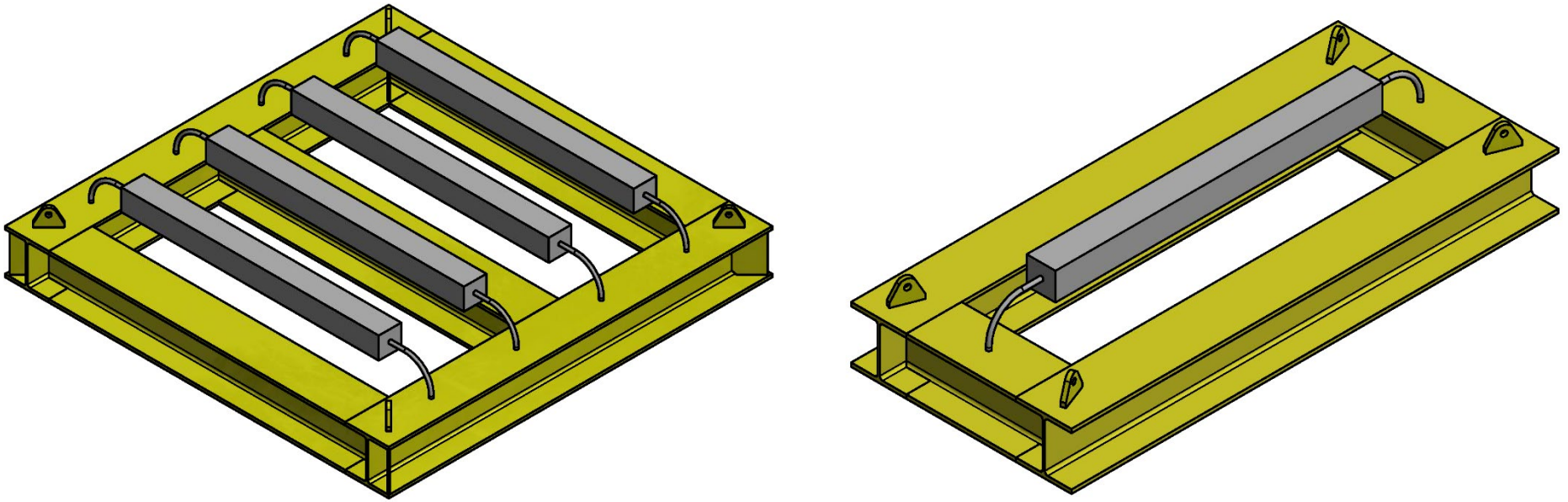

Figure 2.5.5: Anode skid type I (L) and type II (R)

2.6 Well Information

Table 2.6.1 Solan well information				
WONS Well Name	**Premier Oil Well Name**	**Designation**	**WONS Status**	**Category of Well [C]**
205/26a-4		Appraisal	AB3	
205/26a-5Z		Appraisal	AB3	
205/26a-5		Appraisal	AB3	
205/26a-7Y [B]	**W1**	**Water Injector**	**Completed (Operating)**	**SS 3-0-1**
205/26a-7Z [A]		Appraisal	AB1	
205/26a-7 [A]		Appraisal	AB1	
205/26a-8V [B]		**Development**	**AB2**	**SS 0-0-1**
205/26a-8W [A]		Development	AB1	
205/26a-8X [A]		Development	AB1	
205/26a-8Y [A]		Appraisal	AB1	
205/26a-8Z [A]		Appraisal	AB1	
205/26a-8 [A]		Appraisal	AB1	
205/26a-9Y [B]	**P2**	**Oil Producer**	**Completed (Operating)**	**SS 3-0-1**
205/26a-9Z [A]		Development	AB1	
205/26a-9 [A]		Development	AB1	
205/26a-10Z [B]	**P1**	**Oil Producer**	**Completed (Operating)**	**SS 3-0-1**
205/26a-10 [A]		Development	AB1	
205/26a-11 [B]	**W2**	**Water Injector**	**Completed (Operating)**	**SS 3-0-1**
205/26a-15Z [B]	**P3**	**Oil Producer**	**Completed (Operating)**	**SS 3-0-1**
205/26a-15 [A]		Development	AB1	

NOTES:

A. These are historical sidetracks associated with the current wellbore (in **bold**), which will automatically change to AB3 status once the current wellbore reaches AB3 status.

B. These wellbores require to be abandoned as part of the field decommissioning activities. All other wellbores are already at AB3 status or will automatically reach AB3 status (see Note A above).

C. For details of well categorisation please refer the latest version of the Oil and Gas UK[2] Well Decommissioning Guidelines.

[2] Oil and Gas UK changed its name to Offshore Energies UK in early 2022.

2.7 Material Inventory Estimates

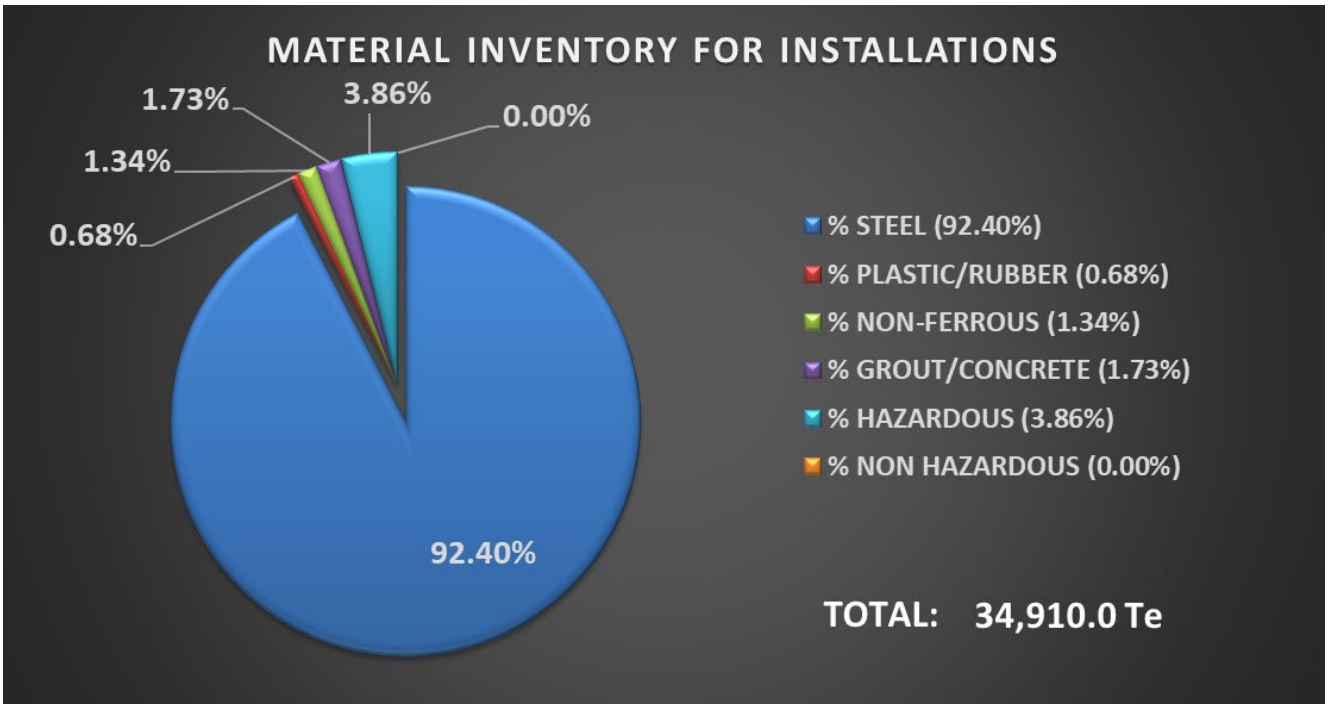

Figure 2.7.1: Material inventory for Solan installations[3]

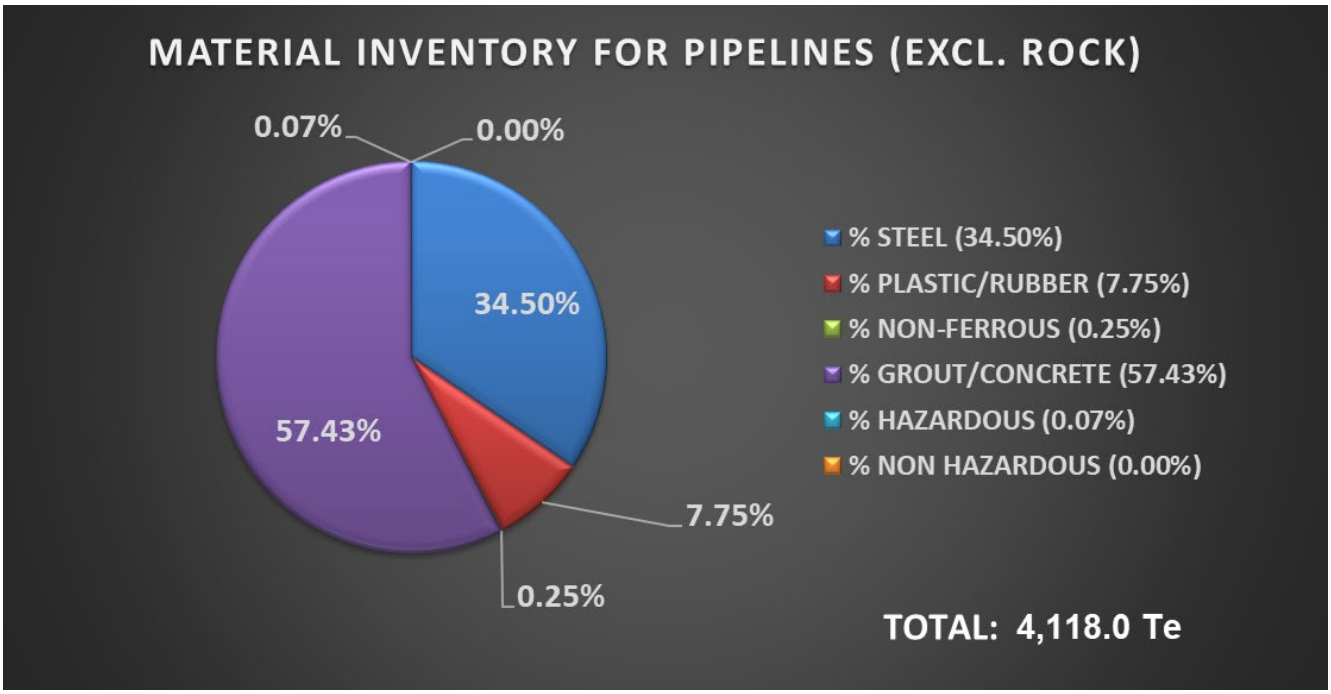

Figure 2.7.2: Material inventory for Solan pipelines[3],[4]

[3] Figures exclude marine growth.
[4] Figure includes pipeline structures, pipeline protection and stabilisation features but excludes rock.

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 nature of the installations and infrastructure, it is unlikely that reuse opportunities will be realised. Waste generated during decommissioning will be segregated by type and periodically transported to shore in an auditable manner and dealt with through licensed waste contractors. Although transfrontier shipment of waste is not intended, any waste disposed of outside of the United Kingdom will be in accordance with the Transfrontier Shipment of Waste Regulations. Steel and other recyclable metal are estimated to account for the greatest proportion of the materials inventory. Refer to the Environmental Appraisal [4] for further details concerning disposal of waste.

3.2 Surface Installations

3.2.1 Topsides' Decommissioning

Topsides' description: The topsides consist of a steel, single lift, integrated deck structure on four main levels – Emergency Shutdown Valve (ESDV) deck, cellar deck, mezzanine deck and weather deck including helideck, crane, and flare. It is supported directly by the jacket substructure and consists of oil separation facilities, gas separation to fuel gas facilities, utilities and power generation, accommodation for 40 personnel, safety equipment and a helideck. The overall dimensions of the topsides are 44m long x 20m wide x 17.5m high. The interface between the topsides structure and jacket structure is located at elevation +27.000m. The topsides' mass is 5,204Te. Refer Figure 3.2.1 and Figure 3.2.2.

Removal methods: the topsides will be completely removed and returned to shore. Possible methods are described in Table 3.2.2.

