APPENDIX E

ANCHOR HANDLING PROCEDURE

LBA CCS PROJECT

Sealine DOUGLAS CCS – POINT OF AYR GAS PLANT
Onshore plant at Point of Ayr to Douglas CCS Platform cable connection

Anchor Handling Procedure

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Sealine DOUGLAS CCS – POINT OF AYR GAS PLANT Onshore plant at Point of Ayr to Douglas CCS Platform cable connection	Project and SoW description LBA CCS PROJECT WP2 – Laying of Submarine Composite Cables	Scale N/A	Sheet of Sheets 1 /111
Document Title Anchor Handling Procedure		Supersedes N.: Superseded by N.: Plant Area 01	Functional Unit 000

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HOLD RECORD

ANCHOR HANDLING PROCEDURE

Project Name			**Composite Cable Installation LB CCS Project**			
Project Document Reference			**0059359-BOS-ENG-PRO-5005**			
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Revision History		
Revision	**Section**	**Change**
01	All	First Issue

HOLD point register			
Nr.	**Description / Ref of HOLD point**	**Responsible Party**	**Status**
01	Finalization of crossing agreements	BSC	Open
02	Selection of anchor type following analysis results of pre-engineering survey	BSC	Open
03	Station keeping result Survival pattern Welsh Channel	BSC	Open
04	Finalization of onshore landing methodology for beach anchor deployment	BSC	Open

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LIST OF FIGURES

LIST OF TABLES

1. PROJECT INTRODUCTION

For a general overview of the project and its scope reference is made to the Project Introduction, [01]. For a general overview of all available project documentation reference is made to the Project Master Document Register, [02].

1.1 Purpose of document

The purpose of this document is to:

- Describe the methodology for anchor handling operations for the CLV during the Liverpool Bay CCS Project with the objective to inform Employer and MWS and get approval for the planned works where applicable;
- Serve as a manual to the offshore crew for the scope as described in section 1.2;
- Ensure a safe and smooth execution of the planned operations.

1.2 Scope of document

The scope of the document summarized as:

- Present indicative anchor patterns for the CLV;
- Positioning of the anchors by AHT;
- Recovering of the anchors by AHT;
- Measuring, Installation and recovery of midline buoys;
- Anchor operations in the vicinity of third-party assets;
- Positioning of anchor wires and connection to beach anchor forerunners.

The scope of work described in this document interfaces with the scopes described within the following project procedures:

- Onshore Landing Procedure – CLV [09];
- Onshore Landing Procedure – Land Side [010];
- Site Setup & Mobilization Procedure [011] ;
- Lay & Burial Procedure NDurance [012];
- Beaching Procedure Ndurance [015].

1.3 Organogram

The organogram presented in the figure below is applicable to the execution of the works presented within this document. For the overall Project Organogram reference is made to [03].

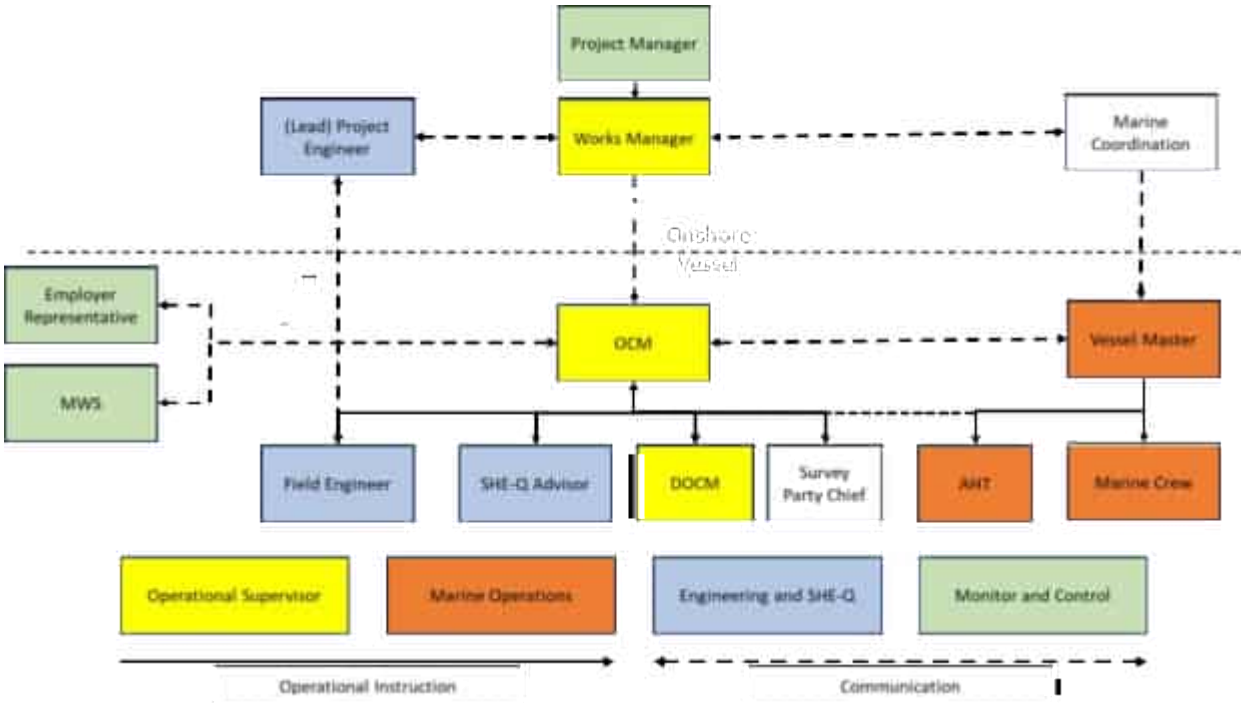


Figure 1: Operational organogram

2. ABBREVIATIONS & DEFINITIONS

2.1 Abbreviations

Table 1 – Document and project specific abbreviations

Abbreviation	Definition	Abbreviation	Definition
AMS	Anchor Management System	NM	Nautical Mile (=1,852 meter)
AHT	Anchor Handling Tug	OCM	Offshore Construction Manager
CLV	Cable Lay Vessel	PLGR	Pre-Lay Grapnel Run
CPS	Cable Protection System	PML	Project Material List
DGPS	Differential Global Positioning System	RA	Risk Assessment
DMS	Document Management System	RPL	Route Position List
DNV	Det Norske Veritas	SI	Système International d' Unités (International System of Units)
DP	Dynamic Positioning	SOLAS	Safety of Life at Sea
HAZID	Hazard Identification	TBT	Toolbox Talk
JSA	Job Safety Analysis	TMS	Tug Management System
KP	Kilometer Point	TP	Task Plan
MDR	Master Document Register	UKC	Under keel clearance
MOC	Management of Change	UXO	Unexploded Ordnance
MWS	Marine Warranty Surveyor	WOW	Way of Working

2.2 Units

The following table provides a definition of non- SI units used throughout this document.

Table 2 – SI Units

Symbol	Non-SI-Unit	Expressed in SI-Units
t	Ton	1000 kg
NM	Nautical Mile	1.852 m
kn	knots	1 NM/h
N	Newton	m·kg·s-2

2.3 Definitions

Table 3 – Definitions

Term	Definition
Employer	Liverpool Bay CCS
Contractor	Boskalis Subsea Cables B.V.
LBA CCS	Liverpool Bay Carbon Capture and Storage
Subcontractor	N/A

3. REFERENCES

3.1 BSC Project Documents

Table 4 – Boskalis Project Documents

Ref.	Document Title	BOS Document Number	External Document Number
[01]	Project Introduction	0059359-BOS-PMT-REP-1002	105627-01-D-G-RV-0102N
[02]	Master Document Register	0059359-BOS-DCC-REG-1001	10562701DGED0101N
[03]	Project Organigram	0059359-BOS-PMT-CHA-1005	10562701DGFD0105N
[04]	Project Schedule	0059359-BOS-PLA-SCH-1006	10562701DGPR0106N
[05]	As-Built Documentation Procedure	0059359-BOS-ENG-PRO-1007	105627-01-D-G-PT-0107N
[06]	Emergency Response Plan	0059359-BOS-SHE-PLA-1010	10562701DFPA0501N
[07]	Emergency Notification Chart	0059359-BOS-SHE-CHA-1011	105627-01-D-B-QV-0050N
[08]	Project Health Safety Plan	0059359-BOS-SHE-PLA-1014	10562701DFQW0503N
[09]	Onshore Landing Procedure – CLV	0059359-BOS-ENG-PRO-5103	105627-01-D-N-PK-6036N
[010]	Onshore Landing Procedure – Land Side	0059359-BOS-ENG-PRO-5807	105627-01-D-N-PK-6045N
[011]	Site Setup & Mobilization Procedure	0059359-BOS-ENG-PRO-5801	105627-01-D-N-PK-6038N
[012]	Lay & Burial Procedure NDurance	0059359-BOS-ENG-PRO-5104	105627-01-D-N-PK-6039N
[013]	PLGR Procedure	0059359-BOS-ENG-PRO-5001	105627-01-D-N-PK-6025N
[014]	Survey & Positioning Procedure NDurance	0059359-BOS-SUR-PRO-3205	105627-01-D-Y-PT-9006N
[015]	Beaching Procedure Ndurance	0059359-BOS-ENG-PRO-5108	105627-01-D-N-PK-6084N
[016]	Station Keeping Analysis NDurance – Anchor	0059359-BOS-ENG-REP-2204	105627-01-D-N-CA-6009N

3.2 WOW Documents

Table 5 – Boskalis WOW Documents

Ref.	Document Title	WOW Document Number	External Document Number
[101]	Toolbox Talk Form	BSCF-SHEQ-203-02-01-FM-01	-
[102]	MD Management of Change	BSCF-SHEQ-110-MD	-
[103]	Management of Change Form	BSCF-SHEQ-110-FM-01	-

3.3 Third Party and Employer Supplied Documents

Table 6 – Third Party and Employer Supplied Documents

Ref.	Document Title	BOS Document Number	External Document Number
[201]	Marine-Operations-and-Marine-Warranty	N/A	DNVGL-ST-N001
[202]	Cable Design Report	N/A	10245601DERV00129
[203]			

4. TECHNICAL INFORMATION

4.1 Weather

Contractor will receive weather forecasts from 2 independent sources for the duration of the operations. Forecasts are received at least every 12 hours, and are checked against the known weather limits by the OCM, Vessel Master, MWS onboard and Client Representative in order to assess whether operations should to commence, continue or be halted.

In accordance with DNVGL [201] the operation(s) described in this document are considered significant and are characterized by a moderate sensitivity with regards to environmental conditions.

Applicable operational limits based on DNVGL standard Marine-Operations-and-Marine-Warranty [201] Table 2-4, are presented within Table 7 below. The second part of the table provides applicable limits for ceasing operations. Further contingencies in case of adverse weather are described in section 6.

The weather limits in Table 7, are determined by the safe operability limits of the AHTs for the operations described. The CLV Master and AHT Master will have a final decision in operation limits during the operations. They have the responsibility to verify the limit based on planned operations, wave heading, wave period, current conditions, etc.

Table 7 – Operational limits and ceasing operations

Installation – Operational and Weather Limits										
Operation	Planned duration T_{POP}	maximum contingency time T_C	Operation reference period T_R	OP_{LIM}			α-factor	OP_{WF}		
	[hr]	[hr]	[hr]	Limit	Value	Unit	[-]	Limit	Value	Unit
Anchor handling operations	2	1	3	Hs	1.4*	[m]	0.73	Hs	1.0	[m]
				Wind	15	[m/s]	0.80	Wind	12	[m/s]
				Current	-	[m/s]	-	Current	-	[m/s]
Anchor handling operations Reduced UKC	2	1	3	Hs	1.0*	[m]	0.68	Hs	0.68	[m]
				Wind	15	[m/s]	0.80	Wind	12	[m/s]
				Current	-	[m/s]	-	Current	-	[m/s]

*Hs limits depend on wave period and resulting vessel motions.

4.2 Site Overview

An overview of the nearshore area is provided in Figure 2. The image shows the POA cable RPL from KP 0 – 15 , anchor corridors, nearby 3rd party assets and exclusion zones. In addition, it shows the West Hoyle Spit sandbank between KP 2.2 – 4 in green.

The nearshore area has large variations in seabed elevation. Over a length of 3 km the seabed changes from 0 mLAT in the shore landing area to 9 mLAT in the Welsh Channel, back up to 0 mLAT around KP 3 – 4 on the West Hoyle Spit and then steadily increases in depth to 10 mLAT around KP 15. The bathymetry is presented in Figure 3. Furthermore, the bathymetry in Figure 3 shows shallow water for anchor handling operations between KP 2.3 – KP 6.

The Welsh Channel is a shipping channel that provides access to the Port of Mostyn. It is draught restricted and access should be planned with regards to vessel's draught and tidal planning. The channel crosses the RPL between KP 1.5 – 2.0. The slopes of the channel steeply go down from 0 mLAT at KP 1.3 to 9 mLAT at KP 1.6 and up again to 1.5 mLAT at KP 2.3, Figure 3.

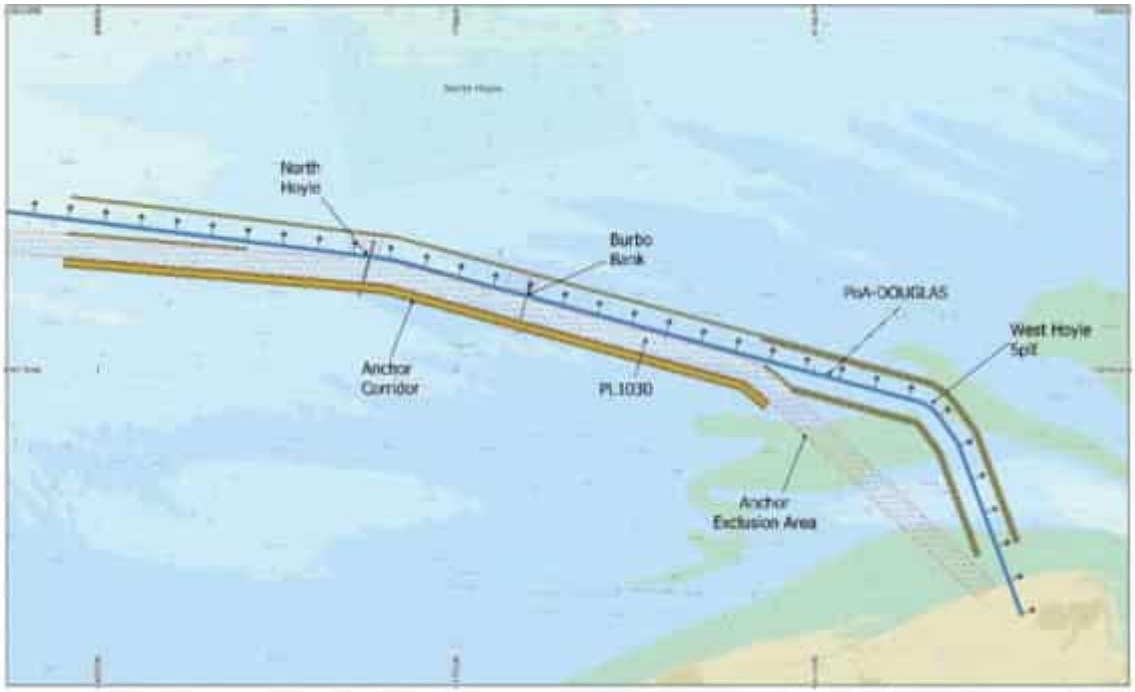


Figure 2: Nearshore site overview KP 0 - 15

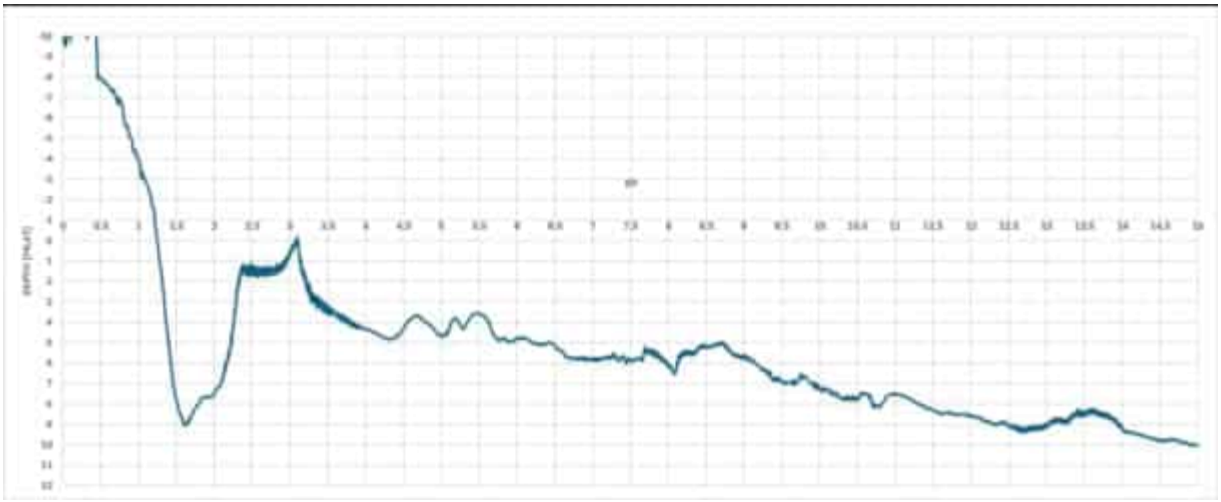


Figure 3: Nearshore bathymetry.

4.2.1 Tidal information

A local current model of the nearshore area has been prepared. The anticipated current directions are presented in Figure 4.

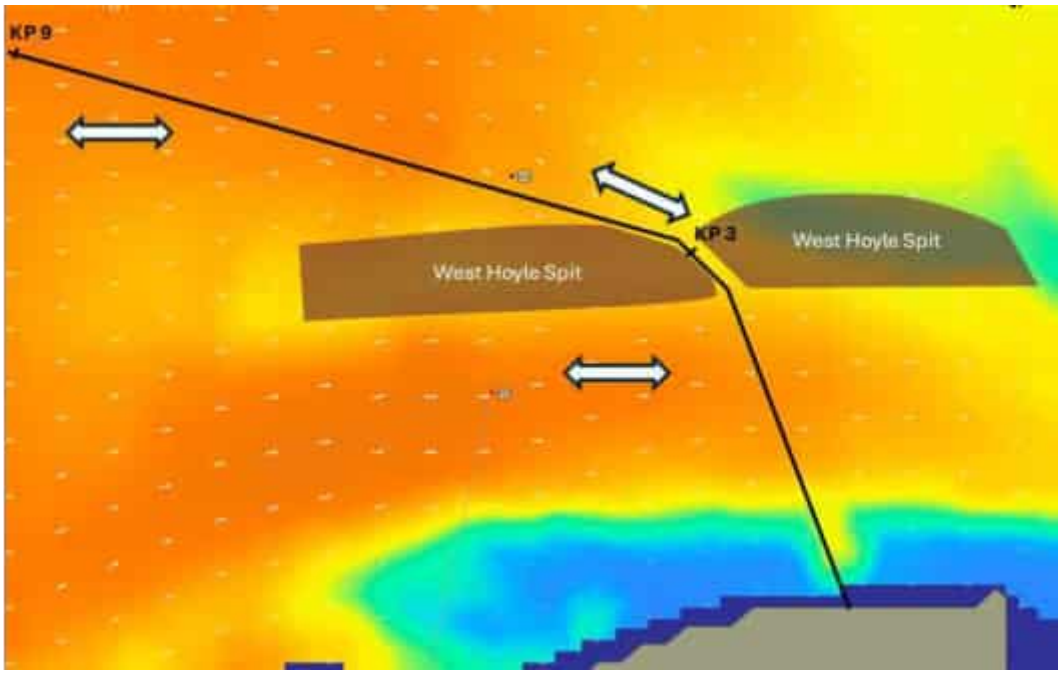


Figure 4: Current directions in nearshore area.

Astronomical tidal predictions on the nearshore area for the months July - October are given below, showing a tidal range of 0 – 8 m. Predicted heights are in meters LAT and the tide is semi-diurnal.

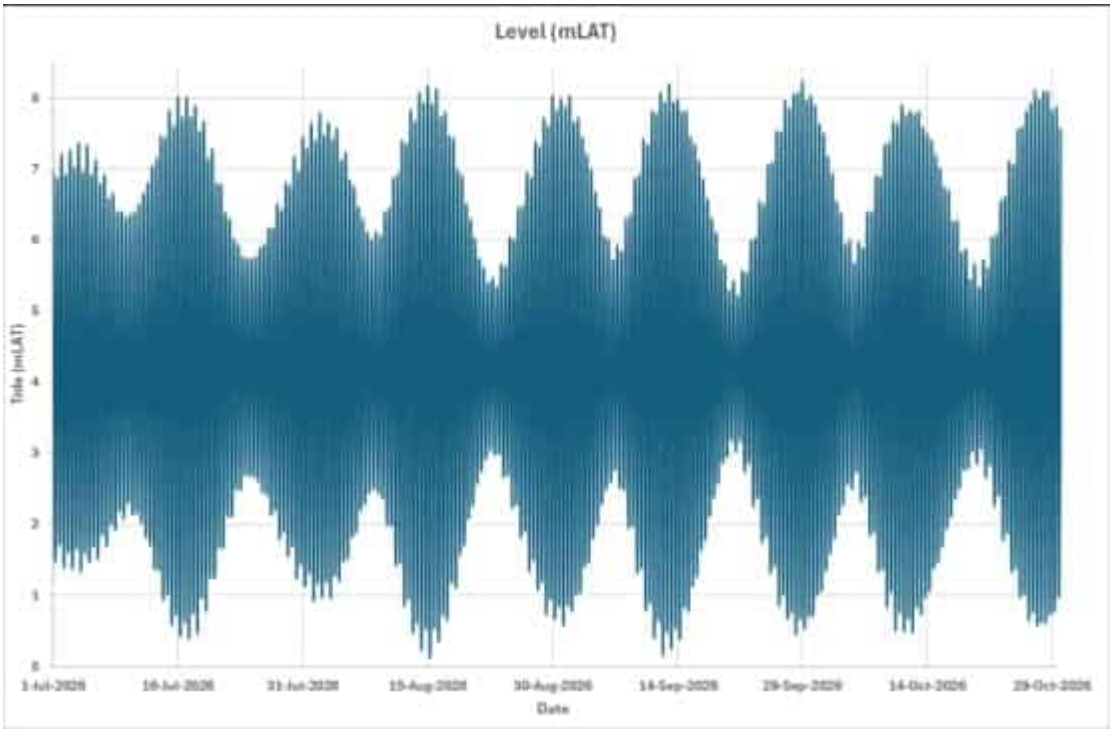


Figure 5: Tidal information nearshore area.