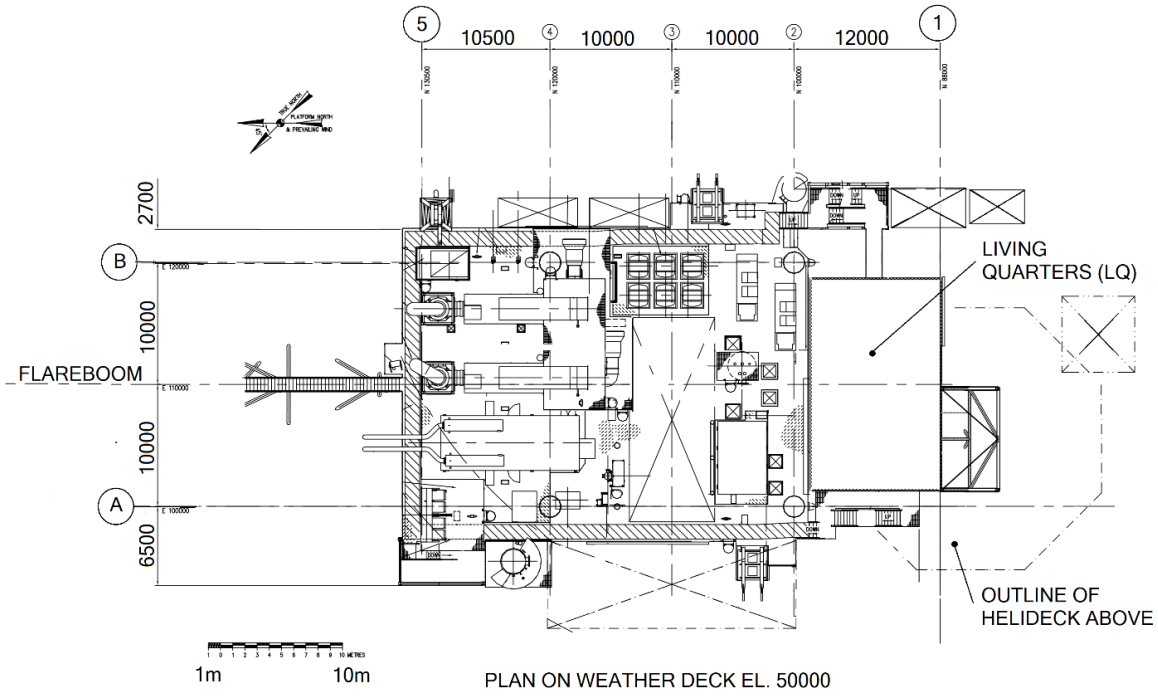

Figure 3.2.1: Solan platform topsides plot plan on weather deck EL. 50.000m

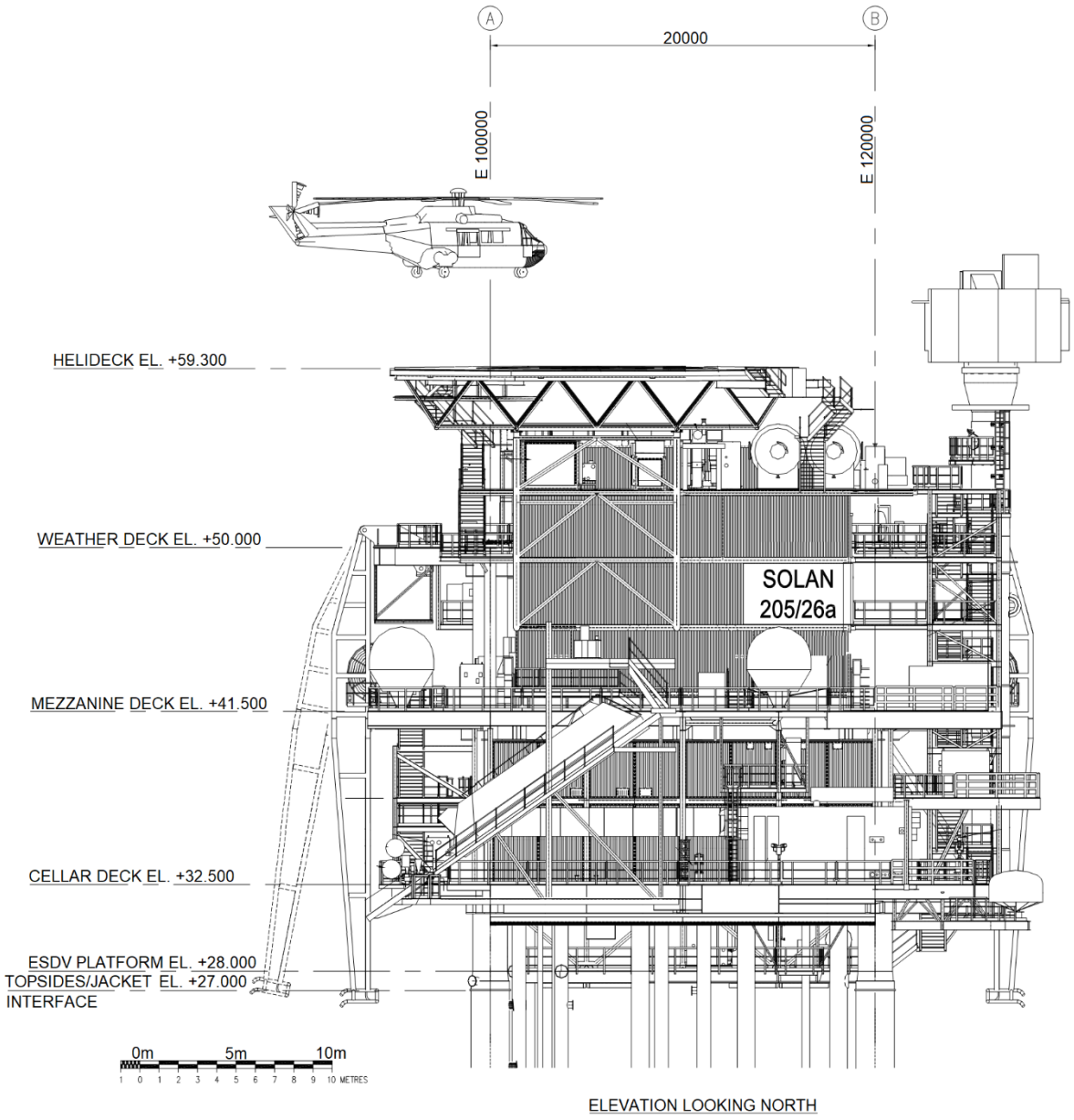

Figure 3.2.2: Solan platform (elevation looking north on south face)

Preparation / Cleaning: The methods that will be used to flush, purge, and clean 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 (if applicable)**
Hydrocarbons	Process fluids	Vessels and pipework will be flushed, nitrogen purged vented and made liquid free.
Produced solids	Sand, NORM	Any pipeline debris captured in filter packages, will be returned onshore for disposal. Any solids remaining in vessels will be removed and disposed of during the dismantlement of the topsides onshore.
Diesel	Bunkered diesel fuel	Any bunkered diesel will be drained and returned onshore for reuse or disposal.
Lubricating oils	Lubricants for equipment e.g. gearboxes, pumps, pedestal crane compressor skid	Lubricating oils will be drained and returned onshore for reuse or disposal.

3.2.2 Topsides' Removal Methods

Table 3.2.2: Topsides' removal methods	
1) Semi-Submersible Crane Vessel ☑; 2) Monohulled Crane Vessel ☑; 3) Single Lift Vessel ☑; 4) Jack up work barge ☑; 5) Piece small or large ☑; 6) Complete with jacket □.	
Methods considered	**Description**
Single lift removal by SSCV or SLV.	Removal of topsides as a single unit followed by recovery to shore for reuse, recycling, and disposal as appropriate.
Piece-small or piece large removal using a crane vessel or an attendant support vessel such as a MCV or JUWB.	Removal of topsides in a series of smaller sub-units making use of an attendant vessel followed by recovery to shore for a programme of reuse, recycling, and disposal as appropriate.
Proposed removal method and disposal route	**Removal of topsides followed by recovery to shore for reuse, recycling, and final disposal to landfill as appropriate. The reuse potential is associated with individual items of topsides equipment. A final decision on the decommissioning method will be made following a commercial tendering process, and OPRED will be advised accordingly.**

3.2.3 Jacket Decommissioning

Jacket description: The Solan jacket is a 4-legged steel pile structure anchored to the seabed using a total of 16 piles, 4 piles per leg. Elevations on rows 'A', 'B', '2' and '5' are shown in Figure 3.2.3. The jacket comprises plan bracing levels at EL. 10.000, EL. -16.000, EL- 43.000, and EL. -71.000, EL. -100.000, and El. -131.500. These are shown in Figure 3.2.4, Figure 3.2.5, Figure 3.2.6, Figure 3.2.7, Figure 3.2.8, Figure 3.2.9 and Figure 3.2.10.

The mass of the jacket excluding piles is ~7,981Te or ~10,624Te including the mass of piles down to 3m below seabed but excluding any soil attached to the piles and any rigging that would be used for lifting operations. The jacket would ideally be removed in a single lift, although technical drivers might drive the jacket to be recovered in sections. The piles will be cut internally to a target depth of 3m below the average natural seabed level. OPRED will be consulted if any technical difficulties are encountered achieving the target depth. The jacket and the cut pile sections will be removed and returned to shore for recycling.

Removal methods: the jacket along with mudmats will be completely removed and returned to shore. Possible methods are described in Table 3.2.3.

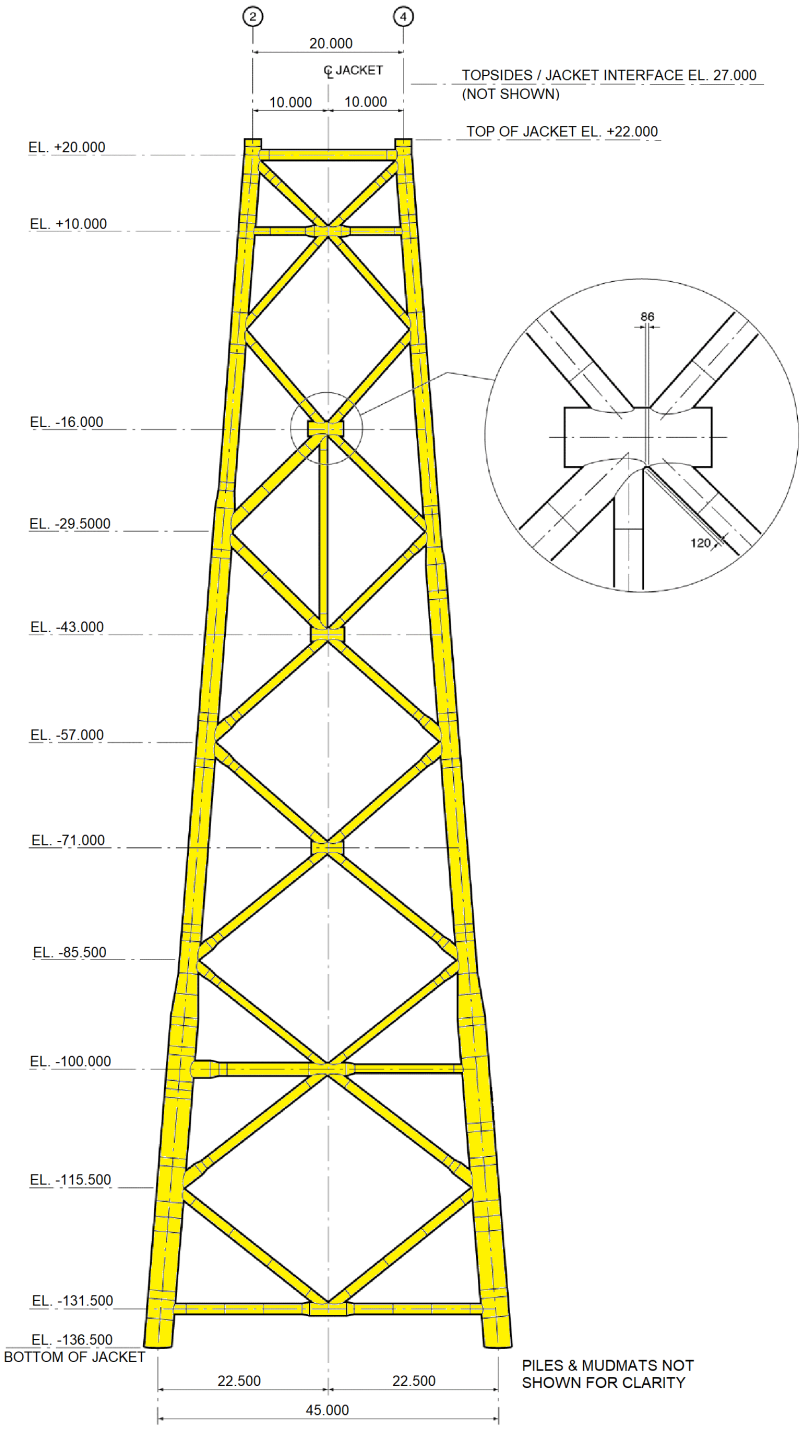

Figure 3.2.3: Solan jacket elevation on row 'A' (rows 'B', '2' & '4' similar)

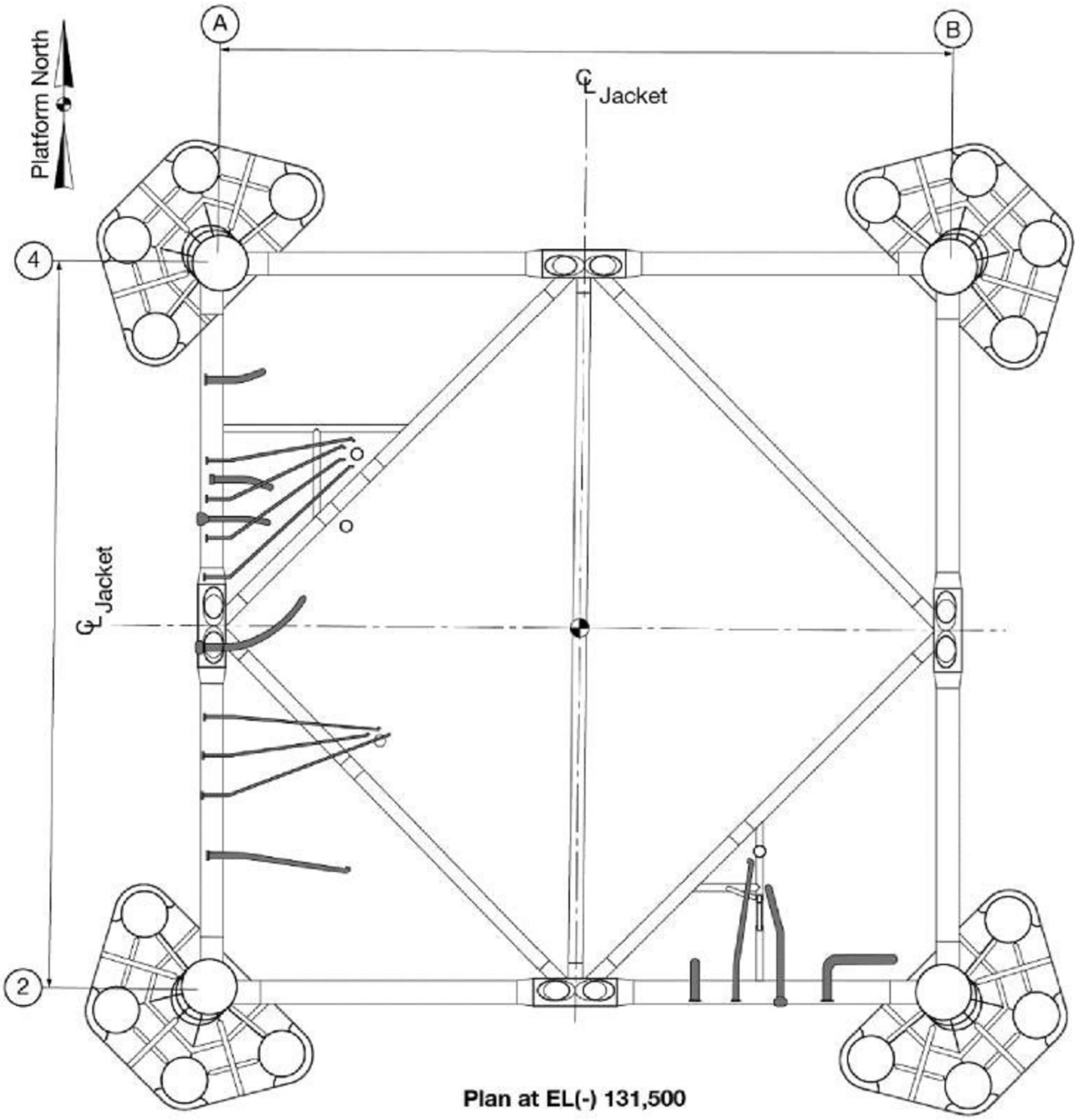

Figure 3.2.4: Solan jacket composite view showing risers, caissons j tubes & mudmats