4.3 3rd party assets

The 3rd party assets that are to be crossed by the POA cable route and will be spanned over by the CLV's anchor wires are listed in Table 8. POAX 1 – 3 are expected to be crossed by all 7 anchor wires, an overview of the nearshore crossings is provided in Figure 6. The remaining crossings are expected to be crossed with the pull anchor wire. Minimum clearances and exclusion zones have been agreed with the asset owners in crossing agreements [HOLD01].

In addition, the following ENI pipeline runs parallel south of the cable route and will be spanned by the CLV's Port side anchor wires:

- PL1030 – start KP 5.5, offset 100 m – End KP 32, offset 100m.

The burial depth of the 3rd party assets will be assessed prior to the start of the anchor handling operations following a pre-lay survey of the cable route. Table 9 shows that in data from 2025 the pipeline is buried less <1.0m between KP 10.7 – KP 11.2. Further information on the actions taken when anchoring over this section and over the crossings is given in section 4.14.

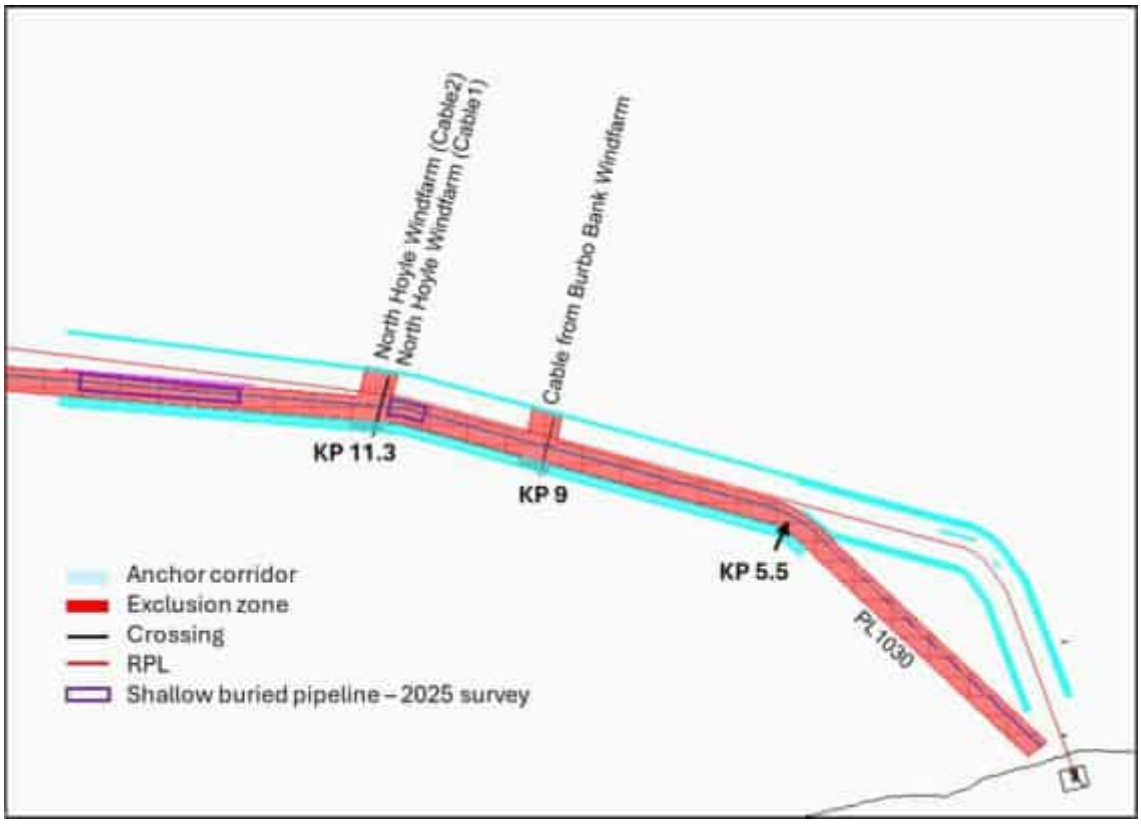


Figure 6: Schematic overview nearshore area with 3rd party assets POAX 1 – 3 and PL1030.

Table 8 – Crossing overview.

Crossing	Crossing ID	Crossing KP	Exclusion zone* [m]		Min. vertical clearance
			Pull towards	Pull away	
Burbo Bank Windfarm cable	POAX-1	9.02	300	100	[HOLD01]
North Holy Windfarm cable1	POAX-2	11.26	250	100	[HOLD01]
North Holy Windfarm cable2	POAX-3	11.28	250	100	[HOLD01]
Gwynt y Môr Wind Farm (Export Cable)	POAX-4	18.32	300	100	[HOLD01]
Gwynt y Môr Wind Farm (Export Cable)	POAX-5	18.38	300	100	[HOLD01]
Gwynt y Môr Wind Farm (Inter Array Cable)	POAX-6	25.26	300	100	[HOLD01]

Western Link HVDC Cable - Pole 1	POAX-7	31.37	300	100	[HOLD01]
Western Link HVDC Cable - Pole 2	POAX-8	31.37	300	100	[HOLD01]
2 x 3” Condensate to PoA	POAX-9	32.72	300	100	[HOLD01]
20” Gas to PoA (PL1030)	POAX-10	32.73	250	100	[HOLD01]
Pipeline PL1030 parallel	N/A	See Table 9.	250	100	See Table 9.
*Exclusion zones have been agreed with asset owner [HOLD01]					

Table 9 – PL1030 pipeline information.

3rd party asset		Value	Unit
Pipeline parallel to RPL	Start	5.5	[KP]
	End	32.7	
Coordinates pipeline parallel to RPL start	Easting	474489	-
	Northing	591473	-
Coordinates pipeline parallel to RPL end	Easting	461762	-
	Northing	5932068	-
Exclusion zone pull towards		250	[m]
Exclusion zone pull away		100	[m]
Pipeline burial depth >1.0 m*		5.5 – 10.7	[KP]
		11.2 – 13.5	
Pipeline burial depth <1.0 m*		10.7 – 11.2	[KP]
		13.5 – 15.5	
*Data from 2025 pre-survey			

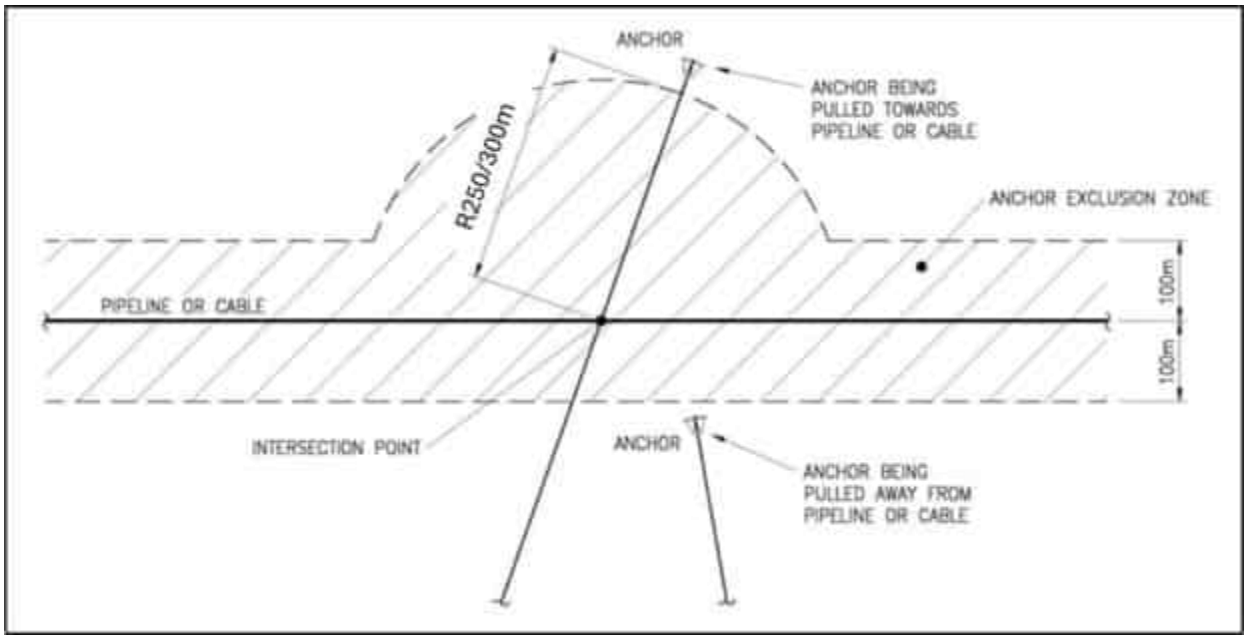


Figure 7: Exclusion distances with respect to anchoring in vicinity of 3rd party assets.

4.4 CLV NDurance

Detailed information on the CLV NDurance can be found in Appendix I, a summary is given in Table 10 below.

Figure 8: CLV NDurance.

Table 10 – Main specifications CLV Ndurance

CLV specifications		
Specification	**Value**	**UNIT**
CLV		
Name	Ndurance	[-]
Type of vessel	DP2 Cable Laying Vessel	[-]
Length x width x depth	99.0 x 30.0 x 7.0	[m x m x m]
Class	Bureau Veritas	[-]
Design draught	4.8	[m]
Cable Lay Spread on CLV		
Carrousel capacity	4,400	[t]
Carousel inner dimensions (D_{outer} x D_{inner} x H)	25.98 × 10.00 × 5.50	[m]
Carrousel rotation	loading: counter-clockwise laying: clockwise	[-]
Maximum loading speed	1,000	[m/h]
Loading tower tensioner pulling capacity	3.0	[t]
Deck tensioner pulling capacity	15	[t]
Chute radius (minimum)	5.0	[m]
Cable track radius (minimum)	5.0	[m]

4.4.1 Mooring system components

On the CLV, seven individually controlled constant tension winches are installed. All seven winches will be utilized for the operations. The specifications of the mooring system components and anchors are included in Table 11 and typical rigging drawings for the anchors are included in Appendix D and Appendix E.

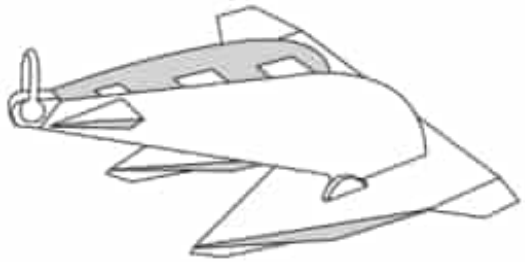


Figure 9: Example of Stevpris Anchor

Table 11 – Mooring System Components

Mooring system components				
Leg 1 - 6	Lines	Length	850	[m]
		Type	6 x 36 WS 48 mm	[mm]
		MBL	1610	[-]
		ULS Load	966	[kN]
		ALS Load	1288	[kg/m]
		Weight	9.42	[t]
		EA @ 20% load	110 000	[t]
	Winches	Pull force Constant tension	500	[-]
		Brake Holding Force	1177	[t]
	Anchors	Type	Delta Flipper 7t / Stevpris Mk5 5t [HOLD02]	[-]
		UHC sand / clay	1648 / 1236 Delta flipper 1720 Stevpris	kN
Leg 7	Anchor Wire	Length	2000	[m]
		Type	6x41 WS IWRC	[-]
		MBL	4238	[kN]
		ULS Load	2543	kN
		ALS load	3390	kN
		Weight	20.4	[kg/m]
	Winches	Brake Holding Force	200	[t]
		Pulling Force	150	[t]
	Anchors	Anchor type	Stevpris MK5	[-]
		Anchor Weight	12	[t]

4.5 AHTs

Anchor Handling Tugs (AHTs) are used for the anchor handling of the CLV. The main tug for handling of the pull anchor is the Lingestroom, or similar, see Figure 10. In addition, the Coastal Crown (Figure 11) or similar, will be assisting with shallow water anchor handling of the positioning anchors. The vessel

specification sheets are provided in the Appendix J and Appendix K. A summary of the specifications are given in Table 12 and Table 13 for the Lingestroom and Coastal Crown respectively.

Figure 10: Typical main AHT

Table 12 – Main specifications typical AHT

Description		Value	Unit
Name		Lingestroom	[-]
Type of vessel		Anchor Handling Tug	[-]
Classification		BV - I HULL • MACH / Tug, Special service- multipurpose ship / Unrestricted navigation • AUT-UMS - Notation: Anchor Handling/ Notation: Clean ship NSI - Unrestricted navigation # IMO - Inventory of Hazardous Materials (Green Passport)	[-]
Dimensions	Length	34.80	[m]
	Width	12.00	[m]
	Depth	4.30	[m]
Draft	Minimum	2.90	[m]
	Maximum	3.40	[m]
Gross tonnage		476	[t]
Bollard pull		61.8	[t]

Figure 11: Typical shallow draft AHT

Table 13 – Main specifications typical shallow draft AHT

Description		Value	Unit
Name		Coastal Crown	[-]
Type of vessel		Multicat / Anchor Handling Tug Anchor handling Tug, Special Service Multipurpose ship, Unrestricted Navigation	[-]
Classification		1 ✠ Hull ● Mach ✠ AUT-UMS Dynapos AM/AT-R DP-2 class certified	[-]
Dimensions	Length	37.00	[m]
	Width	11.84	[m]
Draft	Minimum	1.74	[m]
	Maximum	2.12	[m]
Gross tonnage		420	[t]
Bollard pull		61.8	[t]

4.6 Positioning equipment

A dedicated navigation system for the vessel is utilized throughout the project, including a full Tug Management System (TMS) for the AHT's. Anchor positionings and all the involved marine fleet are monitored via TMS. The coordinates for each specific target are given to the relevant assisting vessel via the TMS and remotely supervised via the survey screen on the CLV. The anchor buoys shall be fitted with AIS beacons to allert the anchor positions to 3rd party vessels. Details of this system are included in the Survey & Positioning Procedure NDurance [014].

Anchor patterns as in Appendix H for the CLV are produced as a guide to anchor handling operations in critical anchoring locations and shall be adjusted by the Master according to the prevailing site conditions (current directions, current speed, etc.) and other conditions. The TMS is used to ensure that anchors are deployed as close as reasonably possible to as-planned locations and in the anchor corridors.

At all times, information on position of anchors, anchor wire tension and length of wire paid out are displayed in the vessel control room. All the anchor positions and other relevant data shall be logged.

4.7 Mid-line buoys

Midline buoys are installed on anchor wires crossing existing subsea assets to maintain the required clearance between them, when applicable. See section 4.3 for an overview of the 3rd party assets.

The anchor buoy's minimum buoyancy requirement is sized according to the anchor wire diameter. A schematic overview of the rigging arrangement is provided in Figure 12, a detailed overview is given in Appendix G.

The vessel measures and marks the distance for the midline buoys with the assistance of the survey system. The AHT first spools anchor wire on its work drum (winch). Then the AHT sails to the midline buoy location and installs the midline buoy on the anchor wire. The AHT shall deploy the anchor once the midline buoy is installed.

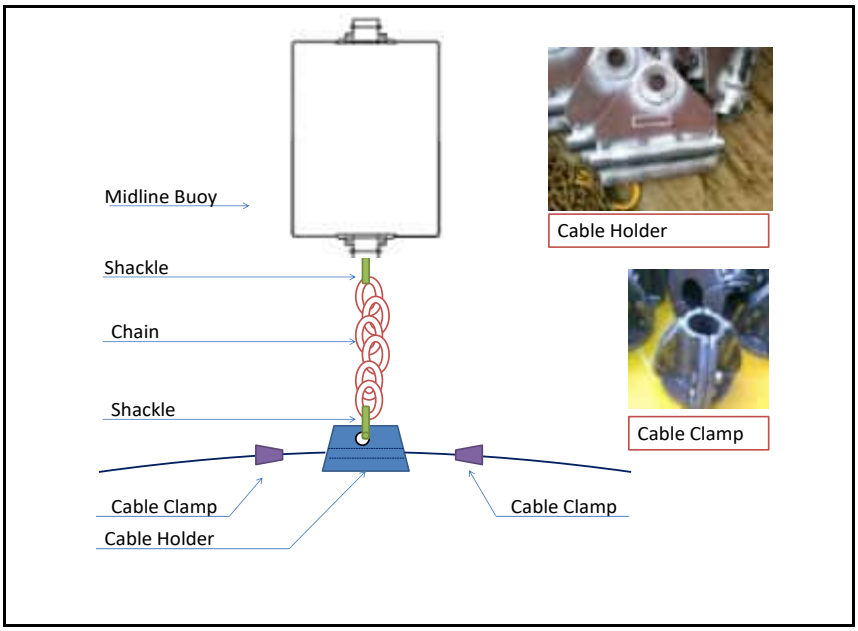


Figure 12: Midline buoy arrangement

4.8 Preparations Before Approaching the Site

The vessel and the AHTs shall be ready for the anchor handling operations when arriving on site. The following steps shall be taken before approaching the site:

- Establish communication lines with all parties involved;
- Test and run the equipment: appliances on the deck + positioning equipment;
- Prepare deck to allow for a smooth operation;
- Inform crew and ensure their availability and understanding;
- Perform and complete relevant Safety Drills;
- Hold Toolbox Talks with the involved crew;
- Approval for crossing or working in close proximity to third party assets is a pre-requisite. Note that obtaining approval/consent from third party asset owners is under Employer's responsibility

The AHT shall organize the winch drums to be cleared of all pennants other than the work wire.

4.9 Anchor patterns

Figure 13 shows 5 areas on the nearshore cable route, with corresponding anchor patterns as given in Appendix H:

- Shore landing position – Nearshore anchor pattern
- Pre-beaching position – Survival pattern Welsh Channel [HOLD03]
- Alter course – Any applicable anchor pattern
- Post-alter course – Standard pattern
- Crossing – Crossing pattern with mid-line buoys (Survival)

The anchor patterns given in Appendix H are indicative and anchor planning shall be modified on board on the day of operations considering the dynamic nature of the weather, and other local conditions on site. Anchor patterns are on the CLV master's discretion, see also section 4.13. A station keeping analysis for the relevant anchor patterns is provided in Station Keeping Analysis NDurance – Anchor [016].

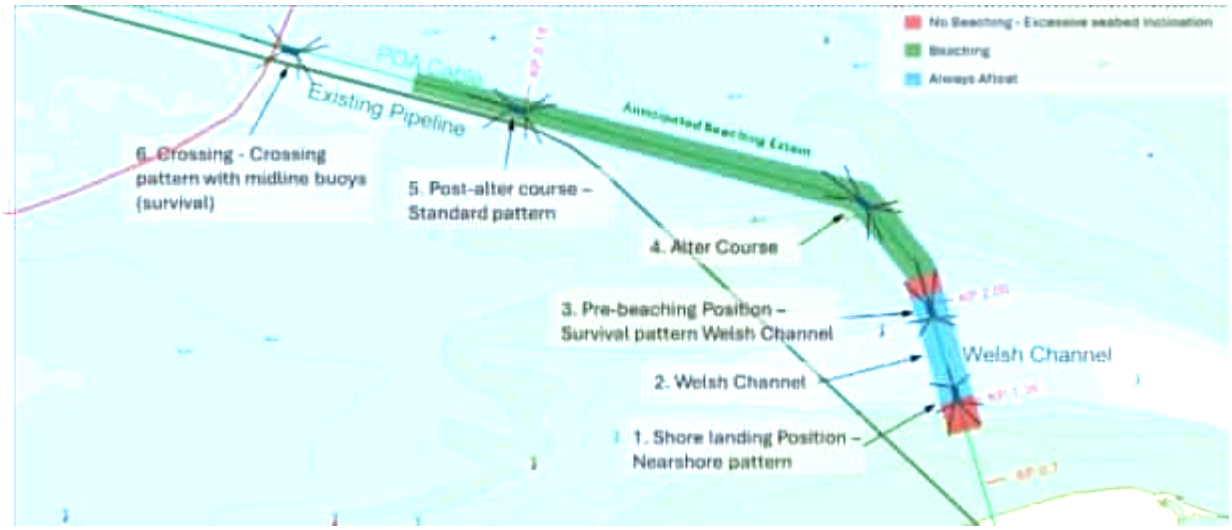


Figure 13: Anchor areas on nearshore cable route.

4.9.1 Shore landing position

At the shore landing position, the indicated Nearshore anchor pattern, Appendix H, is intended for the CLV to set up in after arriving to site. In this pattern the CLV awaits the start of the shore landing operations and performs these operations. The pattern is designed to allow for the Welsh Channel to remain partially open while the CLV is in position, see also section 4.12.

4.9.2 Welsh Channel

Over the Welsh Channel, any of the indicated anchor patterns is intended to be used, as best suited to accommodate the local environmental conditions.

4.9.3 Survival pattern Welsh Channel [HOLD03]

At the pre-beaching position, the indicated Survival pattern Welsh Channel, Appendix H, is intended for the CLV to remain in while awaiting a weather window for the beaching operations to cross the West Hoyle Spit. This pattern addresses the expected beam-on current conditions in the Welsh Channel, Figure 4. The pattern is designed to allow for the Welsh Channel to remain partially open while the CLV is in position, see also section 4.12.

4.9.4 Alter course

At the alter course over the West Hoyle Spit, any of the indicated anchor patterns is intended to be used, as best suited to accommodate the required vessel heading changes.

4.9.5 Post-alter course

After the alter course over the West Hoyle Spit, the indicated Standard anchor pattern, Appendix H, is intended for the CLV to proceed with the simultaneous lay and burial operations over the remainder of the nearshore section of the RPL.

4.9.6 Crossing / Survival pattern

At the nearshore crossing at KP9 (POAX 1) and potentially at the crossing at KP12 (POAX 2 – 3), the indicated Crossing pattern with mid-line buoys, Appendix H, is intended for the CLV to cross the subsea asset. The 3rd party assets are described in Table 8.

This anchor pattern may also serve as a survival pattern for the section of the RPL beyond the later course over the West Hoyle Spit. This pattern addresses survival conditions for bow-on currents that are expected in this section of the RPL, Figure 4.

4.10 Moving into Position

CLV will arrive in deeper waters and switch to DP2 mode. The CLV will perform DP trials. Then she will move towards the RPL to position herself in the first anchoring position at the edge of the Welsh Channel, see 4.9.1 and Appendix H for the proposed anchor pattern. The CLV will aim to setup its anchor spread to minimize hindrance to the shipping lane in the Welsh Channel. In this anchor spread the CLV will connect to 2 beach anchors [HOLD04]. After setting up on anchors, the CLV will move into position to await the onshore cable landing, reference is also made to Onshore Landing Procedure – CLV [09].

4.11 Anchor Proof Loading Test

CLV stays on DP until the completion of the anchor spread setup. Thereafter, proof loading test is to be conducted on all anchors to test and confirm the anchor holding on the seabed.

CLV applies approx. 15-20t tension for 10-15mins on each anchor during the test. Anchor movement is closely monitored via AMS – Anchor Management System. An anchor with excessive slippage shall be immediately recovered and redeployed within the designated area. Following anchor slippage, the anchor is to be repositioned and a re-test of 15-20t for 10-15 mins applies.

Operations will proceed once proof loading test is successfully completed. During operations, when an anchor is to be redeployed, it will be proof loaded again for a short duration of time under the discretion of vessel Master.

4.12 Guard vessels

While the CLV is operating in and around the Welsh Channel, the AHTs shall serve as guard vessels when they are not performing anchor handling operations. This to minimize the required safety

exclusion zone around the anchor spread and allow for 3rd party vessels to pass through the shipping channel. The exclusion zones shall remain under the CLV Master's discretion.

4.13 Anchor Handling Operations

4.13.1 Preparing anchor plan

During the planning phase of the project, the complete cable installation route shall be inspected and evaluated by the Vessel Master, Chief Surveyor, Offshore Construction Manager (OCM) and, where possible, the Anchor Handling Tug (AHT) Master. Prior to commencing operations, the anchor plan shall be discussed and studied, the following parameters shall be considered. These parameters will also be displayed on the TMS / AMS and survey screens:

- Required cable route;
- Water depth (bathymetry) in combination with tide levels;
- Seabed features;
- Anchor exclusion zones, e.g. UXO, AEZ, etc.;
- Crossing areas;
- Other nearby 3rd party assets
- Shipping lanes/vessel routes;
- Surveyed anchor corridor;
- Actual weather conditions;
- Expected soil type;
- As-built location cable.

Given the dynamic nature of the weather, and other local conditions on site, anchor planning shall be modified on board the vessel on the day of operations to suit the actual site conditions. Final approval to proceed shall be granted by the CLV Master. The anchors shall be set out in such a way that minimal anchor movement is required.

Prior to the operations Employer shall notify Third-Party Asset Owner(s) and the Port of Mostyn authorities for anchor handling operations in the notification area.

4.13.2 Operations

Throughout anchor handling operations, the crews on CLV and on AHT's will make visual checks on the anchor handling equipment, whenever possible. All damages or malfunctioning shall be directly reported to AHT/CLV Master and the OCM shall proceed accordingly as far as practicable possible to repair and/or replace and warrant for the functionality.

The anchors shall be made visible by fitted lights to the buoy(s) so that the anchors are also visible during hours of darkness.

Before permission is given to lower the anchor, the position of the AHT's shall be checked by Surveyor, as per task plans in the appendix. After receiving confirmation from the CLV, an anchor can be deployed.

The anchor is lowered with tension on the seabed, keeping the pennant wire under an angle. Adequate pennant wire is to be deployed without creating buoyance to the anchor. Once the pennant buoy departs from the AHT, the buoy shall show the "as installed" position of each anchor. Anchor deployment locations are included in the TMS / AMS as well as on the survey screens of the vessel and the AHTs. Contractor, if required, shall inform intended and as laid anchor positions to traffic/ marine coordinator.

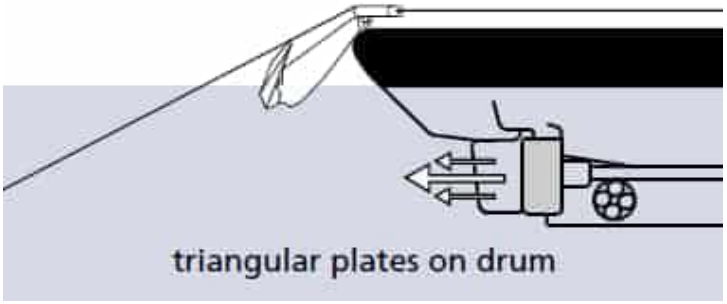


Figure 14: Anchor lowering from AHT

After the anchor has been deployed a proof loading test shall be done as per section 4.11. An anchor slip alarm is in place that continuously monitors anchor positions, line tensions and line lengths, with a threshold set to 50 m.

Generally anchor handlers will deploy the anchors with in an accuracy of approx. 25m from provided anchor deployment coordinate. When anchoring near nearshore 3rd party assets, POAX 1 – 3 and PL1030 in Table 8, the accuracy range of the TMS / AMS system is scaled down to provide 10m accuracy during anchor placement. This will be visual on the AHT's TMS / AMS system.

4.14 Anchoring over 3rd party assets

Anchor handling near and over the third-party assets described in Table 8 shall be kept to a practical minimum. Prior to commencing of operations, the Employer and Third-Party Asset Owner(s) shall be notified as per section 4.13. For every asset that is crossed with an anchor wire a method statement has been shared with the 3rd party asset owner.

When anchoring over the crossings and shallow buried areas of the PL1030 pipeline, special attention is paid to the operations and the following precautions are taken:

- Mid-line buoys are to be applied to obtain sufficient vertical clearance between anchor wire and asset, section 4.7;
- TMS / AMS system is set to 10 m accuracy for anchor deployment, section 4.13;
- Anchors to be recovered to the AHT decks when traversing over subsurface assets;

- Management of anchor wire tension to minimize anchor wires dragging along the seabed;
- Exclusion zones to be included in the TMS, section 4.13;
- Coordinates for each specific target given by TMS and supervised by CLV section 4.13;
- Continuous monitoring of anchor slip alarm, section 4.13;
- Recovery and deployment of anchors via pennant wires and buoys, section 4.13.

5. OPERATIONS

Description of planned operations
TP/01 Preparations
The main activities include: • Communication checks • Readiness checks • Familiarization meetings • Review of functionality of tools, equipment and all relevant systems • Review of required as-built data to be recorded • Assessment on weather and environmental conditions • Review of anchor plans and adjust whenever necessary • Review of sensitive areas • Notification from Employer after Employer has obtained the approval to commence works in proximity to third party assets
TP/02 Setup and deployment of anchors
The main activities include: • Preparation and transfer of anchor deployment materials from vessel to AHT wherever applicable • Deployment of anchors • Anchor holding checks and recovery and redeployment if necessary
TP/03 Recovery and relocation of anchors
The main activities include: • Recovery of anchor recovery rigging • Anchor breakout • Recovery of anchors • Relocation and redeployment of anchors
TP/04 Recovery of anchors after completion of operations
The main activities include: • Recovery of anchors and anchor wires • Transfer of anchors and anchor wires from AHT to vessel wherever applicable
TP/05 Midline buoy and anchor deployment
The main activities include: • Spooling of anchor wire onto AHT winch • Installation of midline buoy onto anchor wire • Deployment of midline buoy • Deployment of anchor
TP/06 Midline buoy and anchor recovery
The main activities include: • Recovery of anchor

- Recovery of midline buoy
- Dismantling of midline buoy off anchor wire

TP/07 Connect/disconnect to pre-Installed beach anchors

The main activities include:

- Transfer of anchor wire from vessel to AHT
- Recovery of beach anchor forerunner
- Connection of forerunner and anchor wire
- Deployment of the connection

For details about beach anchors, reference can be made to Appendix H.

TP/08 Transition from anchor spread to DP system during simultaneous lay and burial

The main activities include:

- Transition from anchor spread to DP
- Continuation of lay and burial operation

6. CONTINGENCY OPERATIONS

In addition to the chapter above, which is providing a summary of all planned operations, this chapter contains a summary of several contingency operations including reference to task plans and storyboards, which may be applied in response to prepared deviations from the base plan.

For any unexpected or undesired event which is not listed in the table below, the onshore project team must be consulted and possible solutions to be identified. Depending on the magnitude of the unexpected or undesired event the available BSCF WOW Management of Change process can be made use of ref. [102] and [103].

All contingencies discussed below are being listed in the document specific risk register Appendix A.

Table 14 – Contingency operations

Description of event and anticipated response
1. Loss of station keeping
In the unlikely case that the CLV loses positioning on anchors or that the weather / events give the Master concer that the vessels station keeping capabilities may be jeopardized, the following actions can be taken: • Engage vessel's thrusters and main propulsion system, if water depth allows. • Adjust anchor positions into 'survival position'. • Spool cable and plough umbilical and tow wire onto sea bed, weather vane and set anchors into 'survival position'. This may result in anchor being placed outside of ALARP areas. • Request assistance from AHT to position itself against the CLV to assist the CLV to maintain positioning.
2. Anchor Dragging
Anchors shall be continuously monitored for dragging. If the tension drops unexpectedly it is possible that the anchor is or could start dragging over the seabed. Operations shall be halted immediately, and the anchor position shall be checked. Further taking up anchor wire may not regain tension. In this case operations may cease and an AHT shall be instructed to recover and re-deploy the dragging anchor. If appropriate a new anchor deployment location shall be assigned.
3. Loss of Anchor Buoy
In the event of an anchor buoy detached from the anchor, the buoy shall be recovered as soon as possible. After the recovery of the buoy, the AHT shall recover the anchor with the assistance of a chaser and install a new pennant wire and buoy to the anchor. An assessment as to why the buoy was lost will be done and the anchor shall be redeployed back to its predetermined position.

4. Loss of Midline Buoy

In the event of a midline buoy detached from the anchor wire, the buoy shall be recovered as soon as possible. Operations shall be halted if the corresponding anchor wire goes over a 3rd party asset as per Table 8. After recovering the buoy, the AHT shall check the rigging and re-install the buoy.

5. Anchor Wire Breakage

In the event of a broken anchor wire, the AHT shall recover the anchor as soon as possible. Depending on the location of the breakage, the existing wire shall be either reconnected to the anchor or a spare wire shall be installed after the evaluation why the breakage occurred.

The parted anchor wire will be paid in along the seabed to vessel if there are no other living subsea assets on the route. Otherwise, near the vessel the AHT connects a wire runner onto the parted anchor wire and runs it along the wire. When over a live subsea asset, the AHT recovers and spools the anchor wire onto the AHT deck winch so that the wire will not be dragged over the subsea asset. Then the AHT returns the anchor wire to the vessel.

6. Loss of Anchor

In an unlikely event where both the anchor wire and pennant wire are broken, the AHT shall recover the buoy to deck first and log the location of the lost anchor.

Depending on the location of the breakage, either:

(1) The remaining anchor wire shall be refitted onto a spare anchor

or

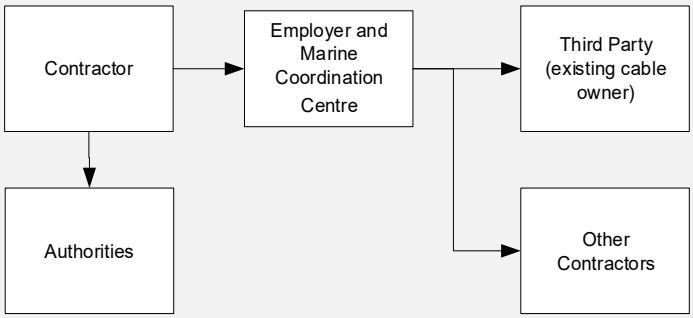
(2) A spare wire shall be installed on to the winch and a spare anchor attached to the new wire.

After the completion of the cable installation an AHT (or suitable vessel) may attempt to recover the anchor and parted anchor wire left on seabed by any method available. If successful, the anchor wire shall be spooled onto the AHT deck winch and the anchor shall be recovered onto AHT deck. The recovered items can then be returned to the vessel.

If the recovery of the anchor is deemed to be too time-consuming for the operation, the anchor position shall be recorded, and the local authorities and Employer/Contractor shall be informed accordingly with an Initial Incident Notification about the situation and the anchor position.

Contractor shall submit a PON2 form to Marine Coordination Centre immediately using a PON2 form. The MCC shall then inform the relevant authorities within 6 hours. Follow-up actions shall be agreed among all involved parties (Authorities, Employer and Contractor). The Employer shall inform any other concerned Third Party of the loss of an anchor in the vicinity of any existing assets, and also other associated works contractors if required. The anchor is to be recovered at a later stage. A replacement anchor shall be ordered immediately.

Notification and information flowchart in case of loss of anchor:



7. Dug-in Anchor

A dug-in anchor shall only be recovered via the pennant wire. When an anchor seems to be stuck the AHT shall make several attempts to recover it. If all attempts fail, AHT and vessel shall decide to cut the anchor wire and leave the anchor in the seabed. The wire will be cut in a natural state with guillotine cutter or similar, the position of the anchor shall be logged, and the local authorities shall be informed about the position. At a convenient time, the anchor shall be recovered.

8. Trapped-in Anchor Wire

In the case an anchor wire is trapped or stuck to an obstacle on the seabed, e.g. a wreck or boulder, the AHT shall try to clear the anchor wire. This shall be accomplished by lifting the anchor and moving it around the obstacle whilst the vessel hauls in on the anchor wire. When moved around the obstacle, the wire shall be tensioned to check if the wire has come loose.

If the AHT's attempts fail, the anchor shall be removed from the anchor wire. The anchor wire shall then be connected to and guided by the AHT whilst hauled in by the vessel in order to run it through the obstacle. The anchor wire shall be hauled in as far as practicably possible and then cut if necessary. The position of the anchor wire left on seabed shall be logged and the vessel shall fit a new socket to the wire. If the remaining length of the anchor wire limits the planned operations, the anchor wire shall be replaced.

9. Mooring Pattern Compromised

In a highly rare case, the mooring pattern is compromised by e.g. a passing vessel, all operations shall be stopped. The compromised anchor wire shall be slackened to prevent any risks. The vessel Master shall command the compromising vessel to move out of the anchor spread zone and shall write an incident report of the event.

10. Mooring Winch Breakdown

In the event of a breakdown of a mooring winch, the remaining anchors are sufficient for safe anchorage of the vessel. The vessel shall assess the incident and attempt to repair. In the situation where the winch cannot be repaired, the anchor wire shall be cut on board and the associated anchor shall either be recovered and disconnected from the anchor wire or be left on the seabed connected to the anchor wire and recovered later. Measures taken due to a non-repairable winch are dependent on OCM's discretion.

11. Presence of Hidden Seabed Obstructions

During the placement of anchors, it might happen that an anchor is deployed on top of a hidden obstruction, e.g. a boulder located just below the seabed. This might hinder the anchor's holding on seabed. The anchor might also be caught behind the obstruction during recovery.

To prevent deploying an anchor on an obstruction the alignment sheets are to be used to give the AHT clear indications (on the survey screen and/or in the anchor planning) on where anchors can, and more importantly, cannot be deployed.

In a rare event where an anchor is still deployed on an obstruction, the vessel can decide to replace the anchor if the placement compromises the anchor pattern. If one of the anchors is caught behind an obstruction, the AHT shall first try to recover the anchor in the standard manner, i.e. via the pennant wire.

If an anchor cannot be recovered due to interference with an obstruction, the method as described in 6 Dug-in Anchor and 8. Trapped-in Anchor Wire shall be performed. To prevent interference with obstructions it is important that Survey has the latest updates on the alignment charts/Navigation screen and that there are clear agreements among vessel, Survey and AHT regarding where to place anchors and where not.

Appendices

Appendix A - Risk Assessment

Appendix B - Task Plans

Number	Title
Appendix B1	TP/01 Preparations
Appendix B2	TP/02 Setup and deployment of anchors
Appendix B3	TP/03 Recovery and relocation of anchors
Appendix B4	TP/04 Recovery of anchors after completion of operations
Appendix B5	TP/05 Midline buoy and anchor deployment
Appendix B6	TP/06 Midline buoy and anchor recovery
Appendix B7	TP/07 Connect/disconnect to pre-Installed beach anchors
Appendix B8	TP/08 Transition from anchor spread to DP system during simultaneous lay and burial

Appendix C - Storyboards

Number	Title
Appendix C1	Setup and deployment of anchors
Appendix C2	Recovery and relocation of Anchors
Appendix C3	Recovery of anchors after completion of operations
Appendix C4	Midline buoy and anchor deployment
Appendix C5	Midline buoy and anchor recovery
Appendix C6	Connect to pre-installed beach anchors

Others

Number	Title
Appendix D	Overview anchor buoy connection Stevpris anchor (plough 7th anchor)
Appendix E	Overview Anchor Buoy Connection Deltaflipper Anchor (mooring 1,2,3,4,5 & 6 anchors)
Appendix F	Rigging Beach anchor and recovery
Appendix G	Rigging midline buoy arrangement
Appendix H	Indicative anchor patterns –
Appendix I	Specification sheet CLV Ndurance
Appendix J	Specification sheet typical AHT
Appendix K	Specification sheet typical AHT

Appendix A Risk Assessment

BSC Risk Management with Starting Conditions
The BSC risk assessment process includes below "starting conditions". When quantifying a risk, the assessment should take these conditions into account. Additional safeguards may be identified in addition to these starting condition if the initial risk is believed to be too high, or believed possible to be reduced.
BSC Starting Conditions
1. WOW processes implemented, including but not limited to: ☐ Safe Working Practices understood and implemented ☐ Training and certification of personnel; competent personnel ☐ Audits and inspections of equipment / work places / companies ☐ Emergency response procedures in place, including drills, plans, etc. ☐ Emergency response equipment in place, including first aid, SOPEP, fire fighting, evacuation, etc. ☐ Service, test, calibration and maintenance of equipment ☐ Hazardous substances identified, MSDS available and personnel trained ☐ Rigging and PPE recertified as applicable; certificates accessible ☐ Applicable contractual and legal requirements understood and implemented ☐ Existing underground facilities, nature reserves or other field no-go areas identified
2. ☐ All actions and precautions as identified in project method statements are implemented
3. Operational precautions in place ☐ Vessels and equipment fit for purpose ☐ Tug management system available and installed on all applicable vessels ☐ Sufficient light, safe walk ways and escape routes available, work area clear of unnecessary obstacles ☐ License conditions and permit conditions from authorities adhered to; relevant authorities informed ☐ Relevant navigational day marks and lights shown ☐ Latest survey data available and updated on all applicable locations ☐ Interfaces with other contractors identified and agreed ☐ SIMOPS on site / with other contractors identified and agreed ☐ Organisation chart, roles and responsibilities communicated and understood ☐ Approval from MWS and Marine Coordinator received ☐ Project site induction, daily briefings, regular meetings implemented ☐ Operational communication lines agreed and functional, spare batteries available ☐ All communication in English ☐ No-go areas on board identified and understood for specific operations ☐ Site security set up as applicable (both on board and at local site) ☐ Weather forecasts monitored, sufficient favourable weather window available ☐ PPE available and correctly used ☐ Lift plans prepared and available ☐ Use of JSA, PTW, LMRA, TBT

Boskalis

Risk Assessment process	Anchor Handling Procedure	Project Document number	
Risk Assessment number		Rev.	
Project number	59539	Client Reference	
Project name	Liverpool Bay CCS Project	Client Rev.	