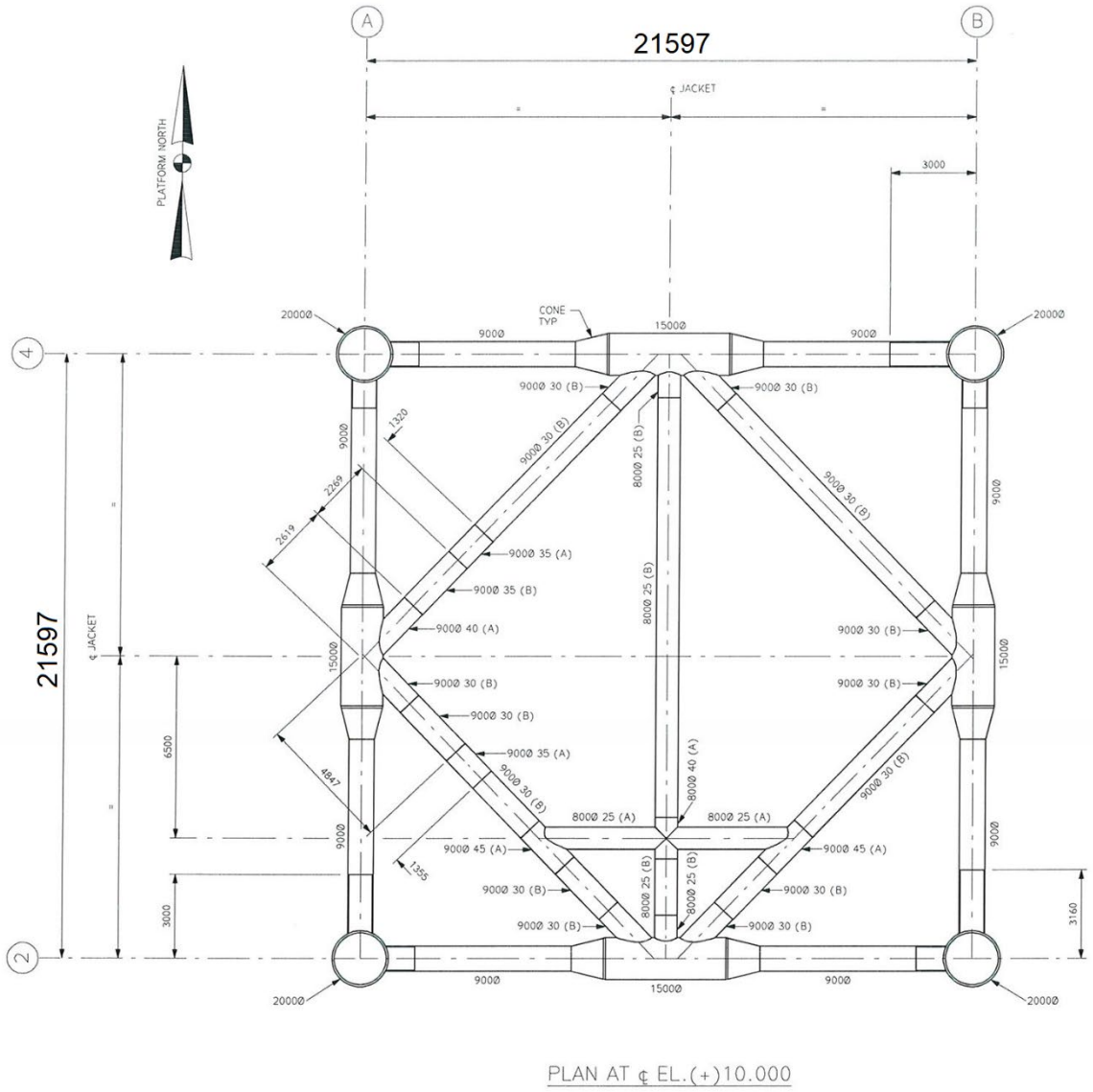

Figure 3.2.5: Solan jacket bracing plan at EL. +10.000

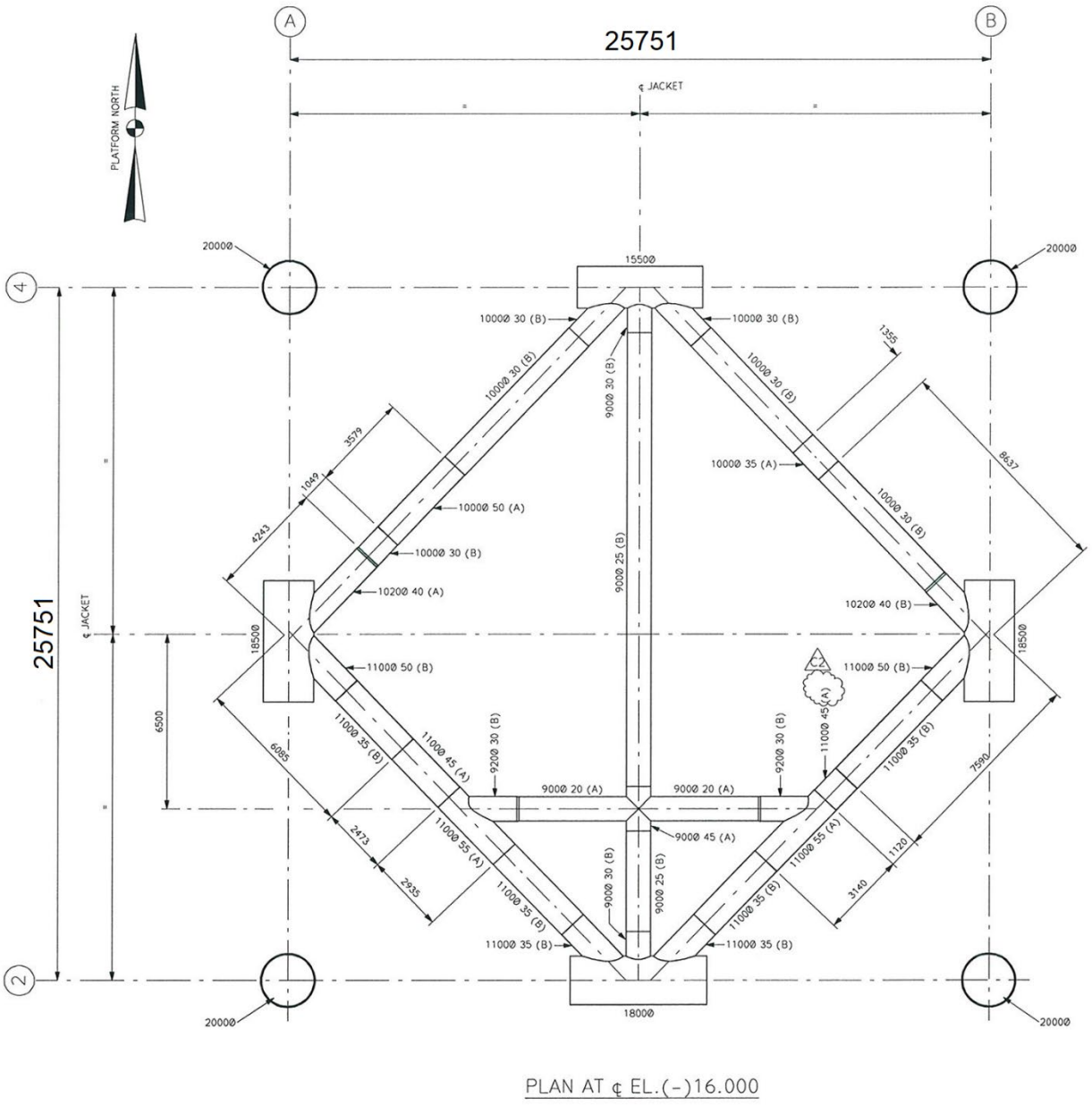

Figure 3.2.6: Solan jacket bracing plan at EL. -16.000

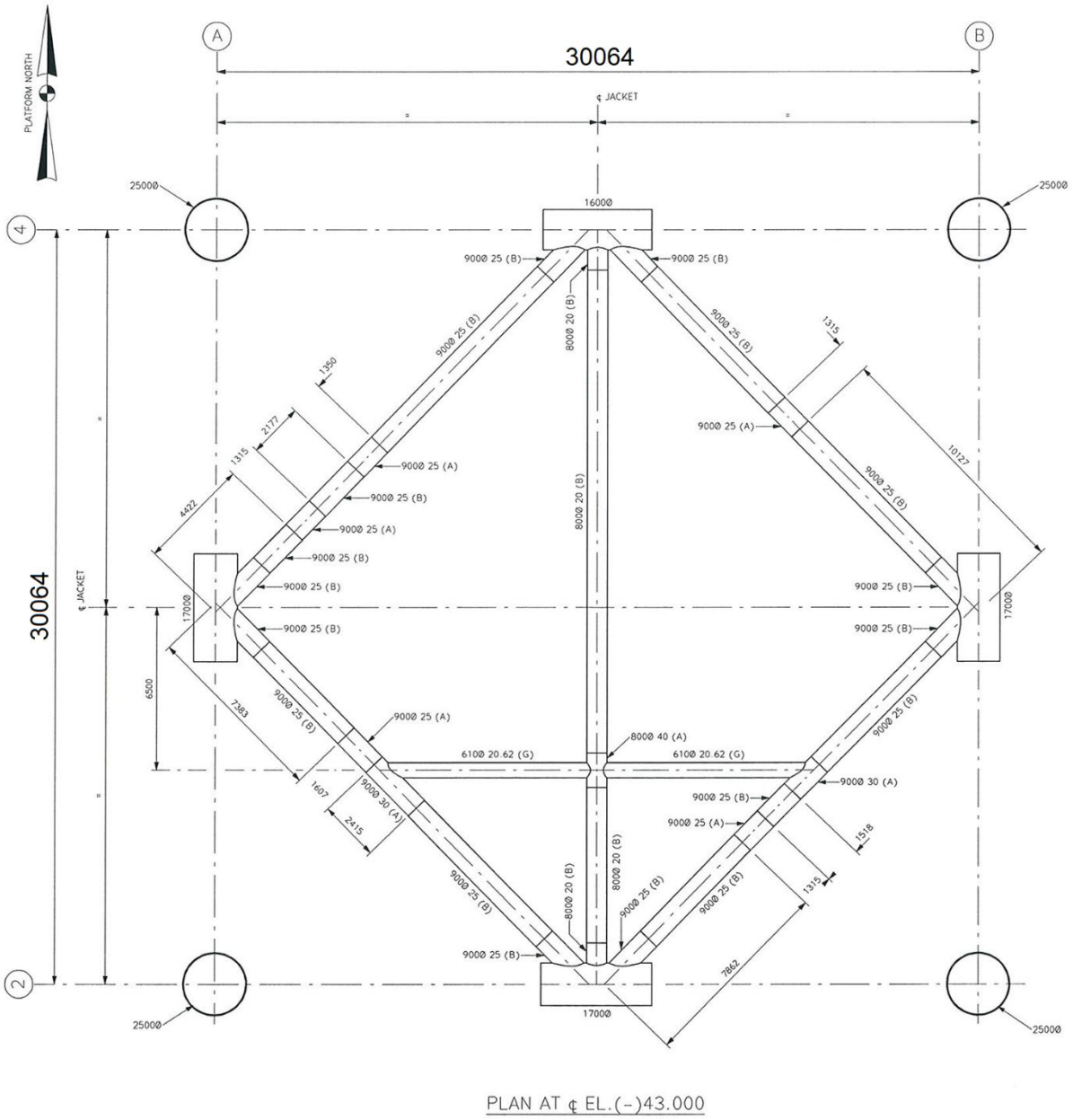

Figure 3.2.7: Solan jacket bracing plan at EL. -43.000

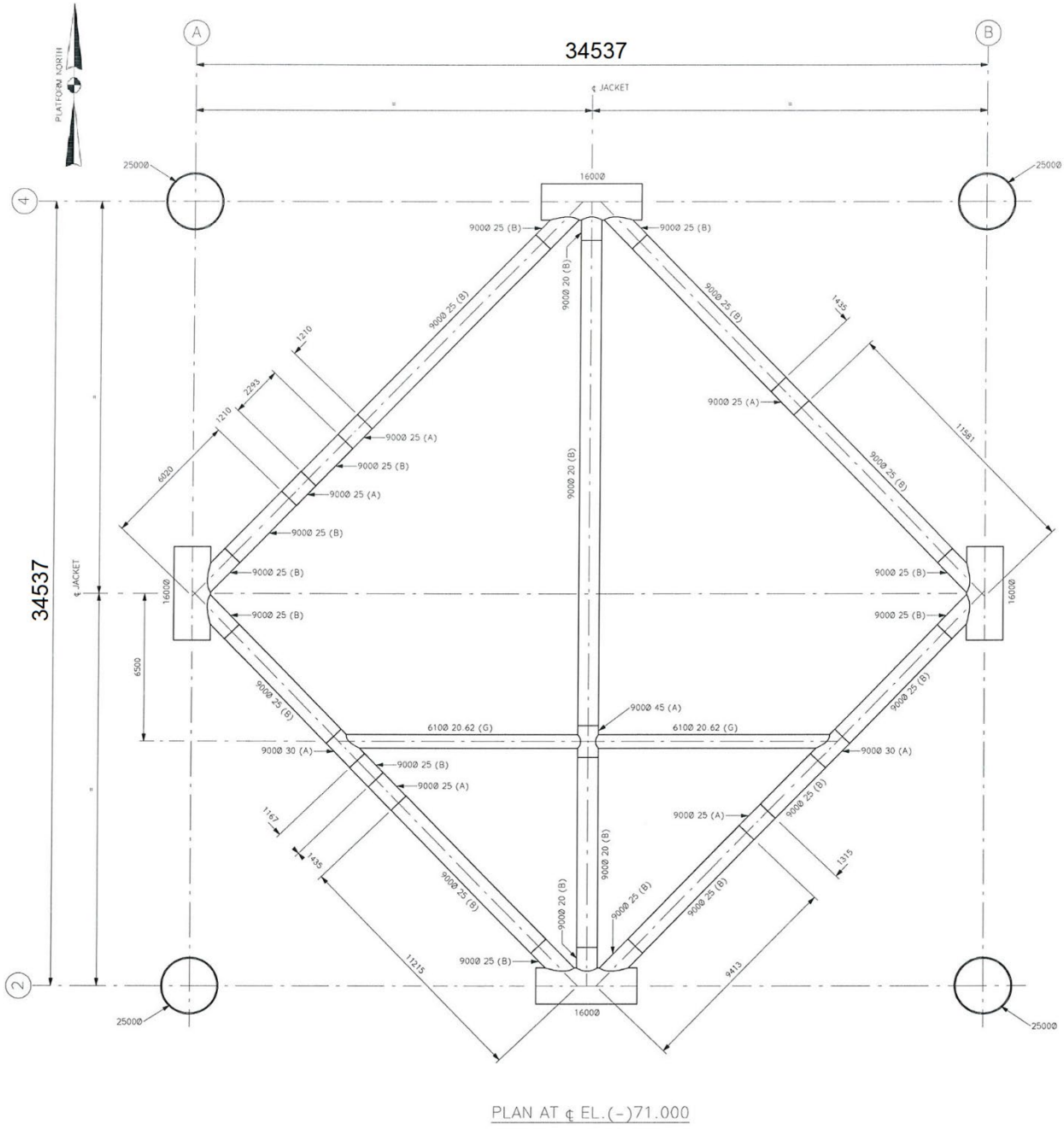

Figure 3.2.8: Solan jacket bracing plan at EL. -71.000

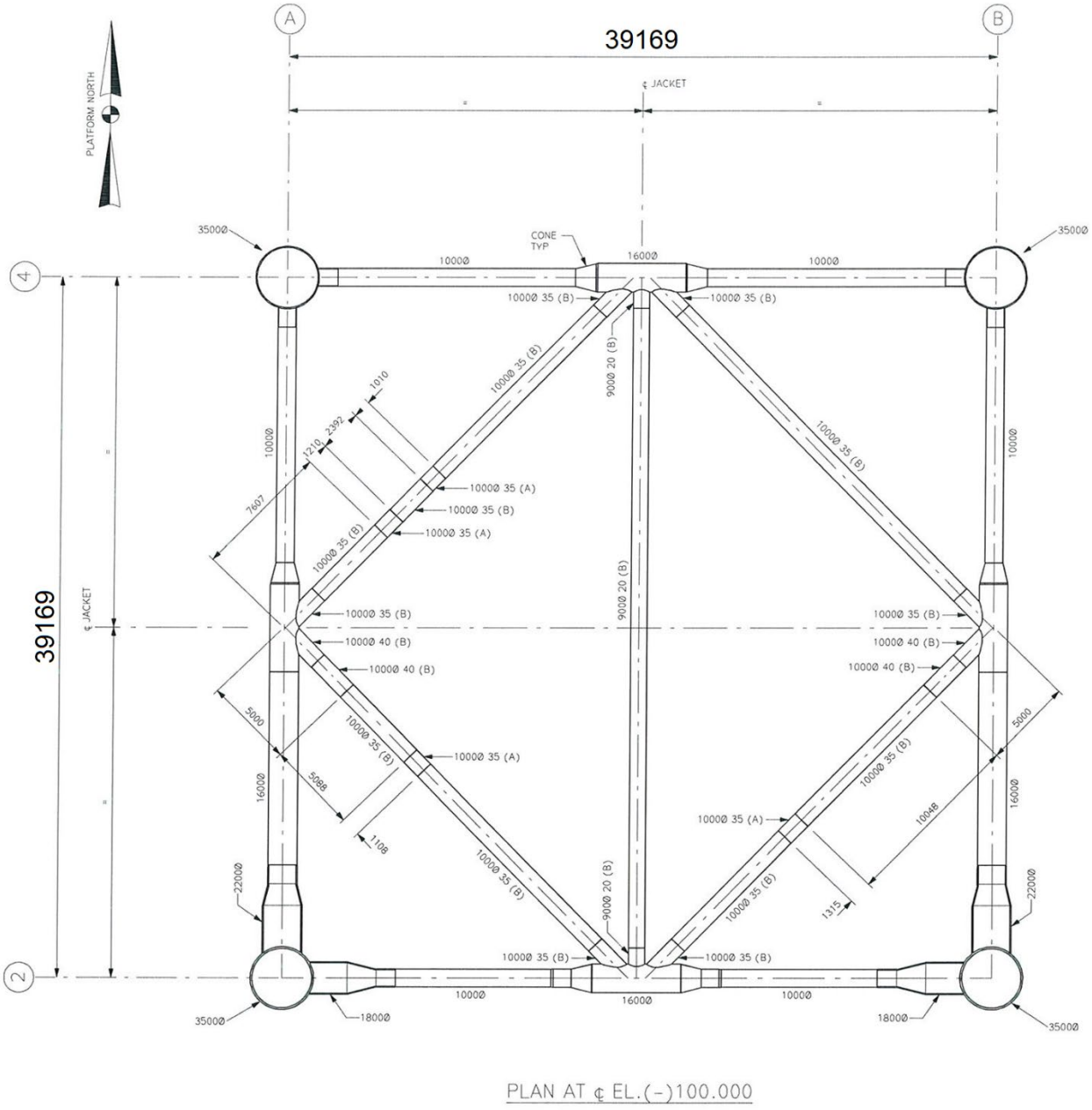

Figure 3.2.9: Solan jacket bracing plan at EL. -100.000

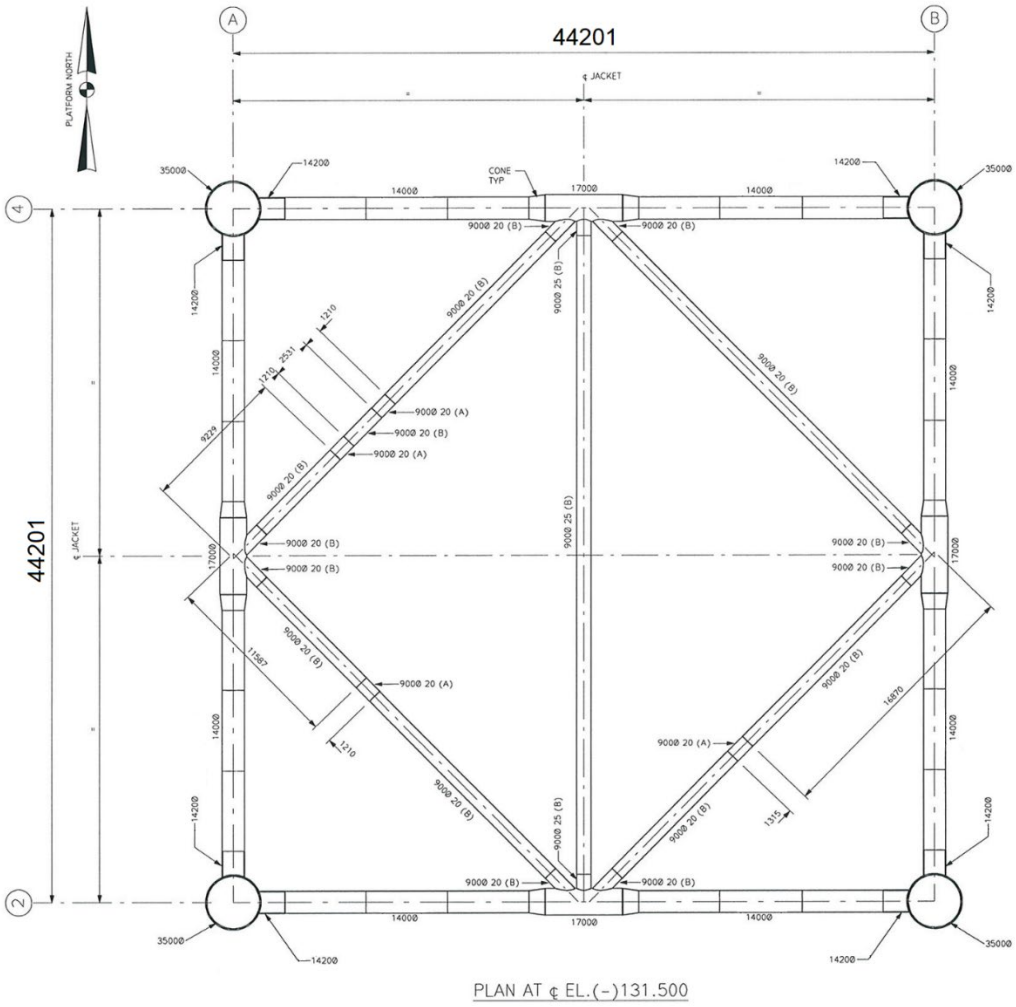

Figure 3.2.10: Solan jacket bracing plan at EL. -131.500

3.2.4 Jacket Removal Methods

Table 3.2.3: Jacket removal methods	
1) Semi-Submersible Crane Vessel ☑; 2) Monohulled Crane Vessel or Marine Construction Vessel ☑; 3) Single Lift Vessel ☑; 4) Jack up work barge ☑; 5) Piece small or large ☑; 6) Complete with topsides ☐.	
Methods considered	**Description**
Single lift removal using SSCV or SLV.	Removal of the jacket as a single unit followed by recovery to shore for reuse, recycling, and disposal as appropriate.
Offshore removal 'piece-small' using a smaller SSCV, MCV or JUWB.	Removal of jacket and dismantlement offshore followed by transportation to shore for reuse, recycling, and disposal as appropriate.
Proposed removal method and disposal route	**Removal of jacket as a single unit followed by recovery to shore for reuse, recycling, and final disposal to landfill as appropriate. A final decision on the decommissioning method will be made following a commercial tendering process, and OPRED will be advised accordingly.**