(R)S = (Residual) Severity
(R)P = (Residual) Probability
(R)R = (Residual) Risk

Hazard Description					Initial Risk				Residual Risk				Accountability		
ID	Activity	Hazard	Consequences	Existing Safe Guards (in addition to starting conditions)	S	P	R	Additional Safe Guards	RS	RP	RR	Target date	Responsible Party or Person	BSC Responsible contact	Completion Status (%)
1.0 General risks															
1.1	3rd party vessels in vicinity	- Collision - Undersired vessel movements - Encroachment by another vessel - 3rd party vessel sailing over anchor line	- Personnel injury - Delay - Damage to asset - Damage to equipment	- Inform relevant authorities and stakeholders (Coastgaurd, Notice to Mariners, local marinas if applicable) - Warn by radio when approaching anchor spread - Bridge/ deck crew continual monitoring of 3rd party vessel(s) - Monitoring of Port Authority and 3rd party radio chatter - Monitoring of onboard AIS systems - Anchors to be marked with buoy	3	1	3								
1.2	Liting operations	- Lifting with limited space available - Dropped objects	- Personnel injury - Damage to equipment - Damage to vessel	- Lift plan to be in place for non-routine lifts - Dropped object sweep to be performed before lifting	3	1	3								
1.3	SIMOPS	- Unclear communication between vessels - Proximity between vessels - Loss of communication	- Personnel injury - Damage to equipment - Delay - Damage to vessel	- Communications check prior to start of operations - Clear 'ALL STOP' command known to all personnel - Operate within weather limits	3	1	3								
2.0 Anchor handling operations															
2.1	Vessel positioning	- Hazard to other shipping - Enchroachment of other vessels - Loss of positioning	- Delay - Civil loss - Damage to equipment - Damage to asset	- Planned anchor patterns for operations to be used as a guide depending on prevailing weather conditions - Information on position of anchors, line tensions and anchor line TDP to be available on bridge - Vessel movements to be timed to limit impact on other vessels - Notice to mariners to be issued - Vessel thruster available for back-up positioning (DP2)	2	1	2								
2.2	Connection of tugger hook / pennant wire	- Manual handling rigging - Pinch points - Wires under tensions - Personnel near unprotected water edge	- Personal injury - Struck by wire - Delay - Damage to equipment	- Personnel to be aware of cable / rope bights on deck - Good hand safety practices - Life jackets with PLB to be worn when working close to unprotected water edge - Mechanical aids to be used as much as possible - Use of towing pin to secure pennant wire	2	1	2								
2.3	Storage of anchor on deck of AHT	- Unexpected movement of anchor on deck	- Damage to equipment - Damage to vessel - Personal injury - Loss of anchor - Delay	- Anchors to be completely recovered and secured on deck when necessary - Authorities to be informed in case of loss of anchor (PON2 report completed) - Maintain suitable walkway	2	1	2								
2.4	Lifting anchor to CLV	- Dropped object - Uncontrolled vessel movement during lift	- Damage to vessel - Damage to equipment - Loss of anchor - Personal injury	- AHT to be moored alongside CLV - Authorities to be informed in case of dropped anchor to sea bed (PON2 report completed)	3	1	3								
2.5	Anchor deployment	- Lines under tension - Release of stored energy - Equipment failure - Personnel near unprotected water edge - Anchor placed on UXO	- Damage to equipment - Delay - Personal injury - Damage to equipment - MOB	- Safety zones on deck to be identified and highlighted - Personnel working near unprotected water edge to wear life vest with PLB - Vessel MOB procedure in place - UXO ALARP certificate	3	1	3								
2.6	Spooling anchor line	- Rotating machinery - Lines under tension	- Personal injury - Damage - Delay	- Rotating machinery to be guarded as required and guards checked - Remotely operated winches - Personnel placement to be optimised to avoid working next to rotating machinery - Safety zones on deck to be identified and highlighted	3	1	3								

Hazard Description					Initial Risk				Residual Risk				Accountability		
ID	Activity	Hazard	Consequences	Existing Safe Guards (in addition to starting conditions)	S	P	R	Additional Safe Guards	RS	RP	RR	Target date	Responsible Party or Person	BSC Responsible contact	Completion Status (%)
2.7	Anchor positioning	- Incorrect anchor placement - Site exclusion zones - Dynamic weather impact - Wires under tension	- Damage to existing assets - Delay - Weakening of mooring position - Damage to vessel - Damage to equipment	- Planned anchor pattern as guide for operations - Anchoring locations to be verified with authorities - Anchor placement sequence to be confirmed and communicated to all involved parties and personnel - Final position anchor to be confirmed to survey after placement - Maintain communication between bridge and deck crew - Constantly monitor anchor wire tensions	2	1	2								
2.9	Anchor handling in shallow water	- Grounding of AHT due to insufficient water depth	- Damage to AHT - Delay	- Tidal data to be monitored - Use of tug with shallow draft - Minimum for under keel clearance to be agreed before operations	3	1	3								
2.10	Anchoring near 3rd party assets	- Anchor placed on 3rd party asset	- Damage to 3rd party asset	- Reduce TMS/AMS accuracy to 10 m - Anchors to be recovered to the AHT decks when traversing subsurface assets; - Management of anchor wire tension to minimize anchor wires dragging along the seabed; - Proof loading test on each anchor placement; - Dedicated navigation system, including full Tug Management System (TMS) for AHT and all involved marine fleet; - All exclusion zones to be included in the TMS; - Coordinates for each specific target given by TMS and supervised by CLV; - Continuous monitoring of anchor position, line tension and line length, including anchor slip alarm (threshold max 50m); - Recovery and deployment of anchors via pennant wires and buoys.	3	1	3								
3.0 Mid-line buoy deployment / Recovery															
3.1	Connecting / Disconnecting mid-line buoys	-Wire under tension - Manual handling - Pinch points - Entrapment	-Personal injury - Damage to equipment - Delay	- Mechanical aids to be used as much as possible - Good hand safety practices - Snapback zones to be identified on deck - No unauthorized personnel in work area	2	1	2								
4.0 Recovery of anchor															
4.1	Vessel positioning	- Hazard to other shipping - Enchroachment of other vessels - Loss of positioning	- Delay - Civil loss - Damage to equipment - Damage to asset	- Planned anchor patterns for operations to be used as a guide depending on prevailing weather conditions - Information on position of anchors, line tensions and anchor line TDP to be available on bridge - Vessel movements to be timed to limit impact on other vessels - Vessel thruster available for back-up positioning (DP2)	3	1	3								
4.2	Recovery of anchor	- Lines under tension - Equipment failure - Under water current	- Lines under tension - Delay - Injury to personnel	- Safety zones on deck to be identified and highlighted - No unauthorized personnel in working area - Remotely operated winches - Equipment inspection before start of operations - Use of lift plans for non-routine lifts	3	1	3								
5.0 Contingeny anchor getting stuck															
5.1	Recovery of stuck anchor	- Failure pennant wire - Failure messenger wire - Lines under tensions - Under water current	- Lines under tension - Delay - Injury to personnel - Damage to asset - Loss of anchor	- Sufficiently long pennant wire to be used - AHT to ensure straight pull to pennant wire - Sufficient strength messenger wire to be used - Safety zones on deck to be identified and highlighted - No unauthorized personnel in working area - Remotely operated winches - Equipment inspection before start of operations - Use of lift plans for non-routine lifts	3	1	3								

Appendix B Task Plans

Task Plan Symbol Specification

Symbol	Description
	The Safety Flash symbol denotes an activity with increased risk, e.g. working at height, electrocution, etc.
	A Toolbox Talk is required at the start or during certain activities. These are to be repeated at each shift handover.
	A mandatory verification point, beyond which an activity may not proceed without approval by a designated party/authority. As agreed per applicable ITP or otherwise.
	A witness point, meaning all parties as agreed per applicable ITP to be invited to witness or sign off before proceeding.
	Information statements are given to avoid doubt in certain instances and for clarity.
	A task which is required to be performed due to a project specific contract requirement and therefore may deviate from BSCF standards/way of working.
	This item indicates when a lift plan is required to support the execution of a specific task step.

Appendix B1 TP/01 Preparations

TP/01 Preparations

Item	Task Description	Responsible
1. 	Hold TBT with relevant personnel. All parties involved in the operation to be briefed. Command and control structure to be agreed. TBT to be held at the commencement of each shift to review and update safety and operational requirements.	All parties
2.	Ensure that all as-built requirements are known and clear and required data shall be recorded.	Field Engineer
3.	Ensure that all necessary survey data related to anchor handling operation is available. Including: - Anchor exclusion zones - Anchor corridors - Beaching corridor - RPL	Master/Survey
4.	Check and review anchor wire ringing and associated equipment.	CLV Master
5.	A meeting will be held to ensure the logistical plan of how to collect all rigging equipment is understood by AHT teams. Likewise, any anchors, wires or buoys to be transported on the AHTs will be agreed, loaded and sea fastened whilst in port.	Masters/AHT
6. 	Prior of any operations, perform: • Full communications check among all relevant parties prior to commencement of the operations. At this stage the key personnel shall explain the communication chain during the operations.	All parties
7. 	Prior to the arrival of vessel on site, review: • Anchor plans based on the latest charts and RPL • Weather conditions based on the latest weather forecasts, including tide. • Functionality of the TMS, AMS and all the relevant systems • Sensitive areas, e.g. crossings, etc.	Masters/Survey
8.	Prior to starting anchoring operations: • Receive confirmation from Employer that stakeholders (e.g. Port of Mostyn, fisheries, etc.) are informed of operations	Field Engineer
9.	Prior to anchoring over 3rd party assets • Receive notification from Employer after Employer has obtained the approval to commence works in proximity of assets	Field Engineer
END OF TP/01		

Appendix B2 TP/02 Setup and deployment of anchors

TP/02 Setup and deployment of anchors

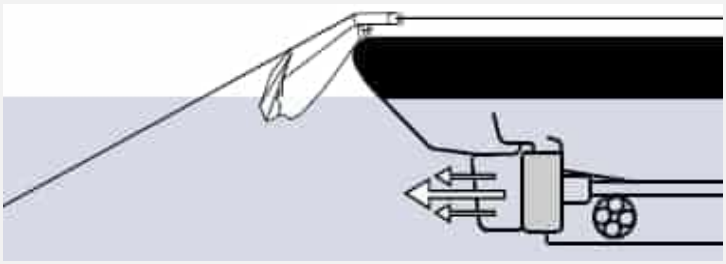
Item	Task Description	Responsible
1. 	Hold TBT with relevant personnel. All parties involved in the operation to be briefed. Command and control structure to be agreed. TBT to be held at the commencement of each shift to review and update safety and operational requirements. Record TBT on Toolbox Talk Form [101]	All parties
2.	Ensure that all as-built requirements are known and clear and required data shall be recorded.	Field Engineer
3. 	Perform full communications check between all relevant parties prior to commencement of the operations. Perform full operation readiness check of required equipment and materials.	All parties
4.	Retract front thruster at Master's discretion while CLV is approaching the position for anchor deployment. NOTE: Station keeping will be switched from DP to anchor spread at approximately KP1.6, while location for the front thruster retraction is independent from the route.	Vessel
5.	Depending on where the anchoring materials are stored, either AHT to prepare the anchor, pennant wire and buoy for deployment, or vessel to do so and pass them to AHT. *Rigging drawing in Appendix D for pull anchor or Appendix E for station keeping anchors*	Vessel/AHT
6.	AHT to connect and spool the pennant wire onto the AHT winch. The other end of the pennant wire to be connected to the anchor, as indicated in Appendix C1	AHT
7. 	Vessel to pass anchor wire to AHT via messenger wire and AHT to connect the anchor wire to the anchor. Depending on the anchor deployment location, the AHT may first spool certain amount of the wire onto its drum before moving out.	Vessel/AHT
8.	AHT to move to the anchor deployment position marked by survey on the TMS while vessel to continuously pay out anchor wire and keep it slack. During anchor positioning by AHT, vessel to visually monitor vessel fairlead and anchor wire movements. Slack in anchor wire shall be maintained at all time. In case of subsea asset crossing, AHT to bring anchor on deck prior to crossing any subsea assets.	Vessel/AHT/Survey

TP/02 Setup and deployment of anchors		
9.	Survey to confirm once AHT arrives at the planned anchor deployment position. AHT to commence anchor deployment once at the correct deployment position.	Survey
10.	Vessel to pay in anchor wire with minimum tension while AHT to pay out pennant wire. The anchor is drawn over the AHT stern and further lowered onto seabed.	Vessel/AHT
11. 	AHT to inform vessel the touchdown of the anchor, and vessel to confirm that the anchor is at the correct position which is then logged by Survey.	AHT/Vessel/Survey
12.	Vessel to slowly increase the anchor wire tension to test if the anchor holds in position. If the anchor fails to hold in position, vessel instructs AHT to recover and redeploy the anchor as described in TP/03 Recovery and relocation of anchors.	Vessel/AHT
13. 	If the anchor holds position, Surveyor to take a fix of the final anchor position and updates the AMS. If the anchor is not holding position, the anchor will be deployed as per TP/03 Recovery and relocation of anchors	Survey
14.	AHT to disconnect pennant wire deploy pennant buoy.	AHT
15.	After the completion of the pennant buoy deployment, AHT to continue with the rest of the anchors by repeating the previous steps.	Vessel/AHT/Survey
END OF TP/02		

Appendix B3 TP/03 Recovery and relocation of anchors

TP/03 Recovery and relocation of anchors		
Item	**Task Description**	**Responsible**
1. 	Hold TBT with relevant personnel. All parties involved in the operation to be briefed. Command and control structure to be agreed. TBT to be held at the commencement of each shift to review and update safety and operational requirements. Record TBT on Toolbox Talk Form [101]	All parties
2. 	Ensure that all as-built requirements are known and clear and required data shall be recorded.	Field Engineer
3. 	Continue good communications between all relevant parties prior to commencement of the operations.	All parties
4.	Vessel to instruct Survey which planned anchor(s) to recover and relocate.	Vessel/Survey
5.	Survey to enter new position(s) of anchor(s) in the TMS and the AHT(s) to be informed accordingly.	Survey/AHT
6.	Vessel to instruct AHT to move to the anchor location as provided via TMS and commence recovery and relocation.	Vessel/AHT
7.	AHT to move to the anchor position and use a grapple hook to hook and recover the polypropylene rope from the pennant buoy. *Rigging drawing in Appendix D for pull anchor or Appendix E for station keeping anchors*	AHT
8. 	NOTE: During the recovery, AHT to inspect the conditions of recovered items for signs of damage, and record, replace and quarantine any items deemed no longer fit for purpose.	AHT
9.	AHT to connect the recovered polypropylene rope to the winch and start to pay in the rope until pennant wire eye comes over the stern/bow roller. Secure the pennant wire on deck.	AHT
10.	Once the pennant wire is secured, if necessary, disconnect the polypropylene rope and pennant buoy from the pennant wire and move and secure them aside on deck. Then connect the pennant wire to AHT winch.	AHT

TP/03 Recovery and relocation of anchors

11. HOLD POINT	Prior to anchor breakout, AHT to inform vessel that the pennant buoy and wire are recovered and AHT is ready to break out and recover the anchor.	AHT
12.	Vessel to pay out anchor wire to reduce anchor wire tension and inform AHT once there is enough slack in the anchor wire.	Vessel
13.	AHT to haul in the pennant wire. 	AHT
14. SAFETY FLASH	AHT to continue pay in pennant wire until the anchor comes on the stern/bow roller and is stoppered off by deck pins. NOTE: In case the route to the next anchor location crosses any subsea assets, the anchor shall be recovered completely.	AHT
15.	AHT to inform vessel once anchor is fully recovered and secured.	AHT
16.	Vessel to pay in/out anchor wire while AHT is moving towards the next anchor deployment position provided via TMS. NOTE: During AHT moving to the next anchor deployment position, Vessel shall visually monitor the fairlead and anchor wire movements and tension to prevent AHT from running over slack anchor wire.	AHT/Vessel
END OF TP/03		

Appendix B4 TP/04 Recovery of anchors after completion of operations

TP/04 Recovery of anchors after completion of operations

Item	Task Description	Responsible
1. 	Hold TBT with relevant personnel. All parties involved in the operation to be briefed. Command and control structure to be agreed. TBT to be held at the commencement of each shift to review and update safety and operational requirements. Record TBT on Toolbox Talk Form [101]	All parties
2. 	Ensure that all as-built requirements are known and clear and required data shall be recorded.	Field Engineer
3. 	Continue good communications between all relevant parties prior to commencement of the operations.	All parties
4.	Vessel to instruct Survey on which anchor(s) to be recovered. Survey to enter the anchor position(s) in TMS and inform AHT.	Vessel/Survey
5.	Vessel to instruct AHT to move to the anchor location.	Vessel
6.	AHT to move to the anchor location and conduct anchor recovery as described in TP/03 Recovery and relocation of anchors.	AHT
7.	AHT to inform vessel once anchor is fully recovered and secured.	AHT/Vessel
8. 	Vessel to pay in/out anchor wire while AHT is moving towards the vessel. NOTE: During AHT's moving, vessel shall visually monitor the fairlead and anchor wire movements and tension to prevent AHT from running over slack anchor wire.	AHT/Vessel
9.	AHT to come alongside and be temporary moored to vessel in preparation of returning anchor wire, anchor, pennant wire and buoy (alternatively, anchor, pennant wire and/or buoy may be stored on AHT).	AHT/Vessel
10.	AHT to pass the anchor wire back to vessel via messenger wire.	AHT/Vessel
11. 	Depending on where the anchoring materials are stored, either AHT to keep the anchor and possibly (some of) the other anchoring materials, or vessel to maneuver the crane on deck to lift the anchor, pennant wire and buoy from AHT back to vessel.	Crane Operator/AHT
12.	Relieve anchor, pennant wire and buoy from the crane and sea fasten the anchor.	Vessel

TP/04 Recovery of anchors after completion of operations		
13.	Under the instruction of vessel, AHT to be relieved from vessel and move to the next anchor position for recovery.	AHT/Vessel
END OF TP/04		

Appendix B5 TP/05 Midline buoy and anchor deployment

TP/05 Midline buoy and anchor deployment		
Item	**Task Description**	**Responsible**
1. 	Hold TBT with relevant personnel. All parties involved in the operation to be briefed. Command and control structure to be agreed. TBT to be held at the commencement of each shift to review and update safety and operational requirements. Record TBT on Toolbox Talk Form [101]	All parties
2. 	Ensure that all as-built requirements are known and clear and required data shall be recorded.	Field Engineer
3. 	Continue good communications between all relevant parties prior to commencement of the operations.	All parties
4.	Based on the distance between the anchor deployment location and the midline buoy deployment location, AHT to spool the required amount of anchor wire onto its own winch according to Appendix C4. Once the spooling is completed, AHT to apply a holdback (stopper) to secure the anchor wire to deck pins. AHT to install midline buoy to the anchor wire. If deemed necessary, anchor can also be sailed out according to TP/02 in combination with a second AHT to attach the midline buoys to the anchor wire.	AHT/Vessel
5. 	Install mid-line buoy rigging arrangement as per Appendix G. Start with the wire suspension bracket. Fasten bolts (M16 x 50) and ensure all bolts have 2 nuts installed.	AHT
6.	Confirm all nuts and bolts are fastened hand tight with wrenches	AHT
7.	Continue installing wire clamps 10 mm from wire suspension bracket. Fasten bolts (M12 x 80) and ensure all bolts have 2 nuts installed. Confirm all nuts and bolts are fastened hand tight with wrenches.	AHT
8.	Repeat for second wire clamp.	AHT
9.	Ensure midline buoy has been installed according to Appendix G.	AHT

TP/05 Midline buoy and anchor deployment		
10.	AHT to move to the midline buoy location whilst vessel to pay out the anchor wire.	AHT/Vessel
11.	Once AHT reaches the midline buoy deployment location, vessel to stop paying out anchor wire and AHT to deploy midline buoy by paying out the spooled anchor wire.	AHT/Vessel
12.	If more buoys are required, AHT to sail towards next location and repeat step 5 till 11. When last buoy is installed AHT to anchor deployment process as in TP/02.	AHT/Vessel
END OF TP/05		

Appendix B6 TP/06 Midline buoy and anchor recovery

TP/06 Midline buoy and anchor recovery		
Item	**Task Description**	**Responsible**
1. 	Hold TBT with relevant personnel. All parties involved in the operation to be briefed. Command and control structure to be agreed. TBT to be held at the commencement of each shift to review and update safety and operational requirements. Record TBT on Toolbox Talk Form [101]	All parties
2. 	Ensure that all as-built requirements are known and clear and required data shall be recorded.	Field Engineer
3. 	Continue good communications between all relevant parties prior to commencement of the operations.	All parties
4.	AHT to move to the anchor location and conduct anchor recovery as described in TP/03 Recovery and relocation of anchors.	AHT
5. 	AHT to inform vessel that anchor is fully recovered and secured, and anchor wire is attached to AHT winch.	AHT/Vessel
6. 	AHT to pay in anchor wire while move towards the midline buoy position, until the midline buoy come over the stern/ bow roller. Halt the recovery.	AHT
7.	Once the buoy is on deck, AHT to apply a holdback (stopper) to secure the anchor wire to deck pins.	AHT
8.	Once the midline buoy is fully recovered and secured, AHT to instruct vessel to pay in anchor wire while AHT to move towards vessel.	AHT/Vessel
9.	Once vessel pays in the rest of the anchor wire and AHT arrives at vessel, AHT to remove the midline buoy from anchor wire and prepare it for vessel crane to lift it back to vessel.	AHT/Vessel
10. 	Vessel to lift the midline buoy onboard, and secure.	Vessel

TP/06 Midline buoy and anchor recovery
END OF TP/06

Appendix B7 TP/07 Connect/disconnect to pre-Installed beach anchors

TP/07 Connect/disconnect to pre-Installed beach anchors		
Item	**Task Description**	**Responsible**
1. 	Hold TBT with relevant personnel. All parties involved in the operation to be briefed. Command and control structure to be agreed. TBT to be held at the commencement of each shift to review and update safety and operational requirements. Record TBT on Toolbox Talk Form [101]	All parties
2.	Ensure that all as-built requirements are known and clear and required data shall be recorded.	Field Engineer
3. 	Perform full communications check between all relevant parties prior to commencement of the operations. Perform full operation readiness check of required equipment and materials.	All parties
4. 	The onshore crew to pre-install beach anchors and ensure that all riggings are fit for purpose for AHT to recover and connect. *Rigging drawing in Appendix F.* Onshore Surveyor to take fixes of the as-installed positions of beach anchors with forerunners and pass the data to CLV Surveyor to update the onboard TMS.	Survey
5.	CLV to confirm which anchor wire to be deployed first, prepare the winch and confirm the readiness to commence pay-out operation.	CLV
6.	CLV to instruct AHT which beach anchor forerunner to be picked up first.	CLV
7.	AHT to move towards the pre-installed anchor wire forerunner recovery rigging. NOTE: tidal conditions shall be monitored and assessed continuously.	AHT

TP/07 Connect/disconnect to pre-Installed beach anchors

8. 	AHT to recover the forerunner recovery rigging with a grapple hook or boat hook, connect the rigging to a tugger winch, and pull the forerunner end on deck. Once the forerunner end is on deck, AHT to apply a holdback (stopper) to secure the forerunner to deck pins. *Rigging drawing in Appendix F.* NOTE: During the recovery, where possible, AHT to inspect the condition of the recovery rigging materials for signs of damage that could result in unsafe handling, inform CLV if any items are not fit for purpose, record, replace and quarantine any items where applicable.	AHT
9.	AHT to move towards CLV with the forerunner in the direction according to the planned anchor pattern.	AHT
10.	Once AHT has brought the forerunner as far as possible, AHT to deploy the forerunner end with the recovery rigging back onto the seabed, and then move back to CLV. If the CLV can move close enough (tidal dependent) and the forerunner has sufficient length, the AHT may bring the forerunner to the CLV without deploying it to the seabed.	AHT
11.	CLV to instruct AHT which anchor wire to deploy first. AHT to come alongside in preparation to receive anchor wire.	CLV/AHT
12.	CLV to pass anchor wire to AHT via messenger wire. If the distance between the CLV and the forerunner recovery rigging deployment location is considered long enough, CLV to pay out anchor wire while AHT to spool it onto the AHT winch until sufficient amount of anchor wire has been spooled.	CLV/AHT
13. 	AHT to move towards the forerunner recovery rigging deployment location while CLV to pay out anchor wire. If the anchor wire is spooled onto the AHT winch, CLV to instruct when she stops paying out anchor wire and AHT in turn to start paying out anchor wire NOTE: tidal conditions shall be monitored and assessed continuously. During AHT's moving, CLV shall visually monitor the fairlead and anchor wire movements and tension to prevent AHT from running over slack anchor wire.	CLV/AHT
14.	AHT to inform CLV of the arrival at the forerunner recovery rigging position.	AHT