3.3 Subsea Installations

Table 3.3.1: Solan subsea installations & stabilisation features			
Subsea installations incl. stabilisation features	**Number**	**Option**	**Disposal route (if applicable)**
Subsea Oil Storage Tank	1	Complete removal. Cut 8x 2420 Ø85 piles to a target depth of 3m below the average natural seabed level. OPRED will be consulted if any technical difficulties are encountered achieving the target depth.	Return to shore for reuse or recycling.
Prod. Well P1 WHPS	1	Complete removal.	Return to shore for reuse or recycling.
Prod. Well P2 WHPS	1	Complete removal.	Return to shore for reuse or recycling.
Prod. Well P3 WHPS	1	Complete removal.	Return to shore for reuse or recycling.
WI well W1 WHPS	1	Complete removal.	Return to shore for reuse or recycling.
WI well W2 WHPS	1	Complete removal.	Return to shore for reuse or recycling.
Trash Cap W1	1	Complete removal.	Return to shore for reuse or recycling.
Trash Cap W2	1	Complete removal.	Return to shore for reuse or recycling.

3.4 Pipelines

For the purposes of the comparative assessment there is an implicit assumption that options for reuse of the pipelines have been exhausted before facilities and infrastructure move into the decommissioning phase and comparative assessment. Therefore, the reuse option has been excluded from this assessment. The decommissioning options can be limited to the following:

- **Complete removal** – This would involve the complete removal of the complete pipeline(s) (i.e. the surface laid sections and the sections buried under rock) by whatever means most practicable and acceptable from a technical perspective,
- **Leave *in situ*** – This would involve removing the surface laid sections but leaving the sections of pipeline(s) buried under rock *in situ* with the stability and burial status of the remaining pipelines being confirmed via future surveys.

Since most of the infrastructure is surface laid the complete removal option can be considered an incremental increase on the leave *in situ* option and includes those sections of pipeline buried under deposited rock. For this reason and to provide context the surface laid sections are included in this assessment, although the surface laid sections would be removed in accordance with mandatory requirements.

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 impacts, and cost [3].

Table 3.4.1: Pipeline or pipeline groups and decommissioning options			
Pipeline or Group	**Condition of line / group (surface laid/trenched/buried/spanning)**	**Whole or part of pipeline group**	**Options considered**
SOST & SAL PIPELINES			
PL3094, PL3578, PL3579, PLU3584	Surface laid. Partly protected and stabilised with concrete mattresses.	Whole of pipeline / umbilical	1
PL3095	Surface laid. PL3095 is part buried under deposited rock 204m long and part suspended in the water column (upper and lower hoses) connected to the SAL.	Whole of pipeline	1, 2
DC1 & DC2 PIPELINES			
PL3580, PL3583, PLU3586	Surface laid. PL3580, PL3583, PLU3585 are part buried under deposited rock, 300m long.	Whole of pipeline / umbilical	1, 2
PL3581, PL3582, PLU3586	Surface laid. PL3581, PL3582 and PLU3586 are part buried under deposited rock 360m long.	Whole of pipeline / umbilical	1, 2
PLU3585JW2	Surface laid. Protected and stabilised with concrete mattresses.	Whole of umbilical	1
PLU3586JW1	Surface laid. Protected and stabilised with concrete mattresses.	Whole of umbilical	1
PLU4204, PLU4205, PLU4206, PLU4207, PLU4208, PLU4209	Surface laid. Protected and stabilised with concrete mattresses.	Whole of umbilical / fly-lead	1
WELL P3 PIPELINES			
PL4971	Surface laid buried under deposited rock 916m long and concrete mattresses at each end.	Whole of pipeline / umbilical / fly-lead	1, 2
PLU4972	Surface laid buried under deposited rock 1,196m long and concrete mattresses at each end.		1, 2
PL4973, PL4974, PL4975, PLU4976, PL4977	Surface laid. Protected and stabilised with concrete mattresses.		1
NOTES: 1. Decommissioning options are numbered as follows: 1. Complete removal, 2. Leave *in situ*.			

Table 3.4.2: Solan pipeline decommissioning proposals		
Pipeline or Group	**Recommended option**	**Justification**
SOST & SAL PIPELINES		
PL3094, PL3578, PL3579, PLU3584	Completely remove pipeline or umbilical.	Removal of surface laid pipeline in accordance with mandatory requirements.
PL3095	Completely remove pipeline. Disperse rock to gain access to remove PL3095 and leave dispersed rock *in situ*.	Preferred option following comparative assessment.
DC1 & DC2 PIPELINES		
PL3580, PL3583, PLU3586	Completely remove pipeline. Disperse rock to gain access to remove PL3580, PL3583, PLU3586 and leave dispersed rock *in situ*.	Preferred option following comparative assessment.
PL3581, PL3582, PLU3586	Completely remove pipeline. Disperse rock to gain access to remove PL3581, PL3582 and PLU3586 and leave dispersed rock *in situ*.	Preferred option following comparative assessment.
PLU3585JW2	Completely remove pipeline.	Removal of surface laid pipeline in accordance with mandatory requirements.
PLU3586JW1	Completely remove pipeline.	Removal of surface laid pipeline in accordance with mandatory requirements.
PLU4204, PLU4205, PLU4206, PLU4207, PLU4208, PLU4209	Completely remove pipelines.	Preferred option following comparative assessment.
WELL P3 PIPELINES		
PL4971	Completely remove pipeline. Disperse rock to gain access to remove PL4971 and leave dispersed rock *in situ*.	Preferred option following comparative assessment.
PLU4972	Completely remove pipeline. Disperse rock to gain access to remove PLU4972 and leave dispersed rock *in situ*.	Preferred option following comparative assessment.
PL4973, PL4974, PL4975, PLU4976, PL4977	Completely remove pipelines.	Removal of surface laid pipeline in accordance with mandatory requirements.
NOTES: 1. All materials that are removed will be returned to shore for reuse, recycling, or disposal as appropriate, using the Waste Framework Directive described in section 3.1.		

3.5 Pipeline Protection and Stabilisation Features

Table 3.5.1: Solan pipeline protection & stabilisation features			
Asset Description	**Number**	**Description**	**Disposal route (if applicable)**
FLOWLINE & UMBILICAL PROTECTION FOR DC1, DC2 & WELL P3 INFRASTRUCTURE AT SOLAN PLATFORM			
Concrete mattresses (6m x 3m x 0.15m)	30	Infrastructure for DC1, DC2 and well P3 at Solan platform. Refer Table 2.3.2 and Figure 6.6.2.	Fully remove to shore for reuse, recycling, or disposal.
25kg sand or grout bags	273		
1Te grout bags	26		
PIPELINE PROTECTION INFIELD BETWEEN SOLAN PLATFORM, SOST & SAL			
Concrete mattresses (6m x 3m x 0.15m)	134	Infrastructure between Solan platform, SOST and SAL. Refer Table 2.3.2, Figure 6.6.3 and Figure 6.6.4.	Fully remove to shore for reuse, recycling, or disposal.
Concrete mattresses (6m x 3m x 0.3m)	6		
Concrete mattresses (6m x 4m x 0.3m)	34		
25kg sand or grout bags	280		
1Te grout bags	32		
PIPELINE PROTECTION AT DC1 (WELL P1/W2), DC2 (WELL P2/W1) AND WELL P3			
Concrete mattresses (6m x 3m x 0.15m)	145	Infrastructure at and in-between DC1, DC2 and at well P3. Refer Table 2.3.2, Figure 6.6.5 and Figure 6.6.6.	Fully remove to shore for reuse, recycling, or disposal.
25kg sand or grout bags	1,232		
DEPOSITED ROCK			
Deposited rock	14,383	Between Solan SOST & SAL on PL3095. Refer Table 2.3.2, Figure 6.6.1 and Figure 6.6.4.	Disperse to allow buried pipelines to be recovered, otherwise leave *in situ*.
Deposited rock	4,228	Between Solan and DC1 on PL3580, PL3583, PLU3585. Refer Table 2.3.2, Figure 6.6.1	
Deposited rock	5,117	Between Solan and DC2 on PL3581, PL3582, PLU3586. Refer Table 2.3.2, Figure 6.6.1	
Deposited rock	12,562	Between well P2 and well P1 on PL4971. Refer Table 2.3.2, Figure 6.6.1 and Figure 6.6.5.	
Deposited rock	6,935	Between Solan and well P3 on PLU4972. Refer Table 2.3.2, Figure 6.6.1	

3.6 Pipeline Structures

Table 3.6.1: Solan subsea installations & stabilisation features			
Subsea installations incl. stabilisation features	**Number**	**Option**	**Disposal route (if applicable)**
SAL	1	Complete removal. Cut 1x pile 1835Ø51 to a target depth of 3m below the average natural seabed level. OPRED will be consulted if any technical difficulties are encountered achieving the target depth.	Return to shore for reuse or recycling.
SAL hose pick-up system	1	Complete removal.	Return to shore for reuse or recycling.
Anode skid Solan platform	2	Complete removal.	Return to shore for reuse or recycling.
Anode skid SOST	1	Complete removal.	Return to shore for reuse or recycling.
Anode skid well P1	1	Complete removal.	Return to shore for reuse or recycling.
Anode skid well P2	1	Complete removal.	Return to shore for reuse or recycling.
Anode skid well W1	1	Complete removal.	Return to shore for reuse or recycling.
Anode skid well W2	1	Complete removal.	Return to shore for reuse or recycling.

3.7 Well Decommissioning

Table 3.7.1: Well decommissioning
All the wells listed in section 2.6 (Table 2.6.1) will be decommissioned in accordance with latest version of the Oil & Gas UK[5] Well Decommissioning Guidelines. 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. In line with good industry practice, as regulated by the NSTA's WONS, Premier Oil intend to cut conductors at 3m below the average natural seabed level. OPRED will be consulted if any technical difficulties are encountered achieving the target depth.

[5] Oil and Gas UK changed its name to Offshore Energies UK in early 2022.

3.8 Waste Streams

Table 3.8.1: Waste stream management method	
Waste stream	**Removal and disposal method**
Bulk liquids	Bulk hydrocarbons will be removed from topsides and SOST and SAL. Further cleaning and decontamination of any residual hydrocarbons will take place onshore prior to reuse 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	Given the age of the installations asbestos is not expected to be present, but in the unlikely event asbestos is found while conducting hazardous material surveys, it will be recorded and dealt with and disposed of in accordance with guidelines and company policies.
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 reuse and recycling options. OPRED will be advised when a dismantling site has been selected.

Table 3.8.2: Inventory disposition				
Asset	**Inventory**	**Total inventory (Te)**	**Planned mass to shore (Te)**	**Planned mass decommissioned *in situ* (Te)**
Solan	Installations	34,910	28,224	6,686
	Pipelines	4,118	4,084	34
	Deposited rock	43,225	0	43,225
Sub-total:	**Excl. rock**	**82,253**	**32,308**	**49,945**
Sub-total:	**Incl. rock**	**39,028**	**32,308**	**6,720**

NOTES:

1. There may be slight discrepancies due to rounding. The figures have not been adjusted to allow for this.
2. These figures exclude marine growth. Marine growth might typically comprise 5% of the overall mass of the SOST (744Te) or SAL (10.9Te) and 10% of the overall mass of a subsea installations: jacket excl. piles (798.1Te), WHPS (∑10.5Te), Trash Caps (1.4Te) or anode skids (∑0.6Te). On this basis assume the total mass of marine growth is ~1,523Te.

4 ENVIRONMENTAL APPRAISAL OVERVIEW

4.1 Environmental Sensitivities

The environmental sensitivities in the Solan area are summarised in Table 4.1.1. Further details are available in the Environmental Appraisal (EA) report [4].