TP/07 Connect/disconnect to pre-Installed beach anchors		
15.	AHT to recover forerunner end and secure it on deck.	AHT
16.	AHT to connect anchor wire to forerunner end via shackles (85t) and swivel (231t MBL) and inform CLV of the completion of the connection. *Rigging drawing in Appendix F.*	AHT
17.	AHT to remove deck pin holdbacks to both anchor wire and forerunner and deploy the connection onto seabed via deck winch. NOTE: Forerunner recovery rigging, incl. buoys, shall remain as part of the deployed system for future recovery.	AHT
18.	AHT to inform CLV the completion of the deployment	AHT
19.	CLV to slowly increase tension on the anchor wire to check if the pre-installed beach anchor is holding in position.	CLV
20.	Once it is confirmed that the beach anchor is holding in position, CLV to instruct AHT to return for the preparation of the next beach anchor connection. AHT to inform CLV once moving back to CLV.	AHT/CLV
21.	If CLV identifies a significant drag of beach anchor, tension to be reduced immediately and anchor to be put back to its original position by land-based equipment, e.g. excavator, etc.	Onshore Team
22.	The disconnection of anchor wire and beach anchor forerunner to be conducted mainly by following the above steps in reverse order. In addition, forerunners to be recovered by land-based equipment once sea conditions permit, and depending on the operation, anchor wires may be directly fitted with offshore anchors or recovered back to CLV.	CLV/AHT/Onshore Team
END OF TP/07		

Appendix B8 TP/08 Transition from anchor spread to DP system during simultaneous lay and burial

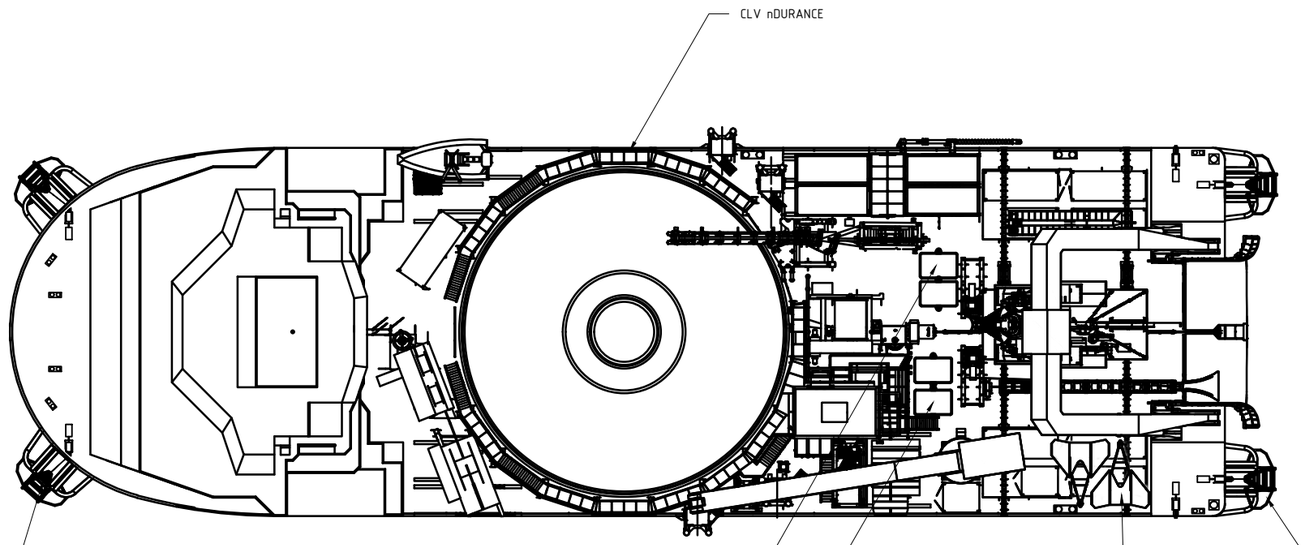
TP/08 Transition from anchor spread to DP system during simultaneous lay and burial		
Item	**Task Description**	**Responsible**
1. 	Hold TBT with relevant personnel. All parties involved in the operation to be briefed. Command and control structure to be agreed. TBT to be held at the commencement of each shift to review and update safety and operational requirements. Record TBT on Toolbox Talk Form [101]	All parties
2. 	Ensure that all as-built requirements are known and clear and required data shall be recorded.	Field Engineer
3. 	Perform full communications check between all relevant parties prior to commencement of the operations. Perform full operation readiness check of required equipment and materials.	All parties
4. 	CLV master to confirm the KP location where there is enough water depth to deploy retractable thrusters.	CLV/Survey
5.	Simultaneous lay and burial to continue while CLV is transitioning from anchor spread to DP system. CLV Master to decide the exact timing and location for the transition based on weather and environmental conditions.	CLV
6.	After the CLV has deployed the thrusters and activated the DP system, follow TP/04 Recovery of anchors after completion of operations except for the plough towing anchor while transitioning.	CLV/AHT
7.	AHT to continue following and assisting CLV during the rest of the operations, e.g. plough anchor relocation, etc.	AHT Master
END OF TP/08		

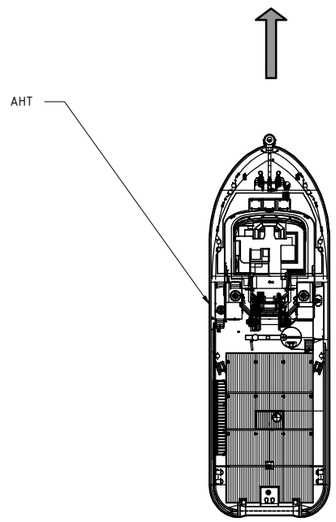
Appendix C Storyboards

Appendix C1 Setup and deployment of anchors

STEP 1

PLAN VIEW SCALE 1:500





GENERAL NOTES

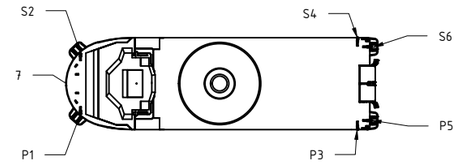
1. ALL MEASUREMENTS ARE IN mm UNLESS NOTED OTHERWISE
2. ANCHOR: STEVPRIS / DELTA FLIPPER (TBC)

Reference is made to:
0059359-BOS-ENG-PRO-5005-Anchor procedure

STEP 1:

- AT ARRIVAL THE TWO ANCHORS AT THE BOW AND TWO AT THE STERN ARE RACKED.
- THE TWO ANCHORS FOR THE REAR STARBOARD SIDE AND PORT SIDE AS WELL AS THE TOWING ANCHOR HAVE BEEN PLACED ON DECK AT THE VESSEL MASTERS DECRETURE.
- THE 6 MID LINE BUOYS, THE PENNANT BUOYS AND OTHER RIGGING HAVE BEEN PLACED SOMEWHERE ON DECK AS DETERMINED BY THE VESSEL MASTER.
- (5) CLV CREW TO PREPARE ANCHOR, PENNANT WIRE AND BUOY FOR DEPLOYING.
- THE AHT MOVES TO THE CLV TO RECEIVE THE ANCHOR AND ATTACHED PARTS.

CLV nDURANCE ANCHOR KEY PLAN



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DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: SETUP AND DEPLOYMENT OF ANCHORS

-

CLIENT: LIVERPOOL BAY CCS

liverpool bay ccs

BOSKALIS SUBSEA CABLES
P.O.BOX 43, 3350 AA PAPENDRECHT - E-MAIL: ROYAL@BOSKALIS.COM

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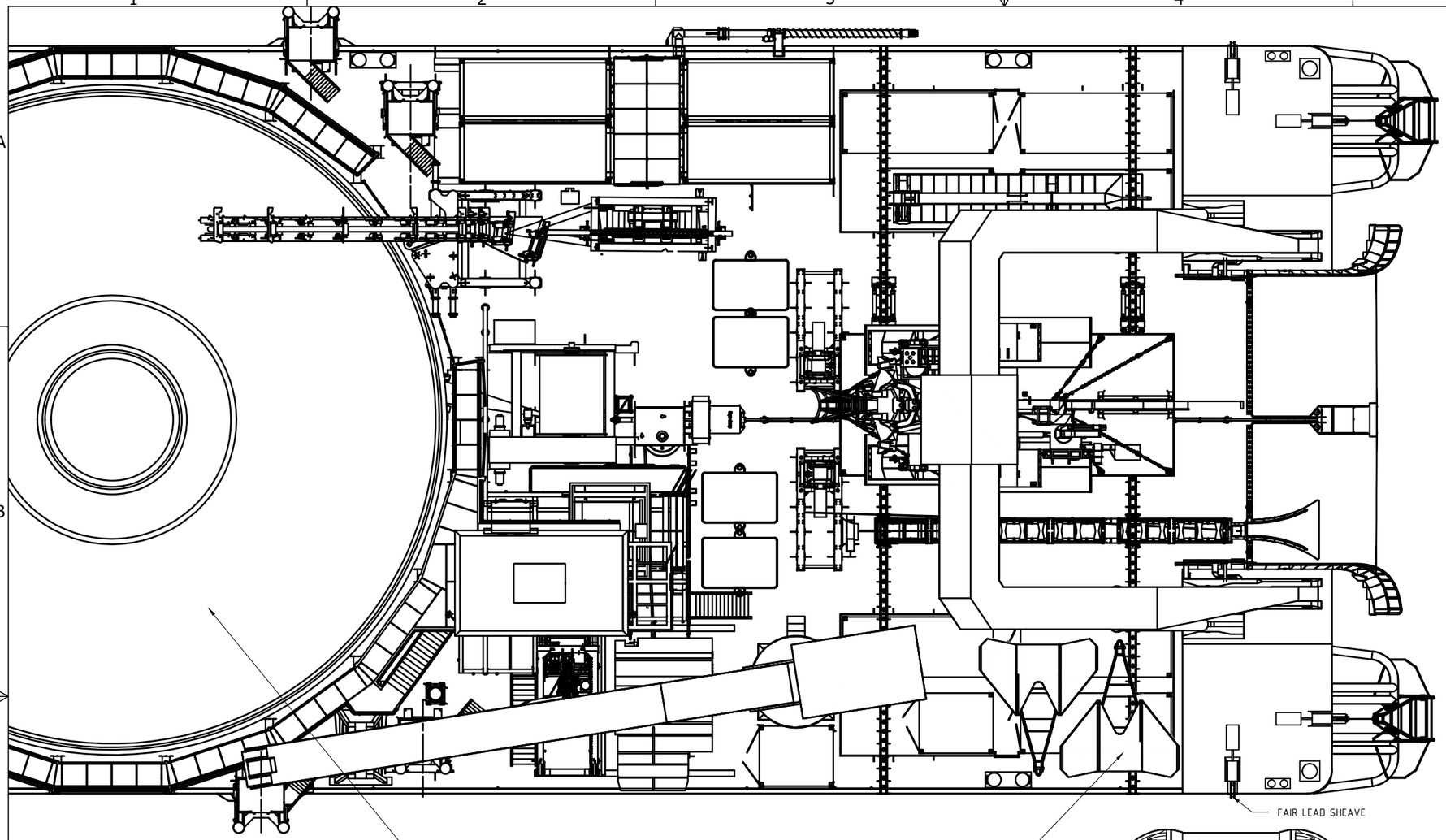
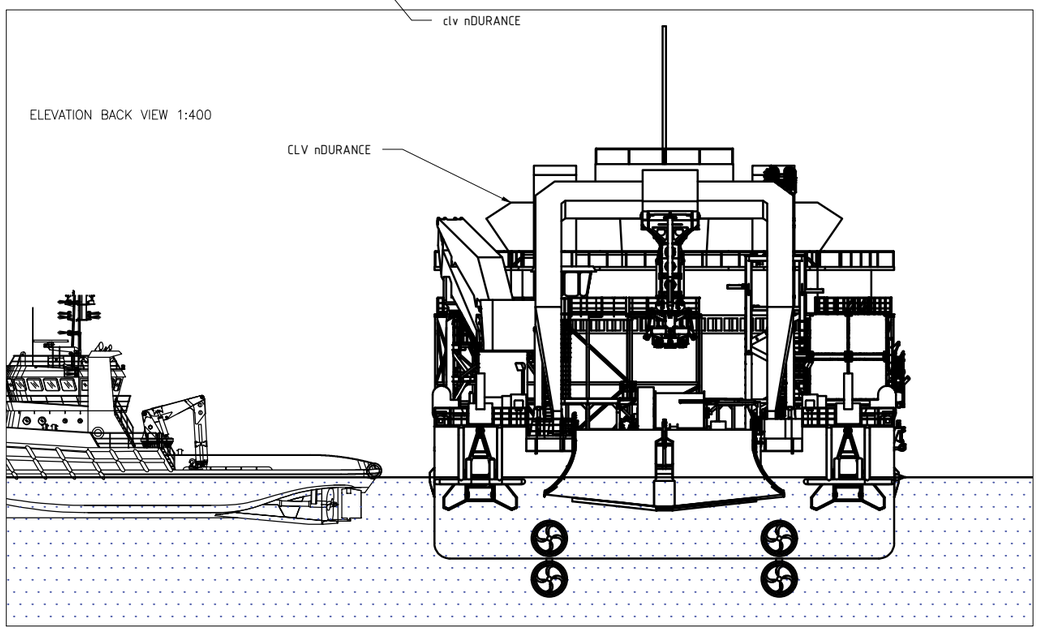


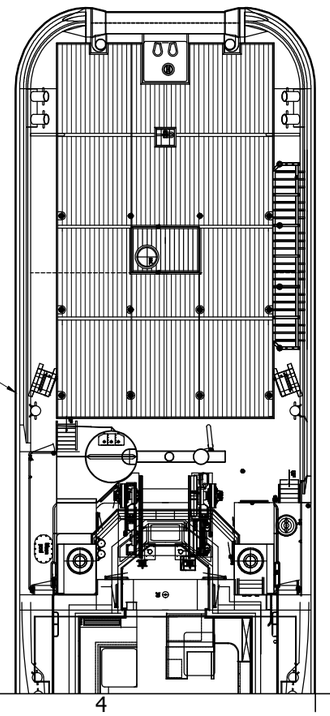
NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 2:

- (6) THE CLV WILL PASS (WITH MESSENGER WIRE OF CRANE ASSISTANCE) THE PENNANT BUOY, PENNANT WIRE AND ANCHOR TO THE AHT (PRE-CONNECTED TO THE ANCHOR WINCH WIRE AS PER C/01 OR C/02).
- CLV MASTER TO DECIDE WHICH ANCHOR(S) TO START WITH.





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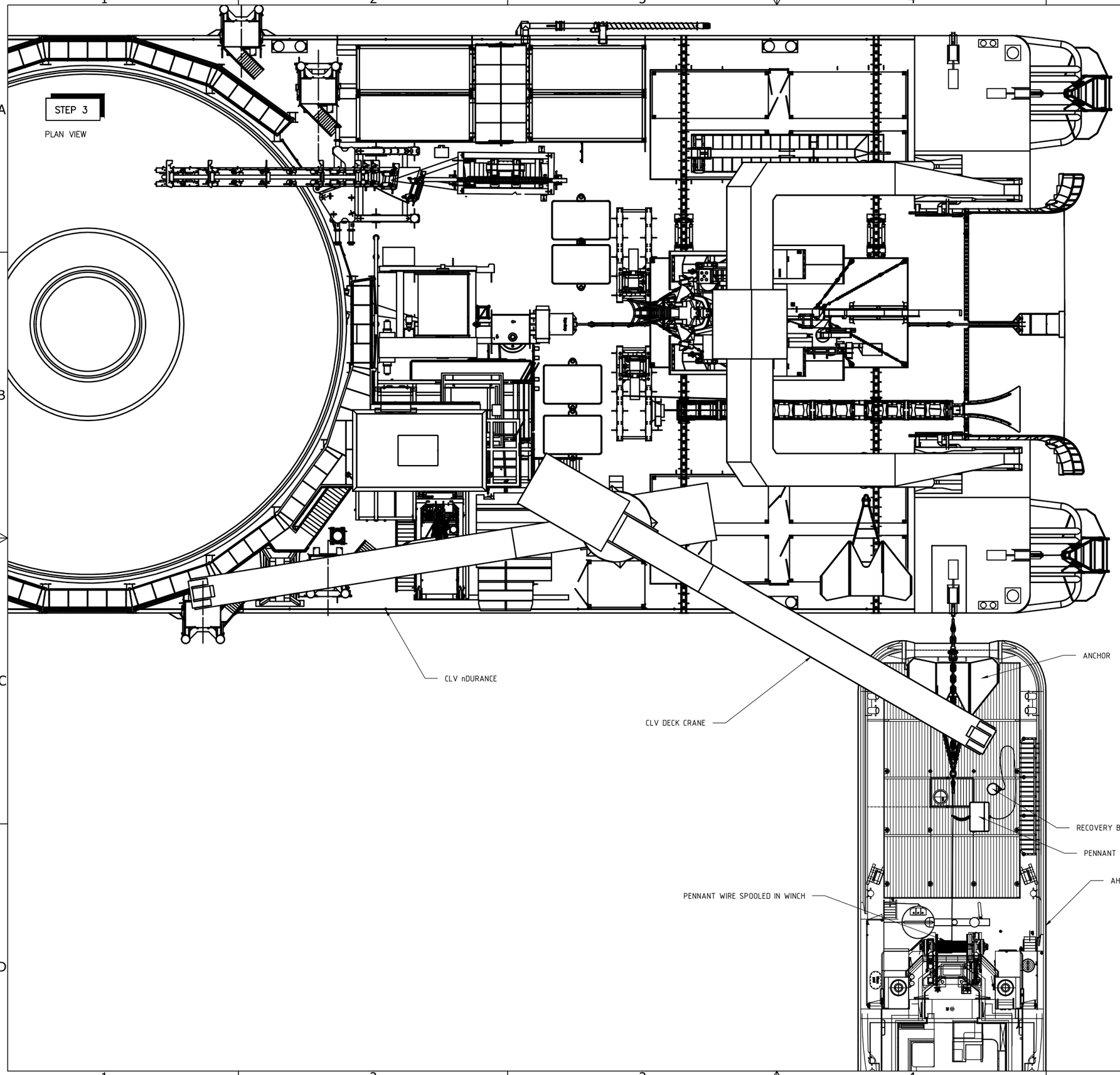
STEP 3

PLAN VIEW



NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 3:

- IF THE ANCHORS ARE STORED ON THE AHT, CLV WILL PASS A MESSENGER WIRE TO CONNECT THE ANCHOR WIRE TO THE ANCHOR.
- (7) AHT CREW CONNECTS THE PENNANT WIRE TO THE DECK WINCH BY A 7.5T HAMMERLOCK AND SPOOL THE WIRE ON THE WINCH. THE PENNANT WIRE WILL BE CONNECTED TO THE ANCHOR AS PER C/01 OR C/02 DEPENDING ON ANCHOR SIZE.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

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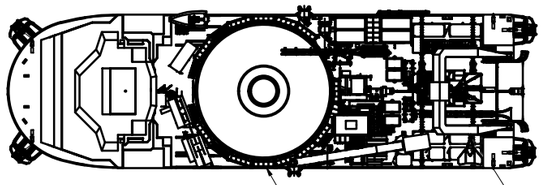
STEP 4

PLAN OVERVIEW SCALE 1:1200



CLV nDURANCE

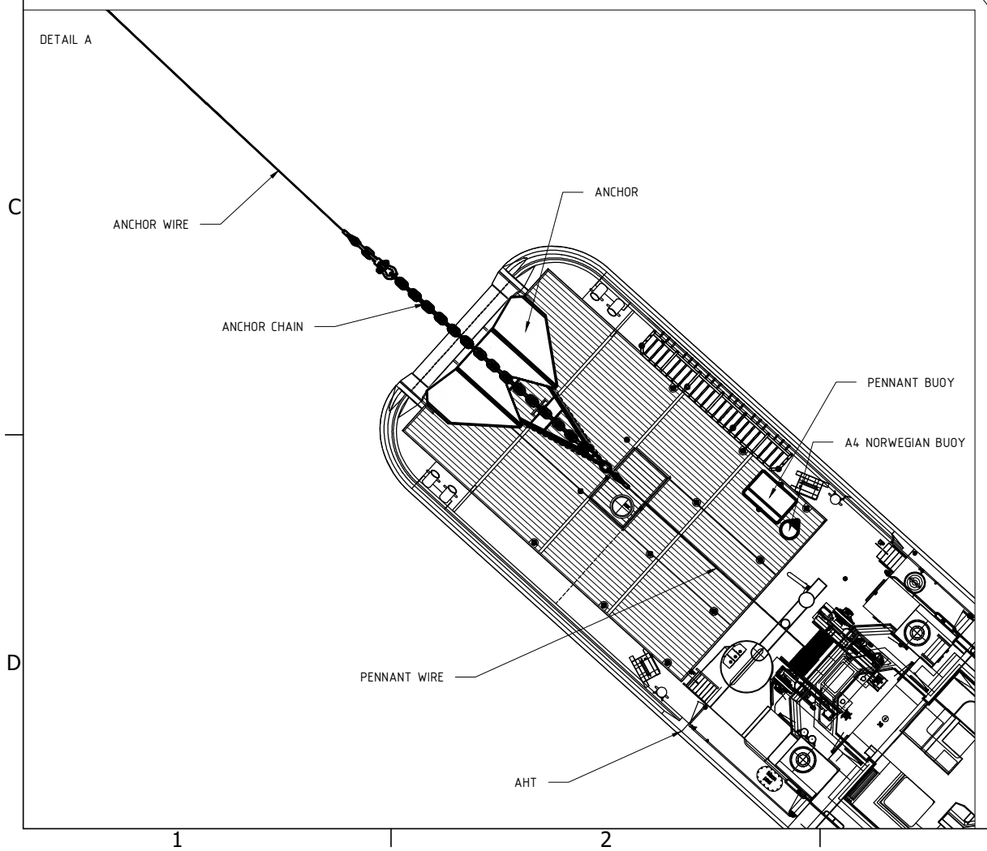
NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 4:

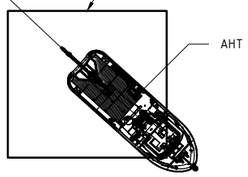
- (8) AHT WILL MOVE TO THE ANCHOR POSITION MARKED BY SURVEY ON THE AMS. CLV WILL KEEP ANCHOR LINES SLACK.
- AHT WILL SPOOL REQUIRED AMOUNT OF WIRE ON IT'S OWN DRUM.
- AHT WILL MOVE TO ANCHOR POSITION MARKED BY SURVEY ON THE AMS. CLV WILL KEEP ANCHOR LINES SLACK.
- ONCE THE AHT SAILED TOWARDS THE DISTANCE FROM THE VESSEL MINUS THE WIRE LENGTH ON ITS OWN DRUM, THE AHT STARTS PAYING OUT WINCH WIRE AND THE CLV STOPS IT'S WINCH.

DETAIL A



ANCHOR LINE SLACK

DETAIL A



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REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: SETUP AND DEPLOYMENT OF ANCHORS

-

CLIENT: LIVERPOOL BAY CCS

liverpool bay ccs

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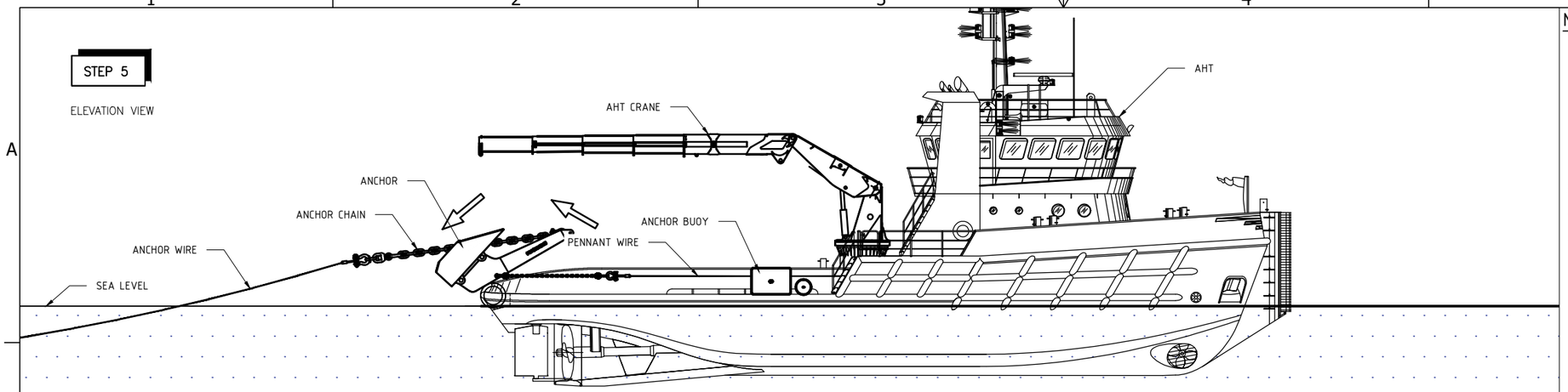
STEP 5

ELEVATION VIEW



STEP 6

ELVATION VIEW

NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 5:

- (9) AT POSITION, THE CLV MASTER TENSIONS UP ON THE ANCHOR WIRE AND AT THE SAME TIME THE AHT MASTER PAYS OUT THE PENNANT WIRE.
- THIS DRAWS THE ANCHOR OVER THE STERN OF THE AHT AND COMMENCES LOWERING TO THE SEABED.

STEP 6:

- (10) WHEN AHT IS 3-5m ABOVE THE ANCHOR DEPLOYMENT POSITION, SURVEY TO CONFIRM PLANNED POSITION
- (11) IF ANCHOR IS IN PLANNED POSITION, AHT TO COMPLETE THE DEPLOYMENT OF THE ANCHOR BUOY.
- (12) MONITOR TENSION ON WIRE. KEEP ANCHOR LINE VERY SLACK.
- THE WINCH OPERATOR SHOULD APPLY MINIMUM TENSION ON THE ANCHOR WIRE BEFORE THE AHT WILL LOWER THE ANCHOR AT THE PLANNED POSITION.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: SETUP AND DEPLOYMENT OF ANCHORS

-

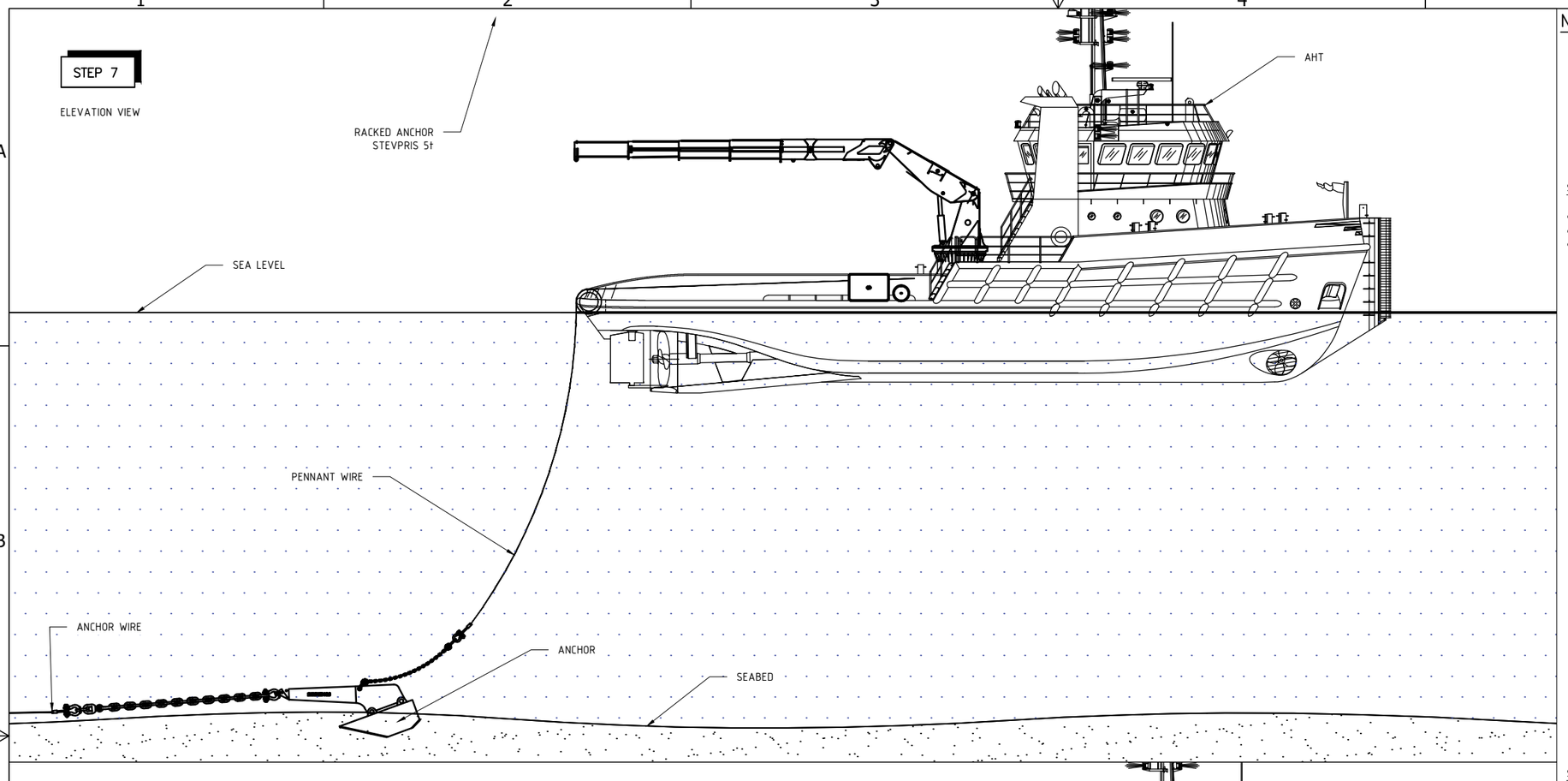
CLIENT: LIVERPOOL BAY CCS

BOSKALIS SUBSEA CABLES
P.O.BOX 43, 3350 AA PAPENDRECHT - E-MAIL: ROYAL@BOSKALIS.COM

FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
1 : 1		0059359-BOS-CAD-DRW-5008	05 of 06 / A

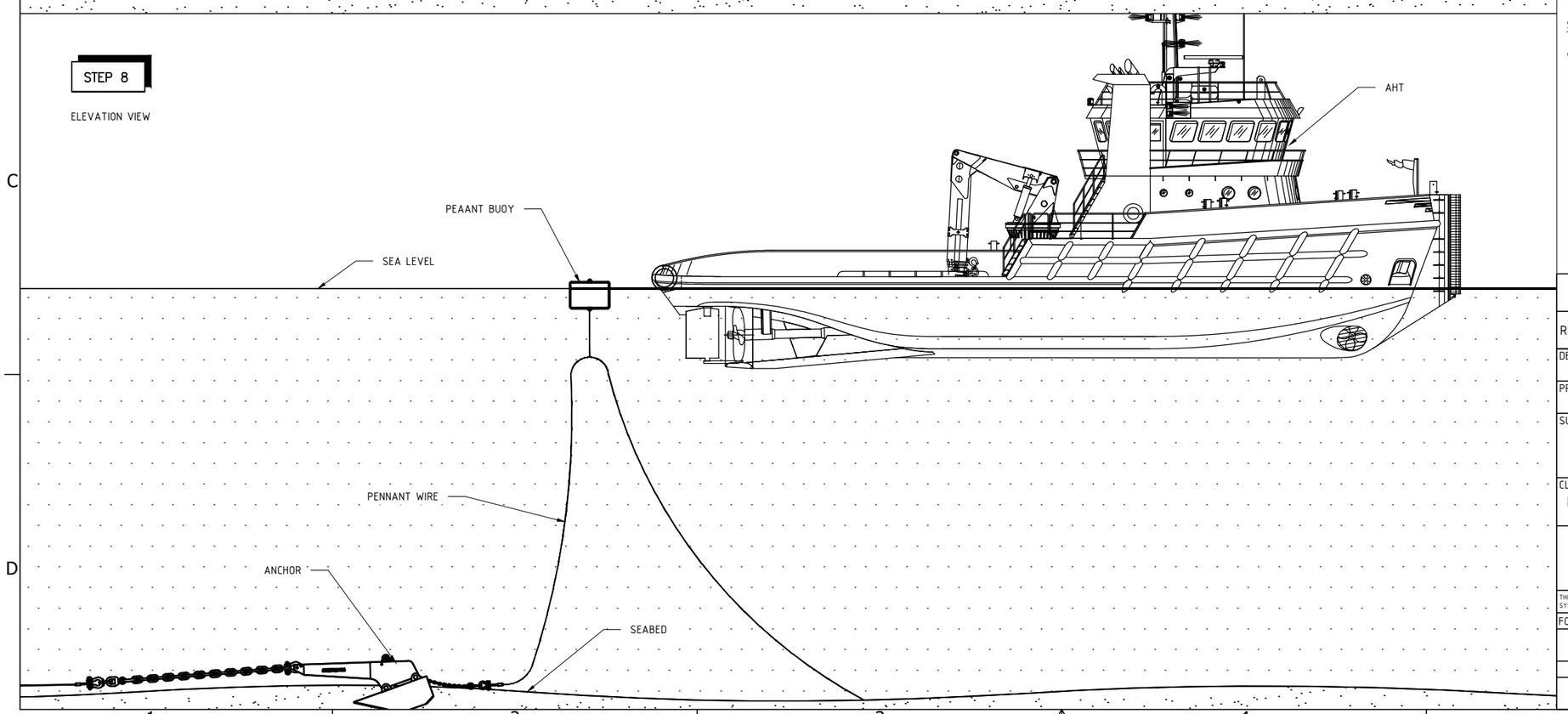
STEP 7

ELEVATION VIEW



STEP 8

ELEVATION VIEW



NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 7:

- (13) CLV SLOWLY TENSIONS UP ANCHOR WIRE TO ENSURE THE ANCHOR HOLDS
- (14) IF ANCHOR HOLDS AND DOES NOT DRAG OVER SEABED, SURVEYOR TAKES FIX OF THIS POSITION.
- (15) AHT TO DISCONNECT FROM ANCHOR PENNANT WIRE BY SPOOLING OFF ANY REMAINING PENNANT WIRE ON THE WINCH AND INSTALLING A BUOY AS PER RELEVANT DRAWING.

STEP 7:

- (16) AHT WILL CONTINUE WITH OTHER ANCHORS AND ABOVE STEPS CAN BE REPEATED.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT
LIVERPOOL BAY CCS PROJECT

SUBJECT
SETUP AND DEPLOYMENT OF ANCHORS

-

CLIENT
LIVERPOOL BAY CCS

liverpool bay ccs

BOSKALIS SUBSEA CABLES
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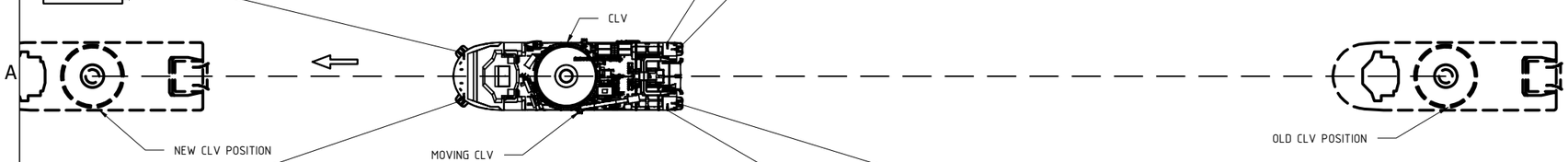
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
1 : 1		0059359-BOS-CAD-DRW-5008	06 of 06 / A

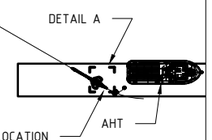
Appendix C2 Recovery and relocation of Anchors

PLAN OVERVIEW SCALE 1:2500
OTHER ANCHOR LINES
ILLUSTRATIVE ONLY

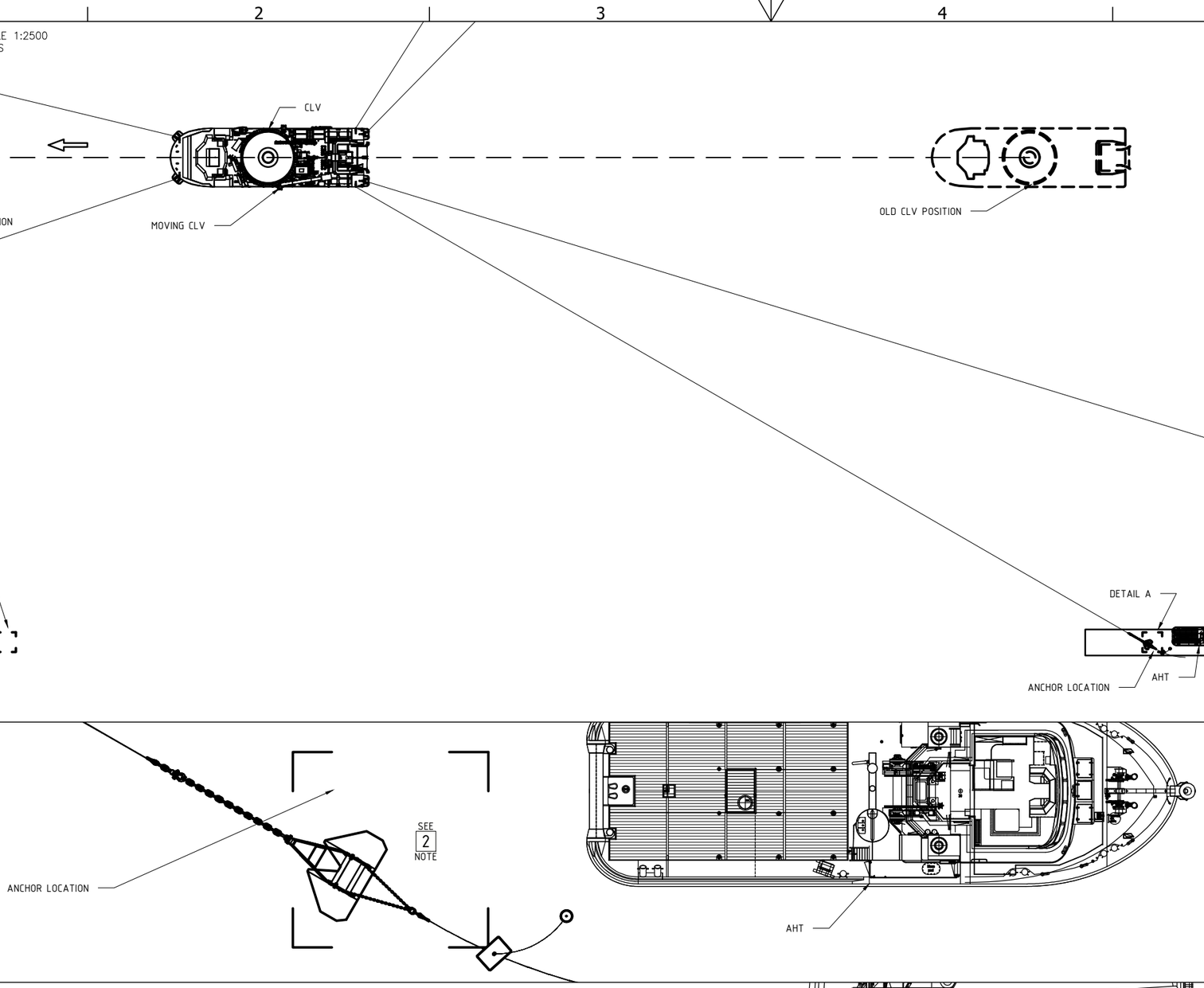
STEP 1



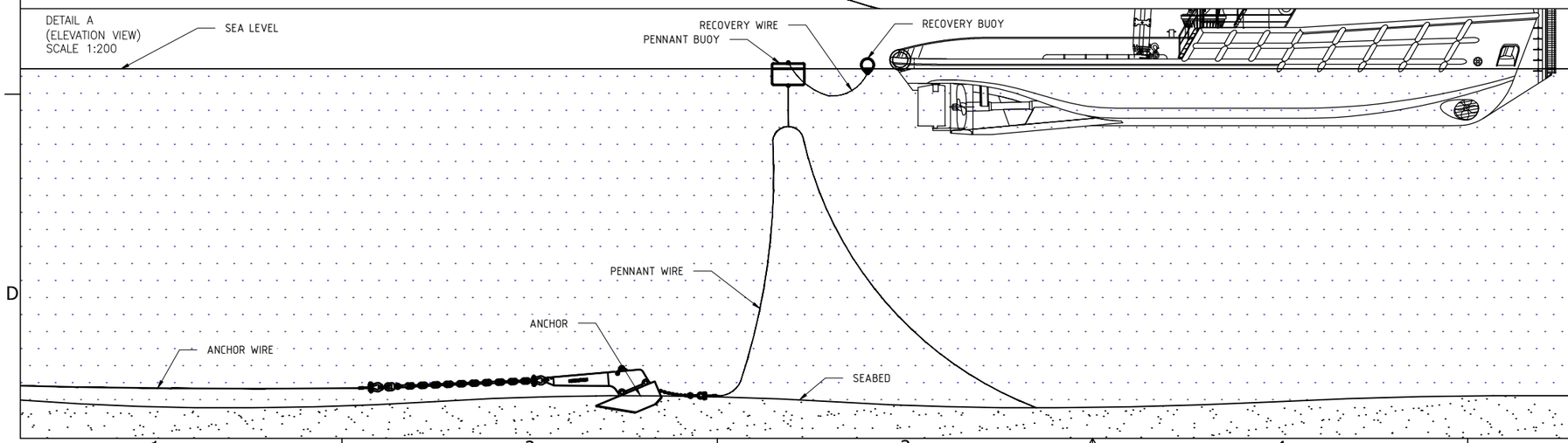
NEXT ANCHOR LOCATION



DETAIL A
PLAN VIEW
SCALE 1:200



DETAIL A
(ELEVATION VIEW)
SCALE 1:200



GENERAL NOTES

1. ALL MEASUREMENTS ARE IN mm UNLESS NOTED OTHERWISE
2. ANCHOR: STEVPRIS / DELTA FLIPPER (TBC)

Reference is made to:
0059359-BOS-ENG-PRO-5005-Anchor procedure

STEP 1:

- (3) CLV'S MASTER OR HIS DEPUTY WILL INSTRUCT SURVEY WHICH ANCHOR(S) HAS/HAVE TO BE RELOCATED.
- (4) SURVEY ENTERS NEW POSITION(S) OF ANCHOR(S) IN THE AMS AND SENDS THESE TO THE AHT(S).
- (5) CLV MASTER INSTRUCTS AHT TO MOVE TO LOCATION OF THE ANCHOR THAT HAS TO BE RELOCATED.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: RECOVERY AND RELOCATION OF ANCHORS

-

CLIENT: LIVERPOOL BAY CCS

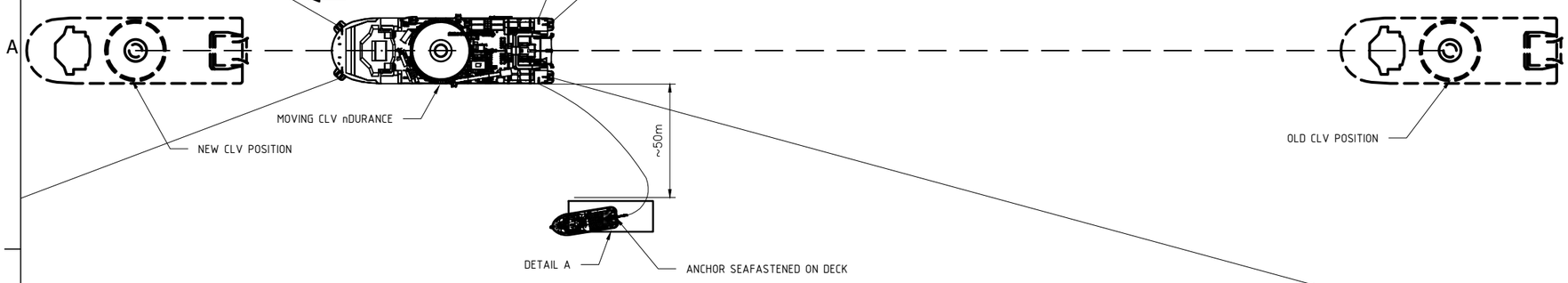
liverpool bay ccs

BOSKALIS SUBSEA CABLES
P.O.BOX 43, 3350 AA PAPENDRECHT - E-MAIL: ROYAL@BOSKALIS.COM

FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
1 : 1		0059359-BOS-CAD-DRW-5009	01 of 04 / A