Table 4.1.1: Environmental Sensitivities

Environmental Receptor	Main Features
Conservation Interests and Sites	The closest protected site within a 40 km radius of the Solan field is the Faroe-Shetland Sponge Belt Nature Conservation Marine Protected Area ('NC MPA'), which is located approximately 22 km away. This has been designated for aggregations of the Oslo and Paris Convention OSPAR (2008) threatened and/or declining habitat of deep-sea sponges. It is also designated for offshore subtidal sands and gravels, presence of ocean quahog (Arctica islandica), large-scale continental slope features, and features representative of the West Shetland Margin Paleo-depositional system Key Geodiversity area, including continental slope channels, iceberg plough marks, prograding wedges, slide deposits, sand wave fields, and sediment wave fields. The West of Shetland Shelf NC MPA is located approximately 23 km away from the Solan field. The NC MPA has been designated for the wide variety of offshore subtidal sand and gravel habitats, which are classed as a United Kingdom Biodiversity Action Plan ('UKBAP') habitat of priority importance. The Seas off Foula Special Area of Conservation ('SPA') is located approximately 38 km from the Solan field. This site is designated as a protected area due to the high concentrations of seabirds which use the site for breeding and foraging. In particular, the site is a breeding and foraging ground for a large population of great skuas. There are no Special Areas of Conservation ('SACs') within a 40 km radius of the Solan field. The nearest Annex I designated offshore conservation site is the Wyville Thomson Ridge SAC, located approximately 110 km to the southwest.
Conservation Species	Harbour porpoise, Atlantic white-sided dolphin, killer whale, 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 throughout the year within the vicinity of Solan in low densitie. The density of harbour porpoise in the project area is estimated to be 0.152 animals/km2, which is relatively low compared to other areas of the UKCS. All of the cetacean species are both European Protected Species ('EPS') and are covered by the UK Biodiversity Action Plan ('UK BAP').

Table 4.1.1: Environmental Sensitivities	
Environmental Receptor	**Main Features**
	Neither grey nor harbour seals are not expected to be present in significant numbers within the project area. Harbour seals are unlikely to occur in the area and grey seals may be present at low densities ranging between 0 and 5 individuals per 25 km^2. Norway pout, cod, saithe, sandeel and whiting are Priority Marine Feature ('PMF') species in offshore waters. Cod are also listed as vulnerable on the International Union for Conservation of Nature ('IUCN') Global Red List. They use the project area as a nursery ground.
Benthic Environment	The sediments within Block 205/26 vary with the majority of sediment characteristic of sand and muddy sand (associated with the identified European Nature Information System ('EUNIS') biotope A5.27 'Offshore circalittoral sand'. The area also features coarse sediment in some parts (associated with EUNIS biotope A5.15 'Offshore circalittoral coarse sediment'). Seabed sediments within the area are expected to comprise fine to coarse gravelly sand with cobbles and boulders, with the presence of Holocene sandy sediment to depths of around 0.8 m below the seabed and over-consolidated firm to hard glacial till at deeper depths. Sparse benthic communities in relatively low abundances which were not uniform across the area were recorded. In total, 1,295 faunal individuals were collected during the survey, representing 163 taxa. Of the 163 taxa, 87 were polychaete annelids (bristle worms) accounting for 64% of the recorded individuals and 53% of the taxa. There were 29 crustacean taxa (crabs, shrimps etc.) and 24 mollusc taxa (bivalves and snails) identified.
Fish	Only Norway pout (*Trisopterus esmarkii*) and sandeel (*Ammodytidae spp*.) are likely to use the Solan area as spawning grounds. Additionally, the following species use the area as a nursery ground: anglerfish (*Lophius piscatorius*), blue whiting (*Micromesistius poutassou*), cod (*Gadus morhua*), European hake (*Merluccinus merluccinus*), herring (*Clupea harengus*) ling (*Molva molva*), mackerel (*Scomber scombrus*) Norway pout, sandeel, spurdog (*Squalus acanthias*) and whiting (*Merlangius merlangus*). The probability of juvenile fish aggregations occurring is the area is low for haddock (*elanogrammus aeglefinus*), whiting, Norway pout, herring, mackerel, blue whiting, anglerfish. Hake have a medium probability.

Table 4.1.1: Environmental Sensitivities	
Environmental Receptor	**Main Features**
Seabirds	According to the density maps provided in Kober *et al*. (2010), the following species have been recorded within the Solan field: northern fulmar, European storm-petrel (*Hydrobates pelagicus*), northern gannet (*Morus bassanus*), Arctic skua (*Stercorarius parasiticus*), great skua (*Stercorarius skua*), black-legged kittiwake, great black-backed gull (*Larus marinus*), lesser black-backed gull (*Larus fuscus*), herring gull (*Larus argentatus*), Iceland gull (*Larus glaucoides*), glaucous gull (*Larus hyperboreus*), common guillemot, razorbill (*Alca torda*) and Atlantic puffin (*Fratercula arctica*). The sensitivity of seabirds to oil pollution is shown below by the Seabird Oil Sensitivity Index. SOSI identifies areas at sea where seabirds are likely to be most sensitive to surface pollution. SOSI is shown by UKCS Block. Solan sits within Block 205/26. Seabird sensitivity to oil within the area of the Solan infrastructure varies considerably throughout the year. For a large part for the year the sensitivity remains 'Low' to 'Medium', however within the months of October, November, December and January it jumps to 'high'. The risk of an oil spill from the proposed operations at the project area is considered remote and therefore the overall risk to birds is considered negligible.
Commercial Fishing	The Solan field infrastructure is located in International Council for the Exploration of the Seas ('ICES') Rectangle 49E6. This ICES Rectangle is predominantly targeted for demersal and pelagic species. However, proportionately the value of pelagic catch exceeds that of demersal species, with demersal fisheries landing 82% of the total weight and 72% of the total value of fish landed in 2022. Comparatively, demersal species amounted to 18% of the total weight and 27% of the value. To put this into the wider regional context, the contribution of Rectangle 49E6 to total UK landings is moderate. In 2022, 481,398 Te of fish were caught in the UKCS, with a total value of over £685 million. ICES Rectangle 49E6 alone contributed 4.1% of the live weight of fish caught across the UKCS and 4.2% of the value in that year. This is higher than for preceding years where the contribution to UKCS fisheries was typically lower. In 2022 fishing effort in ICES rectangle 49E6 was highest in November and December, each accounting for 16% of the total number of days fished. The effort was the lowest throughout the year in June, accounting for 2% of the annual effort combined. The main gear types used in Rectangle 49E6 are hooks and lines (approximately 532 days in 2022), and trawls (approximately 431 days in 2022).

Table 4.1.1: Environmental Sensitivities	
Environmental Receptor	**Main Features**
Other Users	The Solan infrastructure is located within an area of oil and gas development. There are two oil and gas surface structures within 40 km of the project area, the closest being 15 km away. Shipping activity within Block 205/26 considered to be very low. There are two subsea telecommunication cables within close proximity to Solan. These are the disused TAT 10B West Section located approximately 13 km to the south-southwest and the active TAT 14 SEG Ka located 14 km to the south-southeast. There are no active windfarms in the vicinity of Solan. The closest offshore windfarm is the TCE (Scotland) which is approximately 154 km to the south-southeast of Solan. Block 205/26 has a Ministry of Defence ('MoD') licence restriction as it lies within training ranges. This restriction is in relation to the siting of an installation that is fixed to the seabed, resting on the seabed, floating, intended for drilling or getting hydrocarbons, or involves injection of fluids. There are two known wrecks, as identified by Historic Environment Scotland ('HES') in November 2015, located approximately 2.5 km to the southwest and 4.2 km to the northeast of the Solan field. There are no Historic MPAs, scheduled monuments (including wrecks) or war graves within the block.

4.2 Potential Environmental Impacts and Their Management

The EA report [4] addresses potential environmental and societal impacts by characterising the likelihood and significance of interactions between the proposed decommissioning activities and the local environment, whilst considering stakeholder response. The EA also details mitigation measures designed to abate potential impacts in accordance with Premier Oil's Environmental Management System (EMS) and Health, Safety, Environment and Security (HSES) Policy.

Key potential environmental and societal impacts which were considered to be 'potentially significant', and thus requiring further assessment, were identified through an environmental issues identification (ENVID) workshop; they include: seabed disturbance and nesting seabed disturbance. These potential impacts have undergone detailed assessment within the EA and are summarised below in Table 4.2.1

The EA concludes that the recommended options to decommission the Solan Field installations and pipelines can be completed without causing significant impact to environmental or societal receptors.

Table 4.2.1: Environmental Impacts and Management		
Activity	**Main Impacts**	**Management**
Topside, Jacket, Risers and Subsea Infrastructure (SOST, WHPS and SAL) Decommissioning	Seabed Disturbance	• 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; • Lifting operations will be conducted around high tide and slack water to minimise the distribution of mobilised sediments; • 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; • Vessels are most likely to be equipped with dynamic positioning rather than relying on anchors to remain in position which interact with the seabed; • 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 MBES, side scan sonar, using ROVs etc.
	Nesting Seabird Disturbance	• Compliance with relevant guidance (e.g. "Undertaking of Seabird Survey Methods for Offshore Installations: Black-legged kittiwakes" JNCC (2021). • Plan and arrange seasonal surveys; • Explore technological opportunities for evidence gathering; and • Develop Seabird management plans.
Pipelines, Flowlines and Umbilicals Decommissioning	Seabed Disturbance	• 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; • Lifting operations will be conducted around high tide and slack water to minimise the distribution of mobilised sediments; • 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;

Table 4.2.1: Environmental Impacts and Management		
Activity	**Main Impacts**	**Management**
		• Vessels are most likely to be equipped with dynamic positioning rather than relying on anchors to remain in position which interact with the seabed; • 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 MBES, side scan sonar, using ROVs etc.

5 INTERESTED PARTY CONSULTATIONS

5.1 Consultation Summary

Table 5.1.1: Summary of stakeholder comments		
Who	**Comment**	**Response**
Statutory Consultations		
GMG		
NFFO		
NIFPO		
SFF		
Public Consultation		
Public		
Informal Consultations		

6 PROGRAMME MANAGEMENT

6.1 Project Management and Verification

Premier Oil has established a UK Decommissioning organisation as a department to manage and execute decommissioning projects. Premier Oil'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. Premier Oil 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 and 50m either side of each pipeline over its length. Oil and gas debris will be recovered for onshore disposal or recycling in line with existing disposal methods.

Verification of seabed state will be obtained. As the area will be available for the resumption of fishing activities an overtrawl will be used to confirm the status of the seabed. A statement of clearance will be provided to all relevant governmental departments and statutory consultees.

The outcomes of the clear seabed verification activities will be reported in the close out report and sent to the Seabed Data Centre (Offshore Installations) at the Hydrographic Office.

6.3 Schedule

A proposed schedule is provided in Figure 6.3.1. 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.

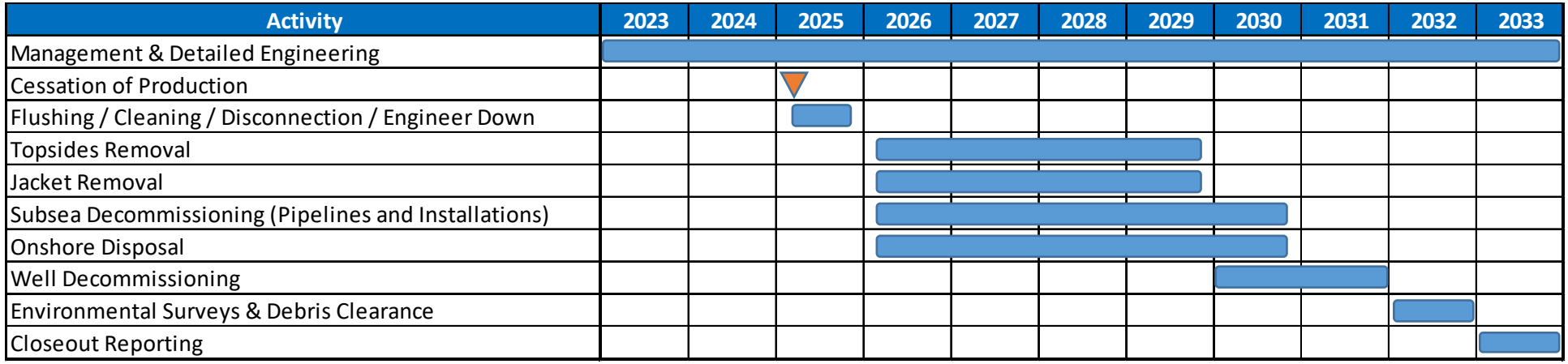

Figure 6.3.1: Gantt chart of project plan

NOTES:

1. Subsea decommissioning includes the SAL system

6.4 Costs

Decommissioning costs will be provided separately to OPRED.

6.5 Close Out

In accordance with OPRED guidelines, a close out report will be submitted to OPRED within 12 months of the completion of the offshore decommissioning scope. 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.