PLAN OVERVIEW SCALE 1:2500
OTHER ANCHOR LINES
ILLUSTRATIVE ONLY

STEP 2



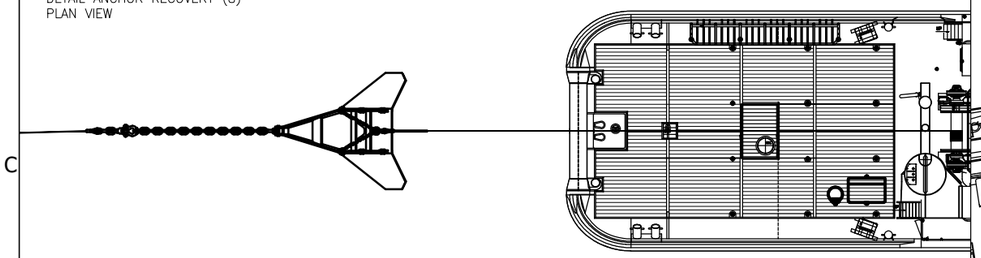
NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

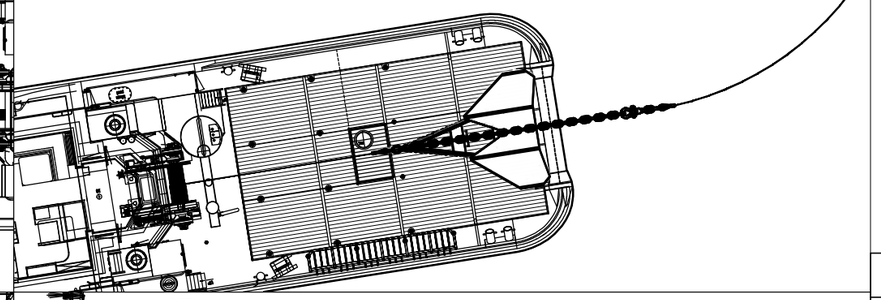
STEP 2:

- (6) THE AHT WILL SAIL TO ANCHOR POSITION AND WILL MAKE AN ANGLE OF 20° TO 30° BETWEEN THE VERTICAL AND THE WORK WIRE.
- (7) AHT TO MOVE AHEAD MAINTAINING CONSTANT DISTANCE FROM THE CLV (DON'T BACK DOWN).
- (8) AHT MOVES TO POSITION AND RECOVERS PENNANT WIRE BY THROWING A SMALL GRAPPLE HOOK TO HOOK ON THE POLYPROPYLENE RUNNER AND RECOVER BUOY TO DECK.
- (9) AHT MASTER SPOOLS POLYPROPYLENE RUNNER WITH BUOY TO WINCH, CLEAR DECK AND WINCH UP UNTIL PENNANT WIRE EYE IS ON DECK.
- (10) DISCONNECT POLYPROPYLENE ROPE FROM PENNANT WIRE.
- (11) CLV SLACKENS THE ANCHOR WIRE AND CONFIRMS AHT MASTER THE WIRE IS SLACKED.
- (12) AHT BREAKS OUT THE ANCHOR WITH THE PROPER RETRIEVAL ANGLE (20-30 DEGREES TO THE VERTICAL). PENNANT WIRE IS LOCKED BY DECK PINS.
- IN CASE THERE IS A CABLE/PIPELINE ON THE ROUTE DURING RELOCATION, THE COMPLETE ANCHOR NEEDS TO BE TAKEN ON DECK OF THE AHT AND NEEDS TO BE SEAFASTENED TO STRONG POINTS. SURVEY TO CONFIRM CROSSING LOCATIONS ALONG ROUTE.

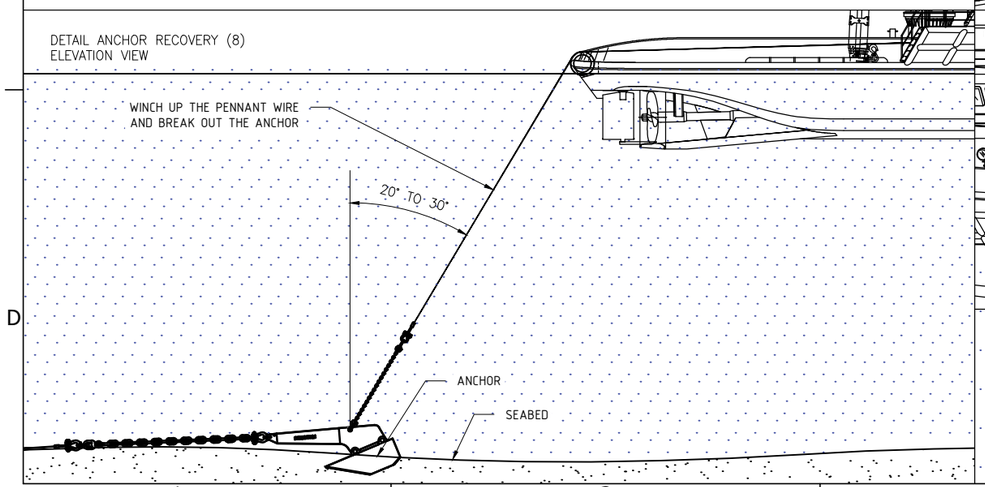
DETAIL ANCHOR RECOVERY (8)
PLAN VIEW



DETAIL A
PLAN VIEW

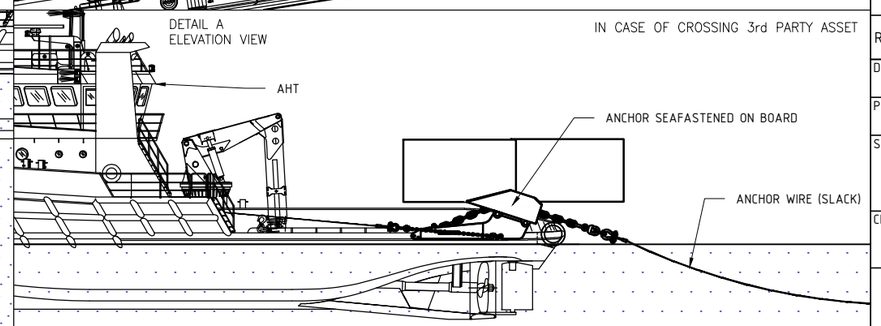


DETAIL ANCHOR RECOVERY (8)
ELEVATION VIEW



DETAIL A
ELEVATION VIEW

IN CASE OF CROSSING 3rd PARTY ASSET



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A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT
LIVERPOOL BAY CCS PROJECT

SUBJECT
RECOVERY AND RELOCATION OF ANCHORS
-

CLIENT
LIVERPOOL BAY CCS

BOSKALIS SUBSEA CABLES
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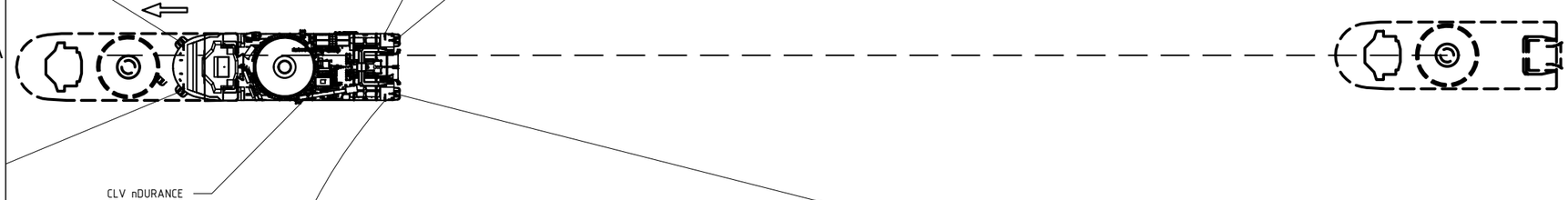
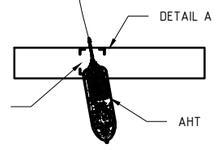
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
1 : 1		0059359-BOS-CAD-DRW-5009	02 of 04 / A

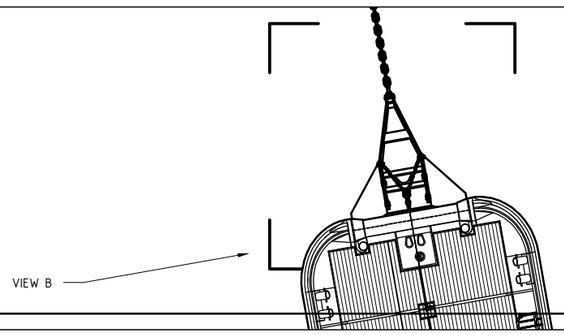
STEP 3

PLAN OVERVIEW SCALE 1:2500
OTHER ANCHOR LINES
ILLUSTRATIVE ONLY

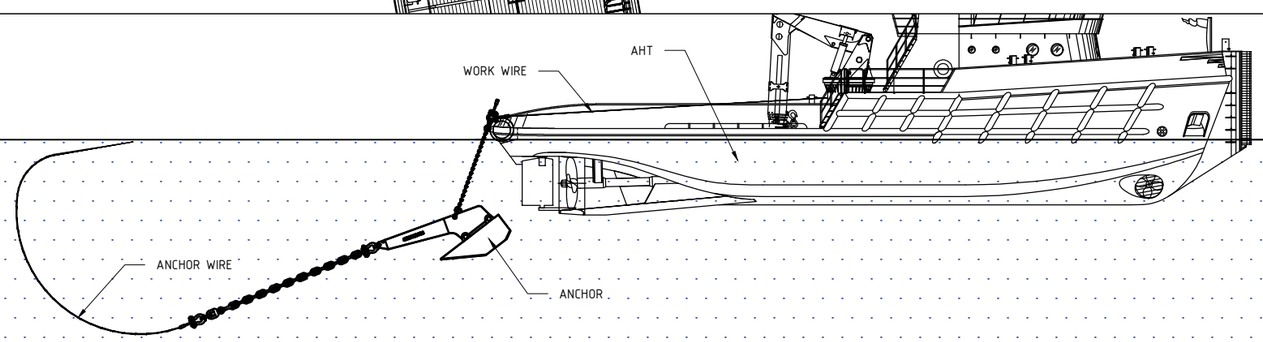




DETAIL A



ELEVATION VIEW B



NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 3:

- (13) CONTINUE WITH ANCHOR DEPLOYMENT

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
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DEVELOPMENT

PROJECT
LIVERPOOL BAY CCS PROJECT

SUBJECT
RECOVERY AND RELOCATION OF ANCHORS

-

CLIENT
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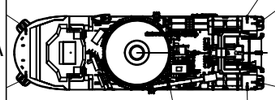
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
		0059359-BOS-CAD-DRW-5009	03 of 04 / A

STEP 4

PLAN OVERVIEW SCALE 1:2500
OTHER ANCHOR LINES
ILLUSTRATIVE ONLY



CLV nDURANCE

PREVIOUS POSITION CLV

PREVIOUS ANCHOR LOCATION

DETAIL A

AHT

ANCHOR LOCATION

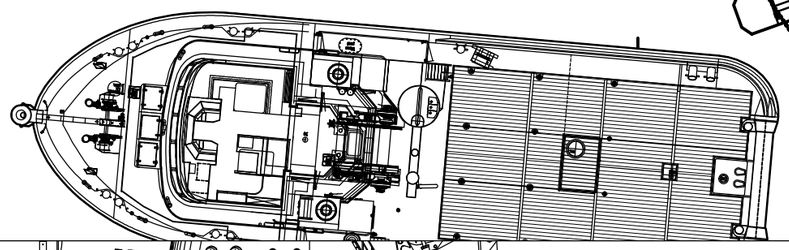
NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 4:

- ANCHOR RELOCATED.
- CONTINUE WITH STEP 1 FOR THE NEXT ANCHOR

DETAIL A



ANCHOR

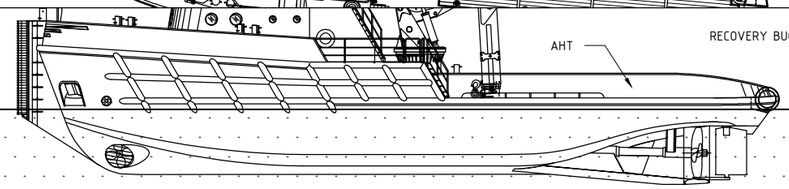
ANCHOR LOCATION

PENNANT BUOY

RECOVERY WIRE

RECOVERY BUOY

DETAIL A
ELEVATION VIEW



AHT

RECOVERY BUOY

RECOVERY WIRE

SEA LEVEL

PENNANT BUOY

ANCHOR WIRE TO CLV

PENNANT WIRE

ANCHOR

SEABED

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT
LIVERPOOL BAY CCS PROJECT

SUBJECT
RECOVERY AND RELOCATION OF ANCHORS

-

CLIENT
LIVERPOOL BAY CCS

liverpool bay ccs

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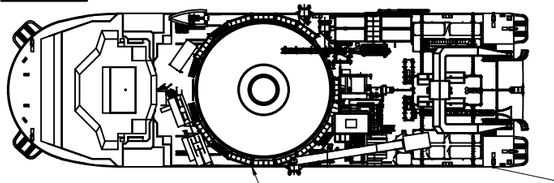
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
		0059359-BOS-CAD-DRW-5009	04 of 04 / A

Appendix C3 Recovery of anchors after completion of operations

STEP 1

PLAN OVERVIEW SCALE 1:1200



CLV nDURANCE

AHT

SEE 2 NOTE

DETAIL A

GENERAL NOTES

1. ALL MEASUREMENTS ARE IN mm UNLESS NOTED OTHERWISE
2. ANCHOR: STEVPRIS / DELTA FLIPPER (TBC)

Reference is made to:
0059359-BOS-ENG-PRO-5005-Anchor procedure

STEP 1:

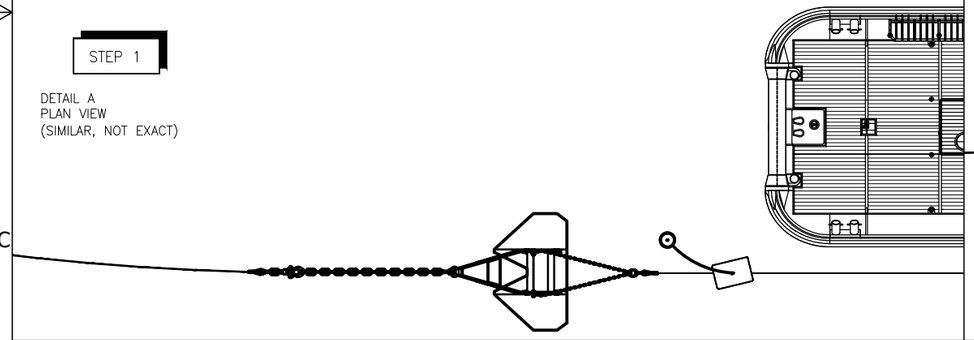
- (5) THE AHT WILL SAIL TO ANCHOR POSITION AND WILL MAKE AN ANGLE OF 20° TO 30° BETWEEN THE VERTICAL AND THE WORK WIRE.
- (6) AHT TO MOVE AHEAD MAINTAINING CONSTANT DISTANCE FROM THE CLV (DO NOT BACK DOWN).
- (7) AHT MOVES TO POSITION AND RECOVERS PENNANT WIRE BY THROWING A SMALL GRAPPLE HOOK TO HOOK ON THE POLYPROPYLENE RUNNER AND RECOVER BUOY TO DECK.
- (8) AHT MASTER SPOOLS POLYPROPYLENE RUNNER WITH BUOY TO WINCH, CLEAR DECK AND WINCH UP UNTIL PENNANT WIRE EYE IS ON DECK.
- (9) DISCONNECT POLYPROPYLENE ROPE FROM PENNANT WIRE.

STEP 2:

- (8) AHT MASTER SPOOLS POLYPROPYLENE RUNNER WITH BUOY TO WINCH, CLEAR DECK AND WINCH UP UNTIL PENNANT WIRE EYE IS ON DECK.
- (9) DISCONNECT POLYPROPYLENE ROPE FROM PENNANT WIRE.
- (10) CLV SLACKENS THE ANCHOR WIRE AND CONFIRMS AHT MASTER THE WIRE IS SLACKED.
- (11) AHT BREAKS OUT THE ANCHOR

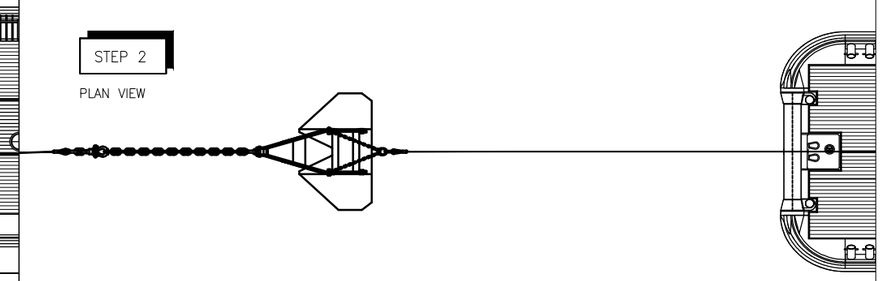
STEP 1

DETAIL A
PLAN VIEW
(SIMILAR, NOT EXACT)

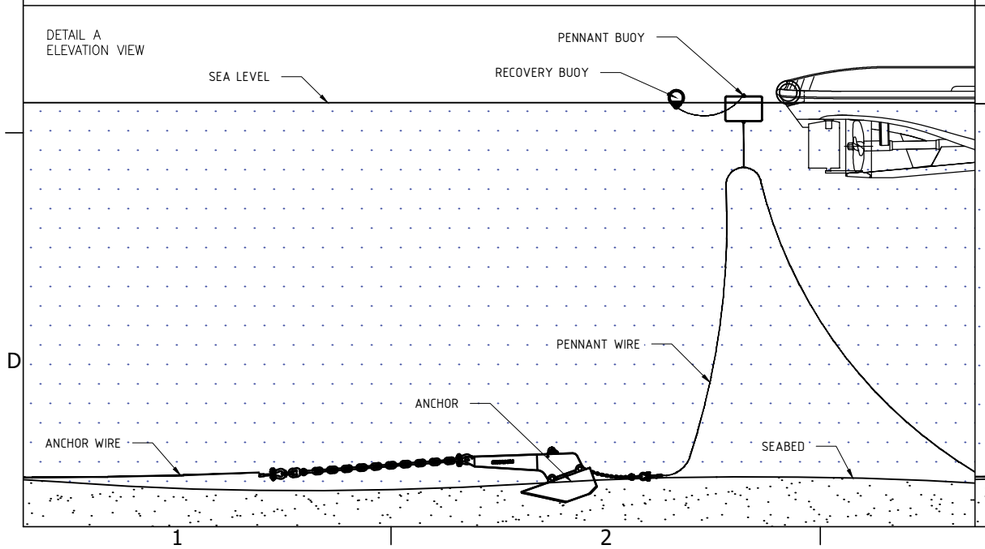


STEP 2

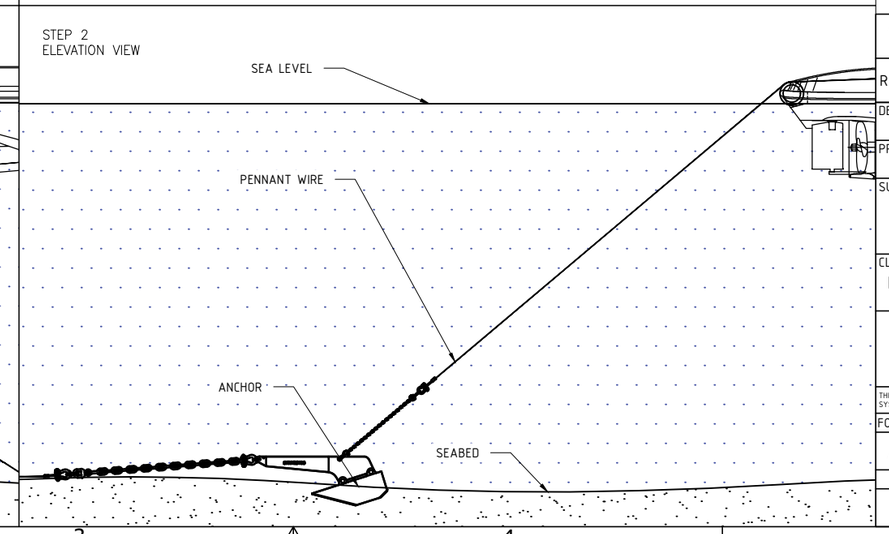
PLAN VIEW



DETAIL A
ELEVATION VIEW



STEP 2
ELEVATION VIEW



REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: RECOVERY OF ANCHORS AFTER COMPLETION OF OPERATIONS

-

CLIENT: LIVERPOOL BAY CCS

liverpool bay ccs

BOSKALIS SUBSEA CABLES
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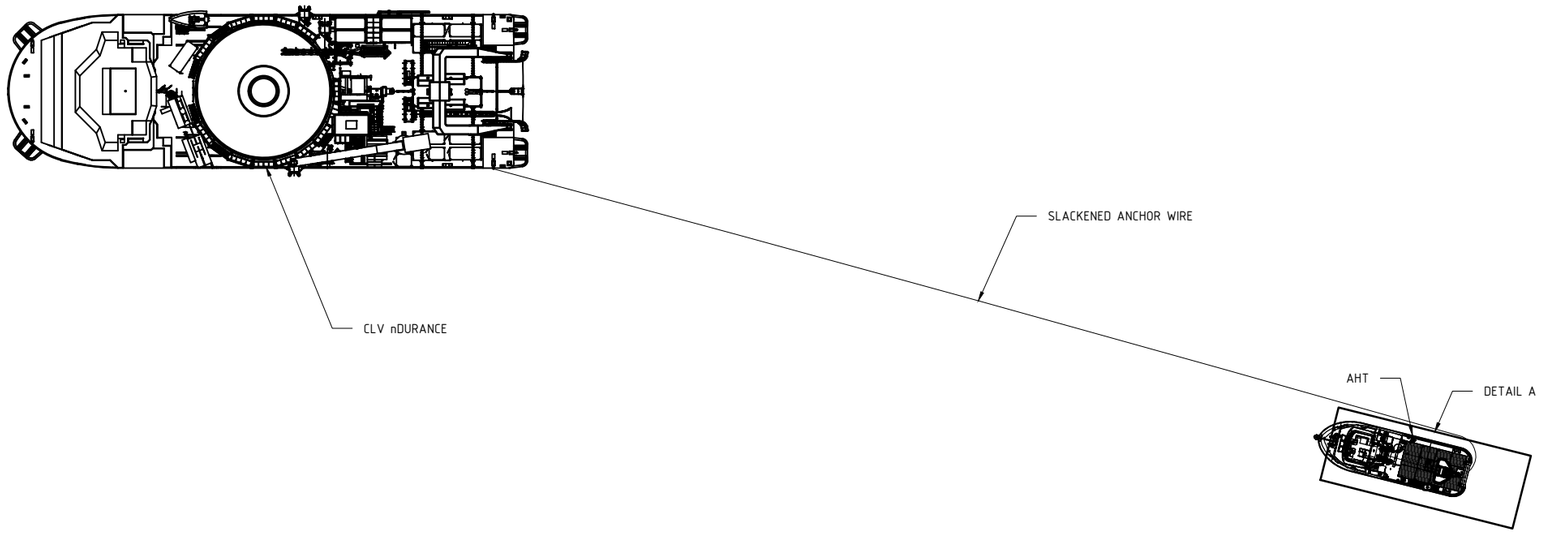
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
1 : 200		0059359-BOS-CAD-DRW-5010	01 of 03 / A