6.6 Post Decommissioning Monitoring and Evaluation

Following removal of the Solan topsides there may be a period before the jacket is removed. During this time, the jacket top will remain above sea level. Throughout this phase of decommissioning the existing 500m safety zone will remain in place and the Solan Consent to Locate will be revised to reflect the change to the installation. In addition, appropriate navigational aids will be fitted, and the jacket logged in FishSAFE.

Upon completion of the topsides removal activities the jacket will remain where it is until it is decommissioned. During this period, the jacket integrity will continue to be monitored as per the Company jacket inspection & monitoring strategy.

Depending on the eventual sequence of removal activities, the subsea 500m zones will be retained following removal of the installations until such time as the seabed clearance verification activities have been successfully concluded.

7 REFERENCES

[1] OPRED (2018) Offshore Oil and Gas Decommissioning Guidance Notes.

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

[3] Premier Oil, Solan Pipeline Decommissioning Comparative Assessment, AB-SO-LAP-LL-SU-RP-0001.

[4] Premier Oil, Solan Decommissioning Environmental Appraisal, AB-SO-XGL-LL-SE-RP-0001.

APPENDIX A SCHEMATICS

Appendix A.1 Field overview

KEY
DC1 – Drill Centre 1 (Well P1, well W2)
DC2 – Drill Centre 2 (Well P2, Well W1)
EHCCU – Electrical, Hydraulic, Chemicals and Control Umbilical
ESP – Electrical Signals & Power
ESPU – Electrical Signals and Power Umbilical
HU – Hydraulic Umbilical
P1 – Production well P1
P2 – Production Well P2
P3 – Production well P3
PCFF – Production Composite Flexible Flowline
SCFF – Treated Seawater Composite Flexible Flowline
SUTU – Subsea Umbilical Termination Unit
UMJB1 – Umbilical Junction Box 1 (i.e. splitter box)
UMJB2 – Umbilical Junction Box 2 (i.e. splitter box)
W1 – Water Injection Well 1
W2 – Water Injection Well 2

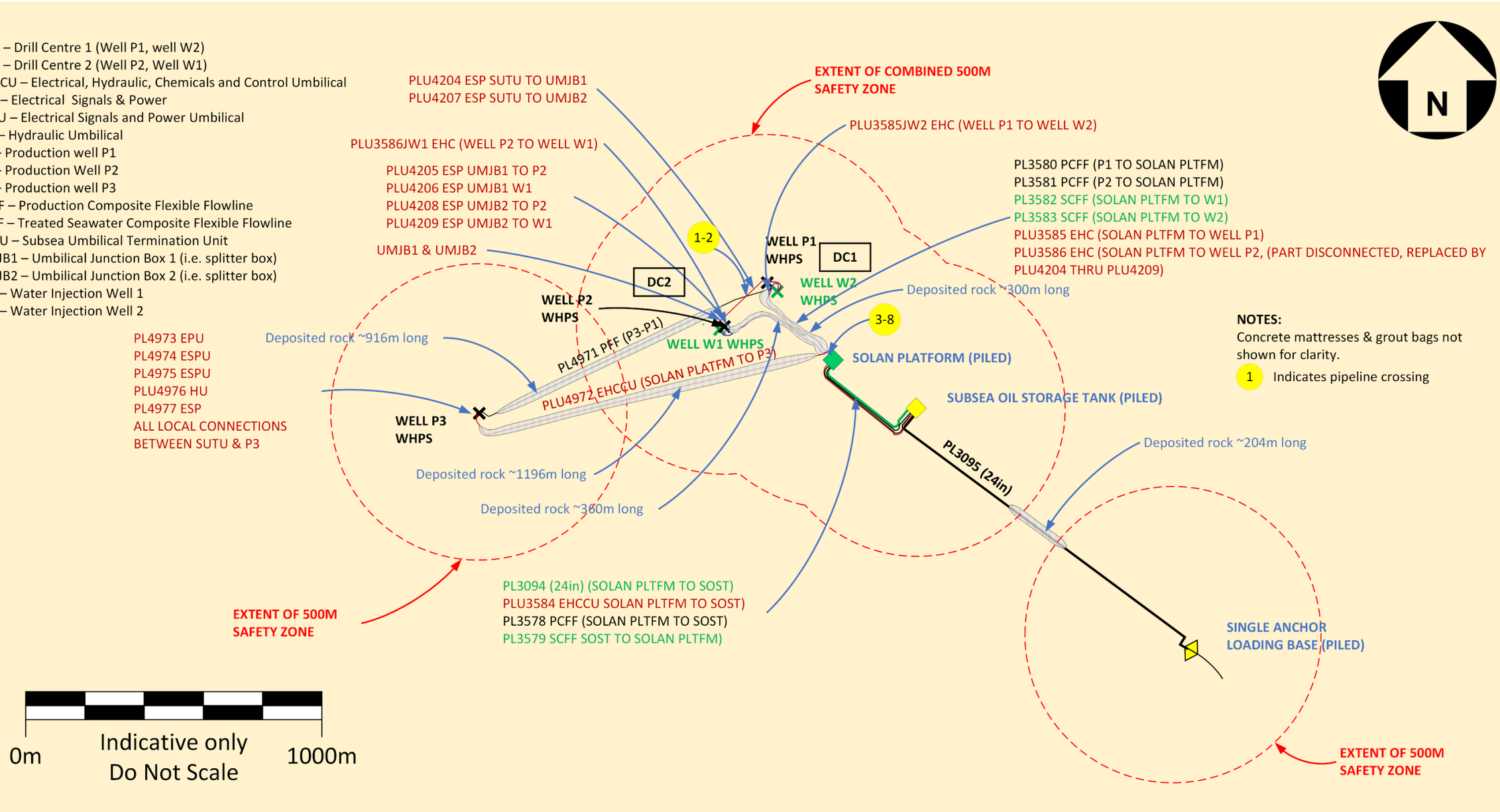

Figure 6.6.1: Solan field infrastructure overview schematic

Appendix A.2 Solan platform

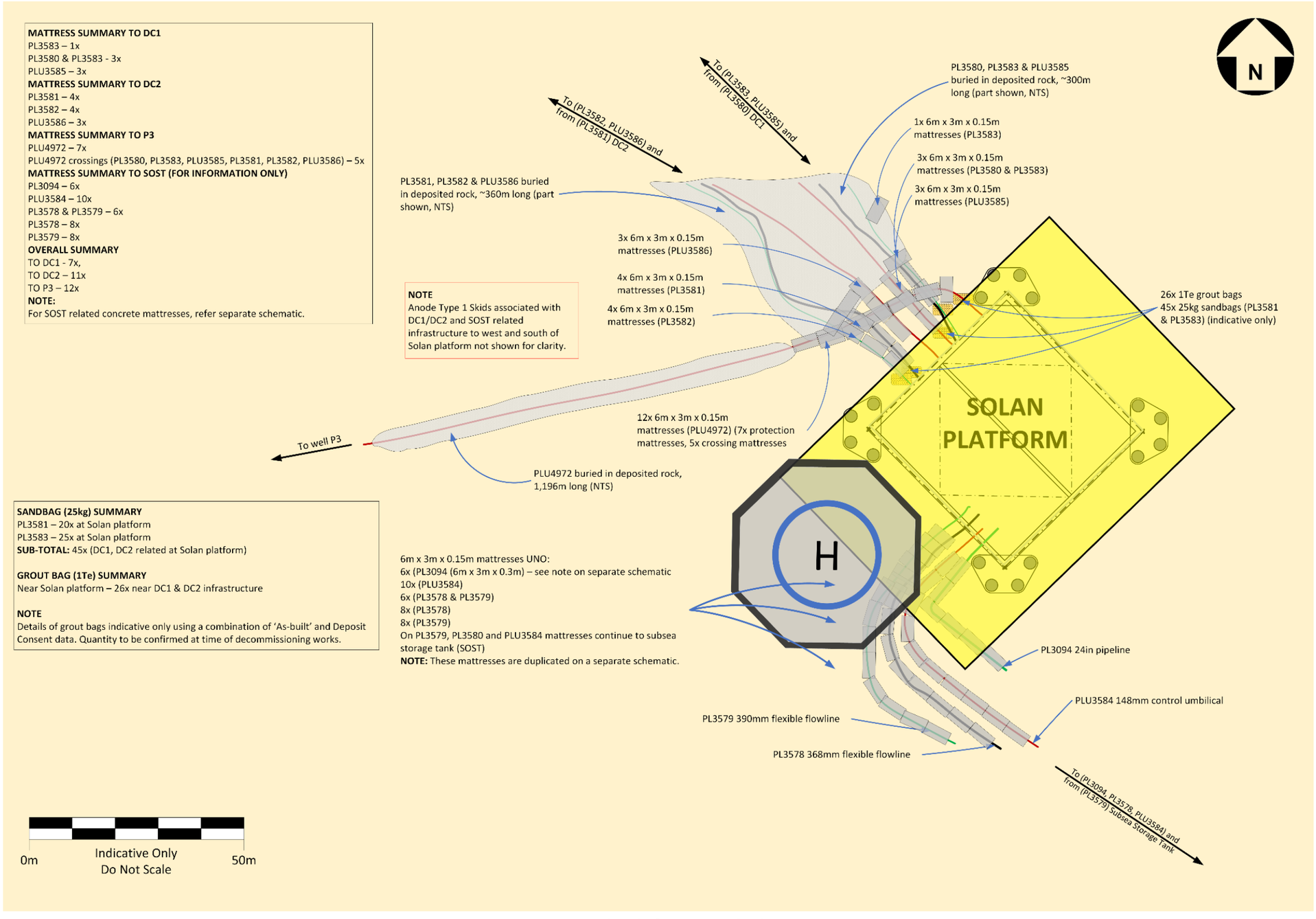

Figure 6.6.2: Solan platform approach schematic

Appendix A.3 Between Solan platform, SOST and SAL

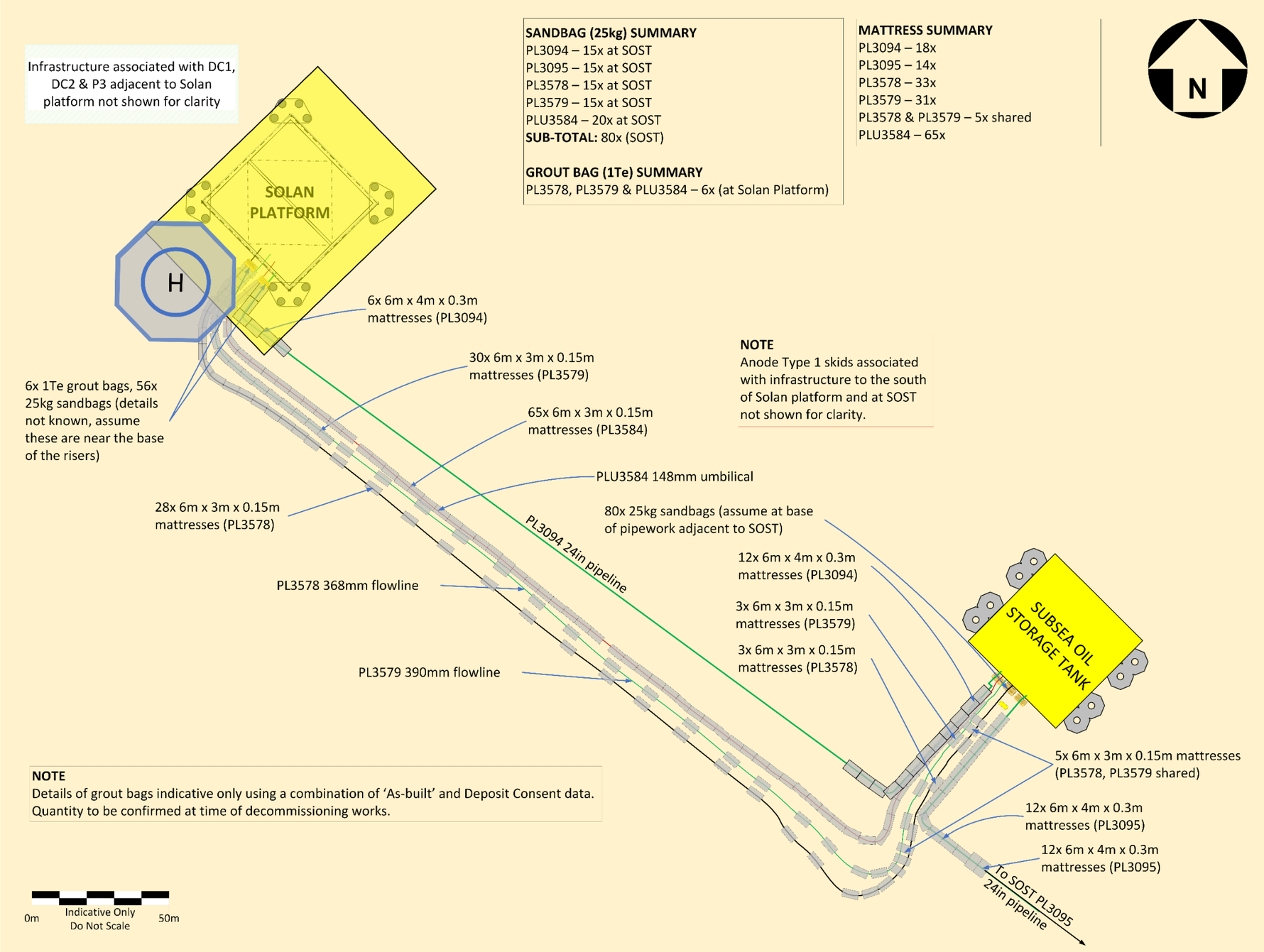

Figure 6.6.3: Solan platform and SOST infrastructure schematic

Appendix A.4 Single Anchor Loading (SAL) approach

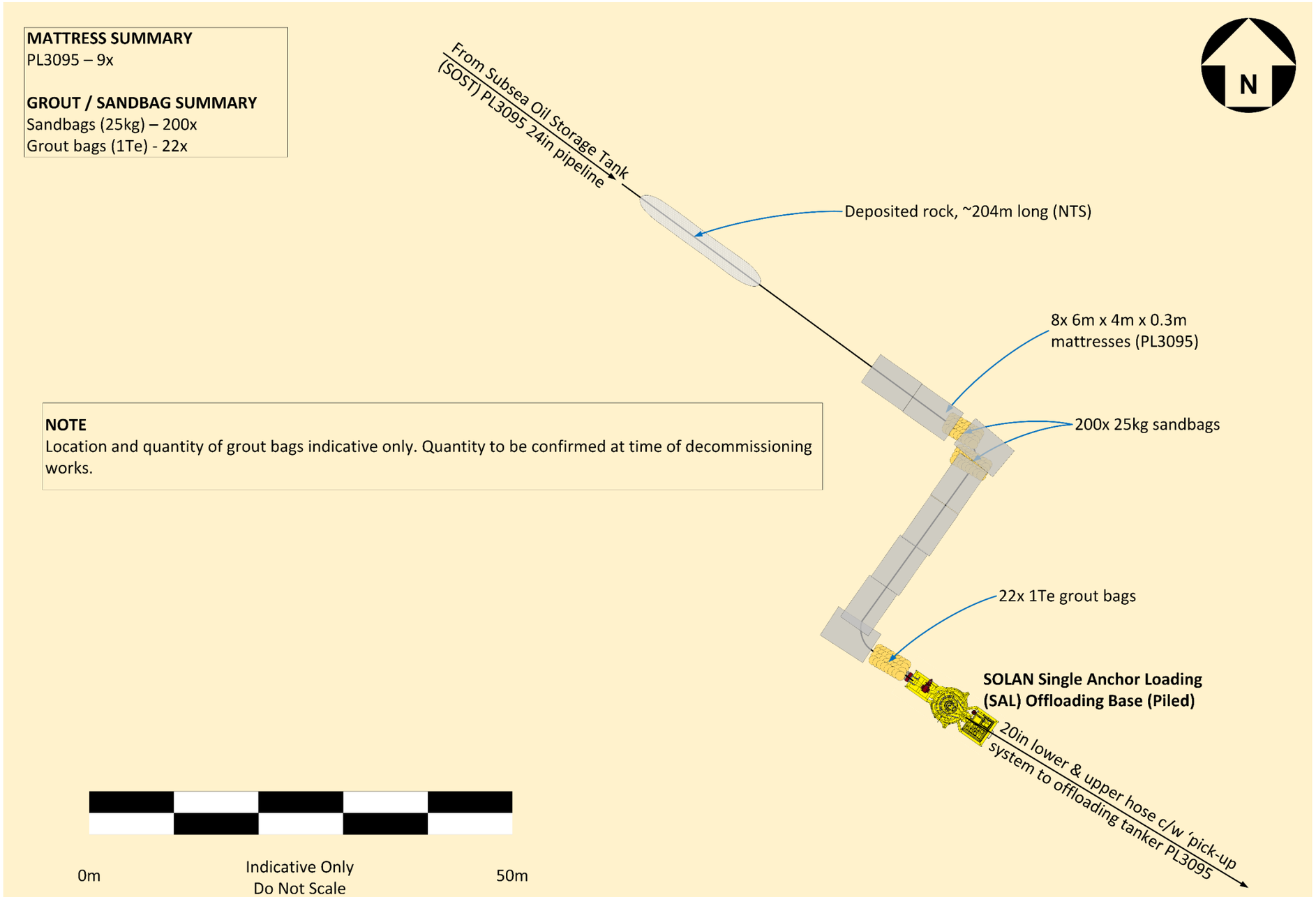

Figure 6.6.4: SAL approach schematic

Appendix A.5 Infrastructure between DC1 and DC2

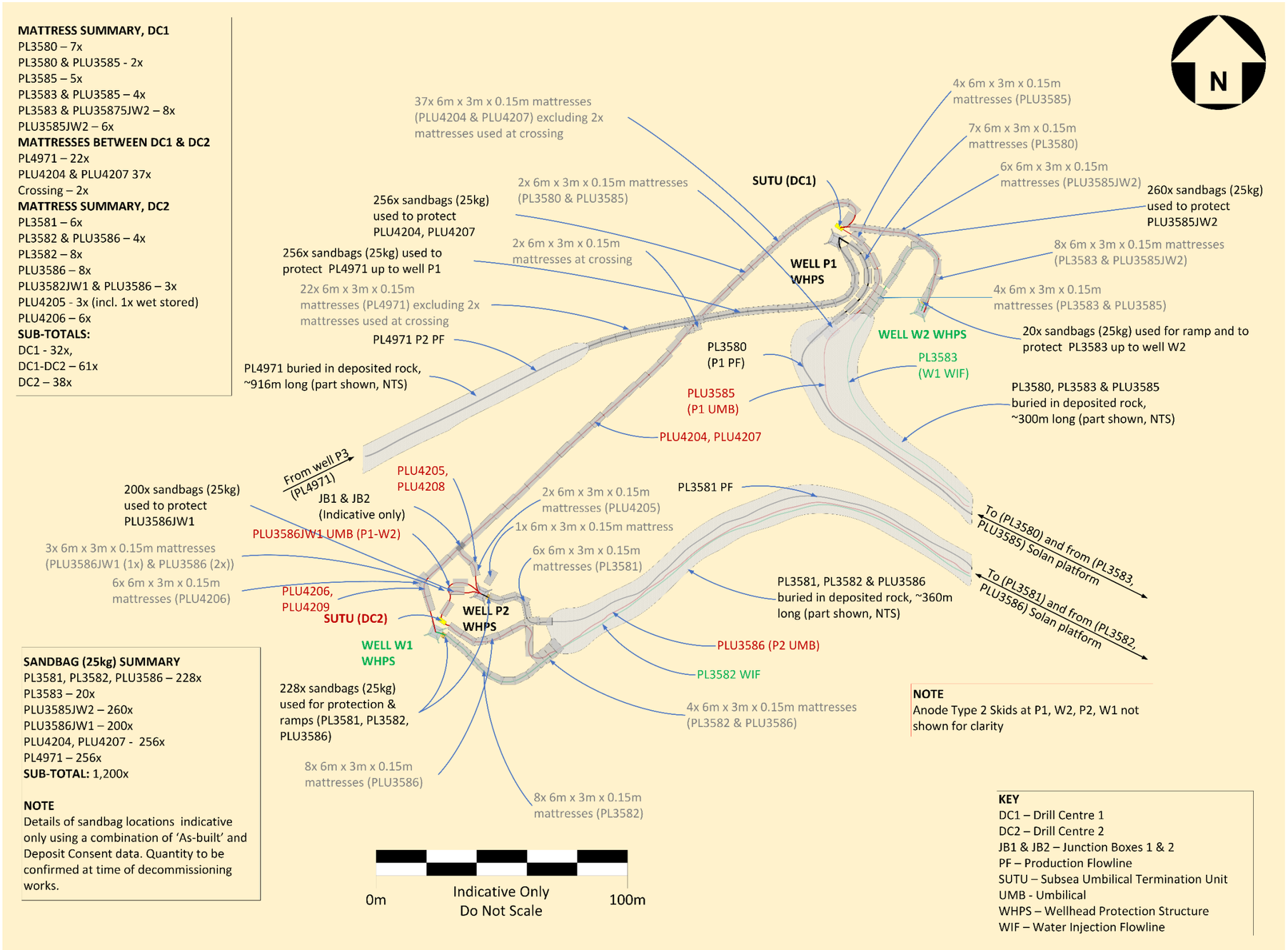

Figure 6.6.5: Infrastructure between DC1 and DC2 and on approaches

Appendix A.6 Infrastructure at well P3

MATTRESS SUMMARY
PL4971 – 7x
PLU4972 – 7x
SUB-TOTAL: 14x
SANDBAG (25 kg) SUMMARY
PL4971 – 100x
PLU4972 – 160x
SUB-TOTAL: 260x

NOTES
No definitive as-built data available. Quantity of grout bags estimated.
There is no anode skid for well P3 infrastructure

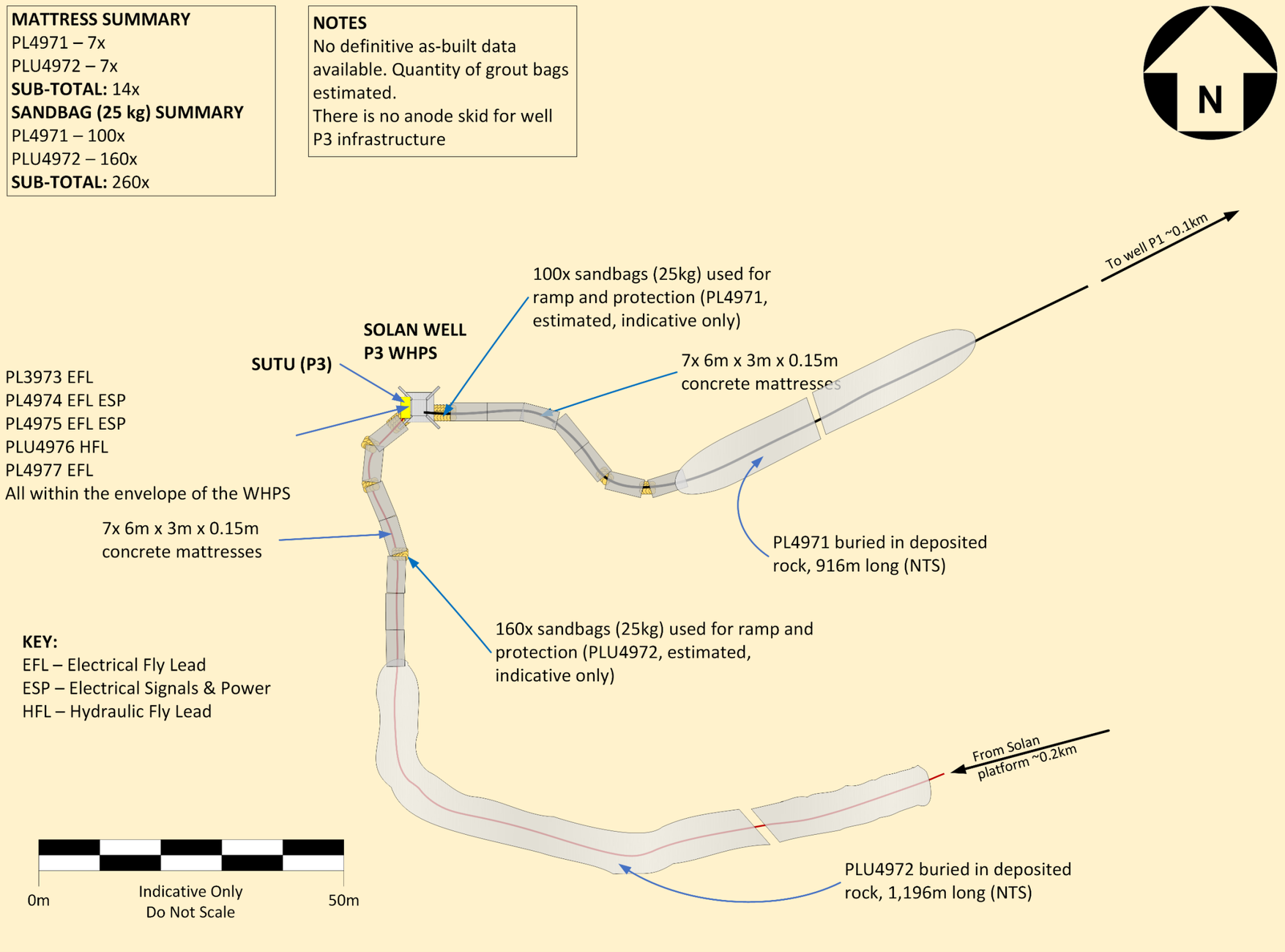

Figure 6.6.6: Infrastructure on approach to well P3

APPENDIX B PUBLIC & CONSULTEE CORRESPONDENCE

Appendix B.1 Public Notices

APPENDIX C LETTERS OF SUPPORT (TO BE ADDED POST CONSULTATION)