STEP 3

PLAN OVERVIEW SCALE 1:1200



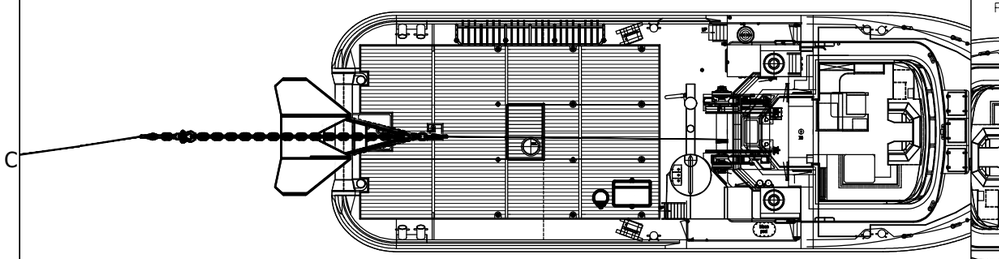
NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

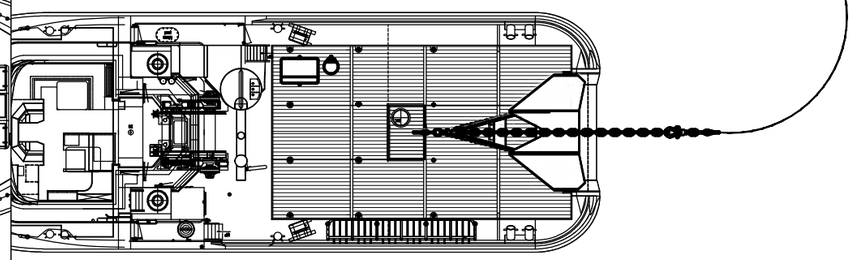
STEP 3:

- (11) AHT BREAKS OUT THE ANCHOR AND HAUL IN PENNANT WIRE IN UNTIL THE ANCHOR IS JUST ON THE STERN/BOW ROLLER.
- THE COMPLETE ANCHOR NEEDS TO BE TAKEN ON DECK OF THE AHT AND NEEDS TO BE DOUBLE SECURED ON BOARD.
- (12) WHEN ANCHOR IS SEAFASTENED ON DECK OF THE AHT, AHT WILL SAIL TOWARDS CLV.

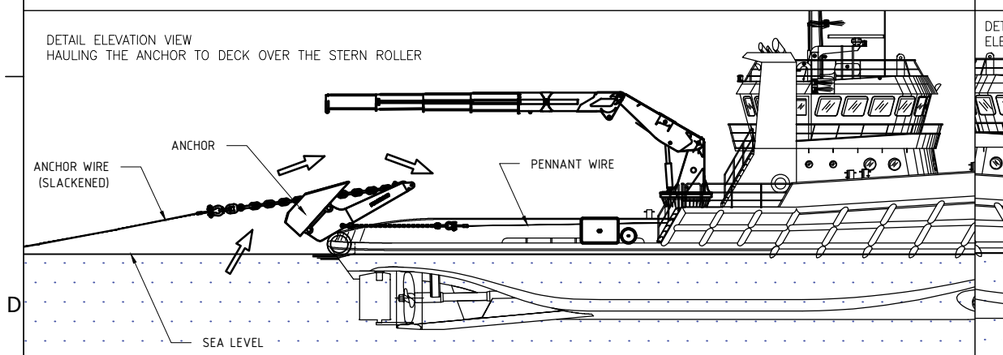
DETAIL PLAN VIEW



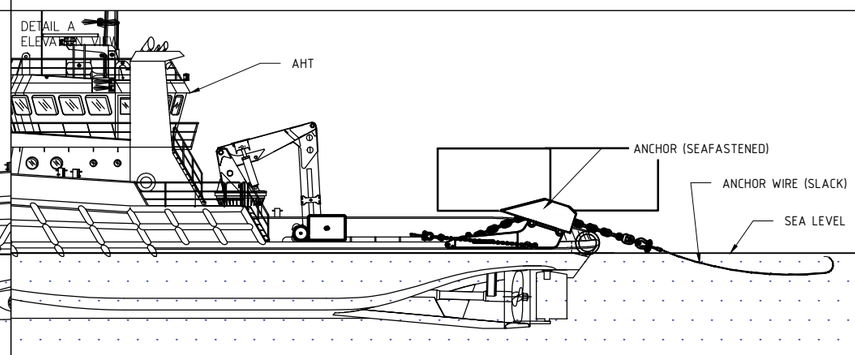
DETAIL A
PLAN VIEW



DETAIL ELEVATION VIEW
HAULING THE ANCHOR TO DECK OVER THE STERN ROLLER



DETAIL A
ELEVATION VIEW



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A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT
LIVERPOOL BAY CCS PROJECT

SUBJECT
RECOVERY OF ANCHORS AFTER COMPLETION OF OPERATIONS
-

CLIENT
LIVERPOOL BAY CCS

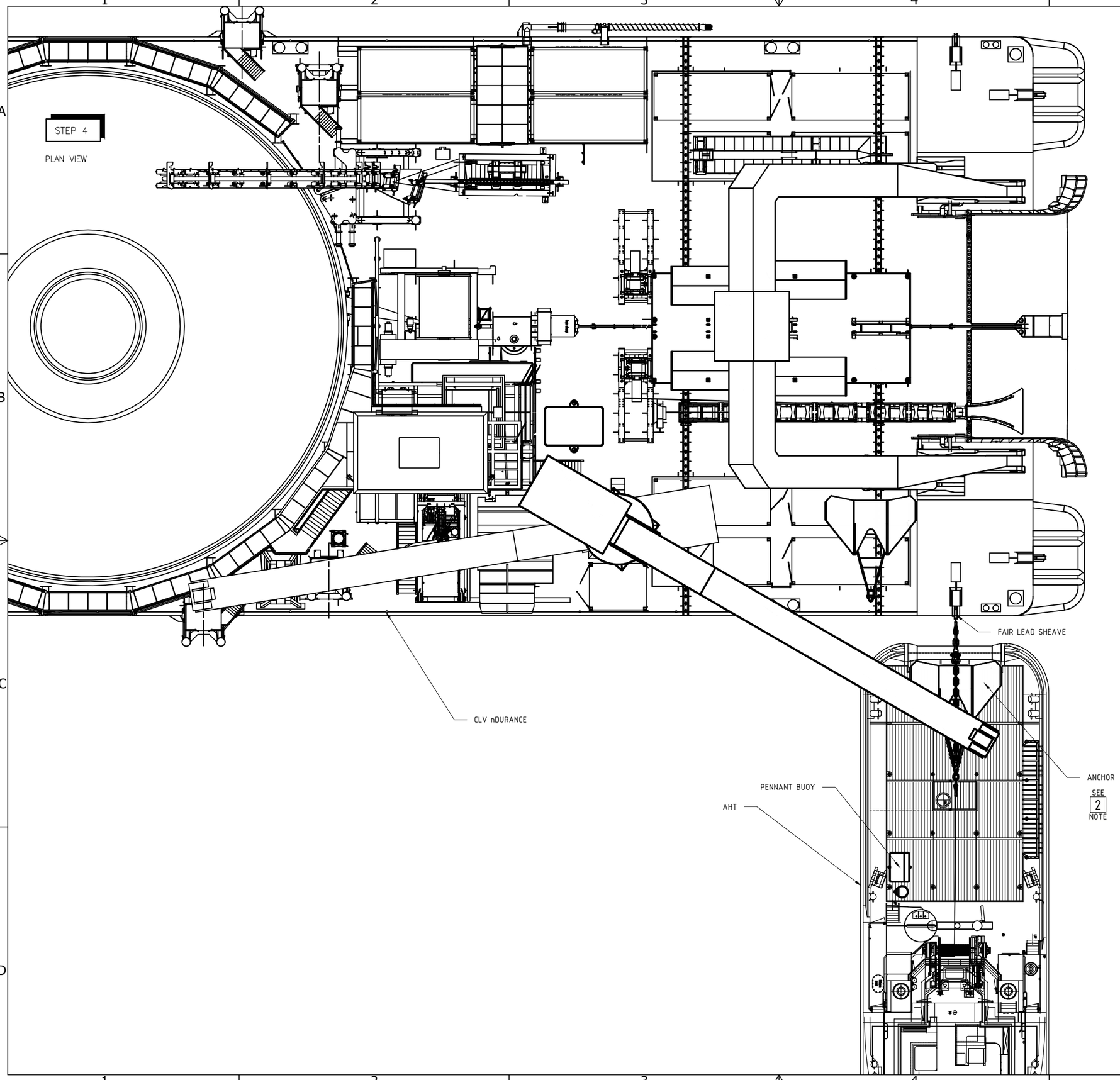
BOSKALIS SUBSEA CABLES
P.O.BOX 43, 3350 AA PAPENDRECHT - E-MAIL: ROYAL@BOSKALIS.COM

FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-

SCALE	BOSKALIS DRAWING NO.	SHEET	REV.
1 : 1	0059359-BOS-CAD-DRW-5010	02 of 03	A

STEP 4

PLAN VIEW



NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 4:

- (13) CLV WILL REDUCE THE TENSION ON THE WIRE AND KEEP MONITOR THE TENSION AND MOVING IN OF THE AHT.
- (14) WHEN AHT IS NEARBY CLV, REMOVE THE WINCH WIRE FROM THE ANCHOR.
- UNTIL COMPLETE JOB IS DONE, ANCHORS 3 AND 4 ARE TO BE WET STORED. ANCHORS 1, 2, 5 AND 6 ARE RACKED.
- CLV WILL SLEW CRANE INTO POSITION AND THE ANCHOR WILL BE CONNECTED TO THE CRANE HOOK.
- CLV WILL LIFT ANCHOR INTO STORAGE POSITION ON CLV AND THE DECK CREW WILL SEAFASTEN TO STRONG POINTS ON THE DECK.
- IN CASE NO DECK SPACE IS AVAILABLE, THE ANCHORS WILL BE STORED AT THE DESIGNATED WET-STORE LOCATION.
- (16) AHT CAN CONTINUE RECOVER REMAINING ANCHORS.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: RECOVERY OF ANCHORS AFTER COMPLETION OF OPERATIONS

-

CLIENT: LIVERPOOL BAY CCS

liverpool bay ccs

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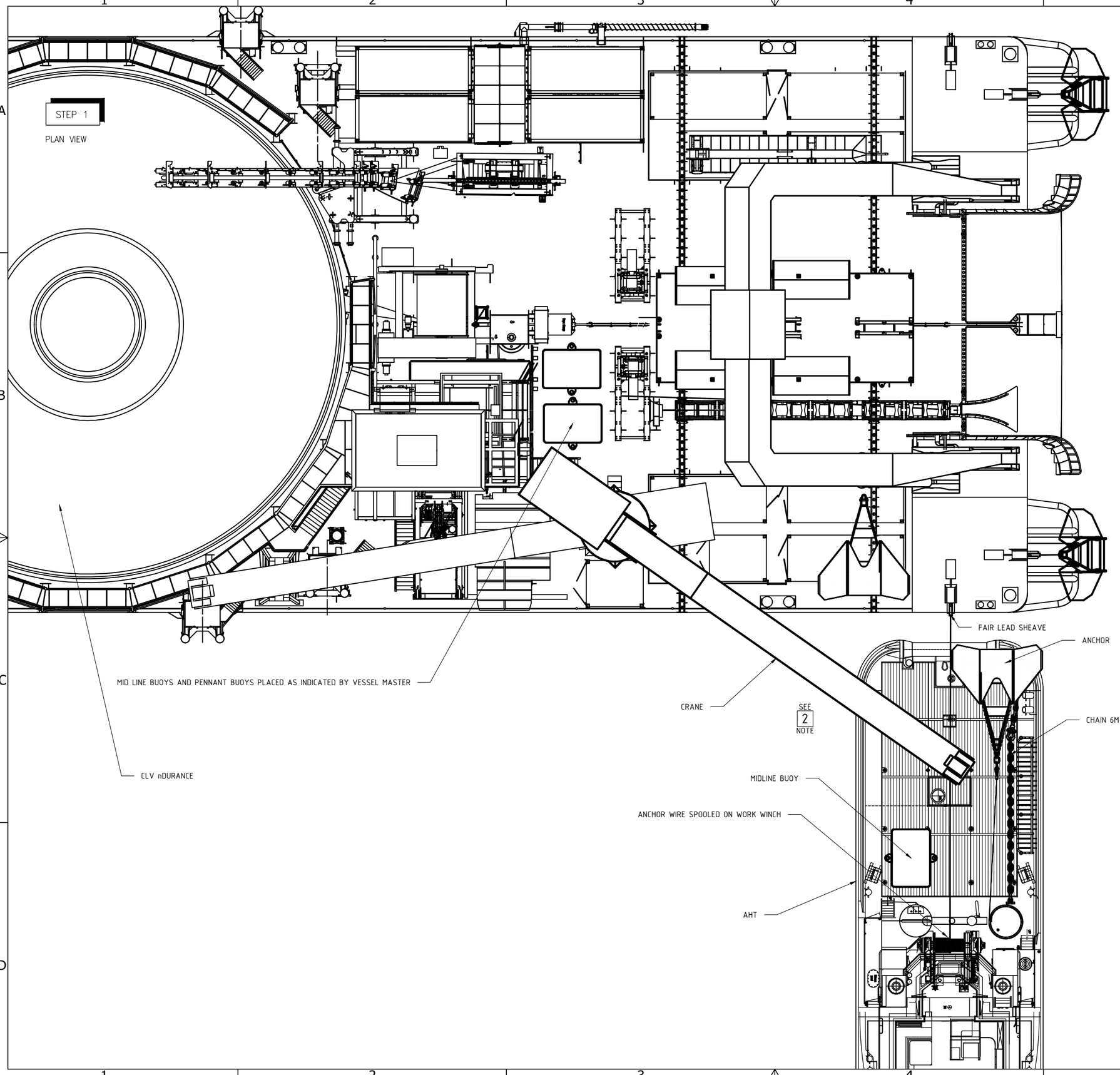
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
1 : 200		0059359-BOS-CAD-DRW-5010	03 of 03 / A

Appendix C4 Midline buoy and anchor deployment

STEP 1

PLAN VIEW



GENERAL NOTES

1. ALL MEASUREMENTS ARE IN mm UNLESS NOTED OTHERWISE
2. ANCHOR: STEVPRIS / DELTA FLIPPER (TBC)

Reference is made to:
0059359-BOS-ENG-PRO-5005-Anchor procedure

STEP 1:

- (4) CLV MEASURE LOCATION(S) FOR MIDLINE BUOY(S) WITH SURVEY SYSTEM.
- (5) THE CLV WILL PASS (WITH MESSENGER WIRE AND/OR CRANE ASSISTANCE) MIDLINE BUOY, PENNANT BUOY, PENNANT WIRE AND ANCHOR TO THE AHT.
- (PRE-CONNECTED TO THE ANCHOR WINCH WIRE AS PER MID -LINE BUOY ARRANGEMENT DRAWING IF THEY ARE STORED ON THE CLV.
- IF THE ANCHORS ARE STORED ON THE AHT, CLV WILL PASS A MESSENGER WIRE TO CONNECT THE PENNANT WIRE TO THE ANCHOR.
- CLV MASTER TO DECIDE WHICH ANCHOR(S) TO START WITH.
- (6) THE COMPLETE ANCHOR NEEDS TO BE TAKEN ON DECK OF THE AHT AND NEEDS TO BE DOUBLE SECURED ON BOARD.
- THE MIDLINE BUOY(S) ARE ALSO ON DECK OF THE AHT AND SECURED ON BOARD.
- (7) CLV APPLY MARKER TAPE ON CLV DECK AT MIDLINE BUOY LOCATIONS.
- AHT SPOOL ANCHOR WIRE ON WORK WINCH AHT.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: MID-LINE BUOY AND ANCHOR DEPLOYMENT

-

CLIENT: LIVERPOOL BAY CCS

liverpool bay ccs

BOSKALIS SUBSEA CABLES
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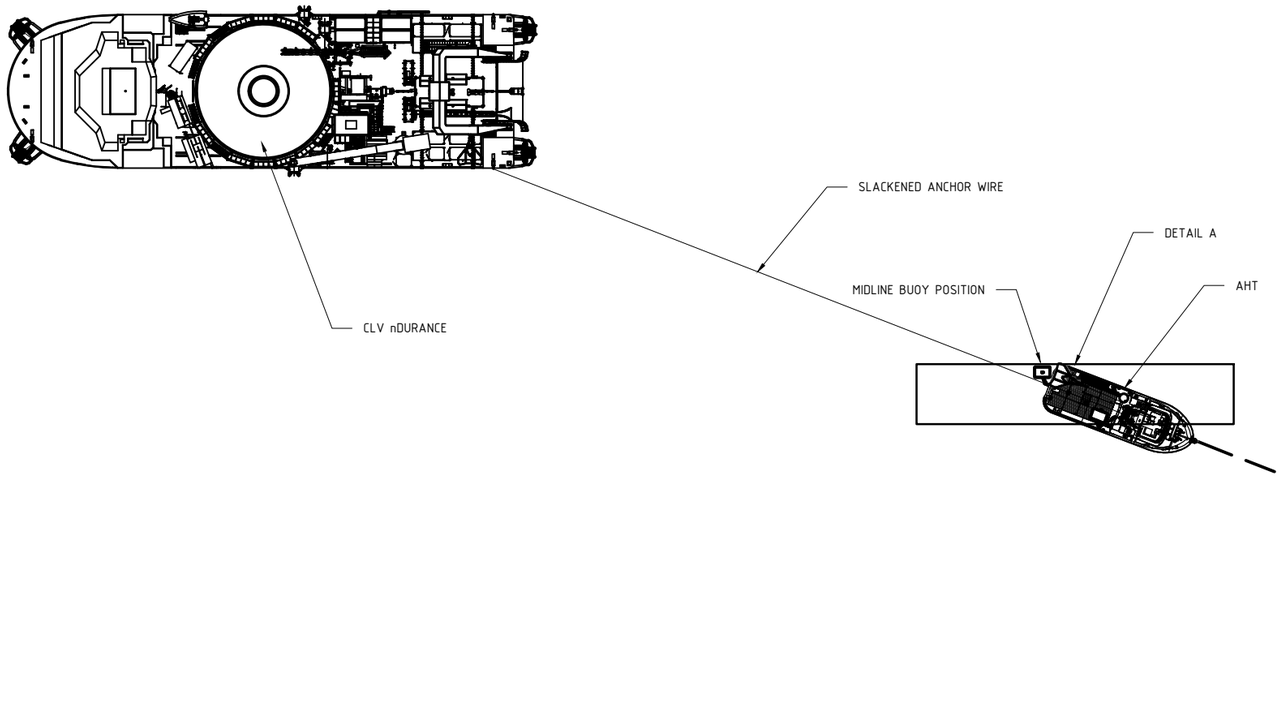
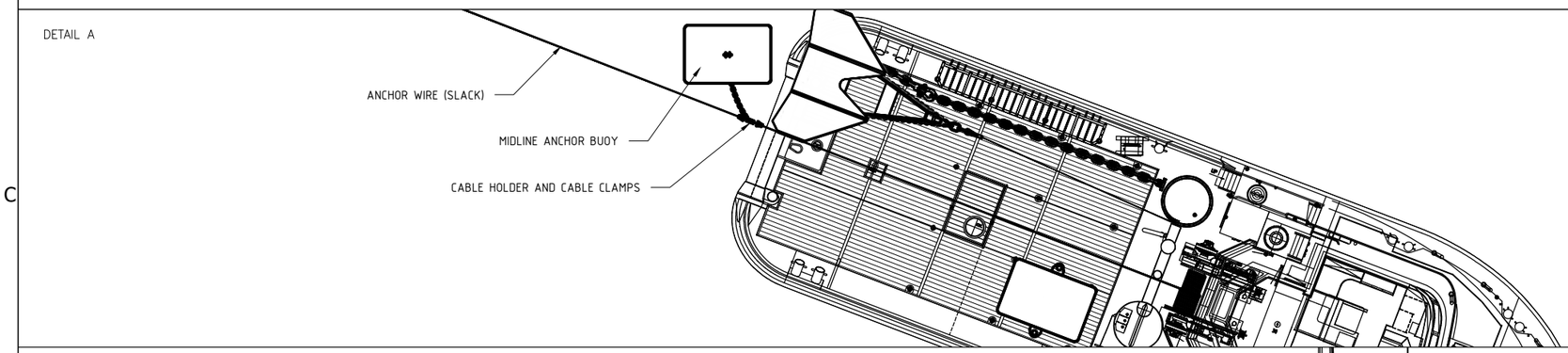
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
1 : 200		0059359-BOS-CAD-DRW-5011	01 of 03 / A

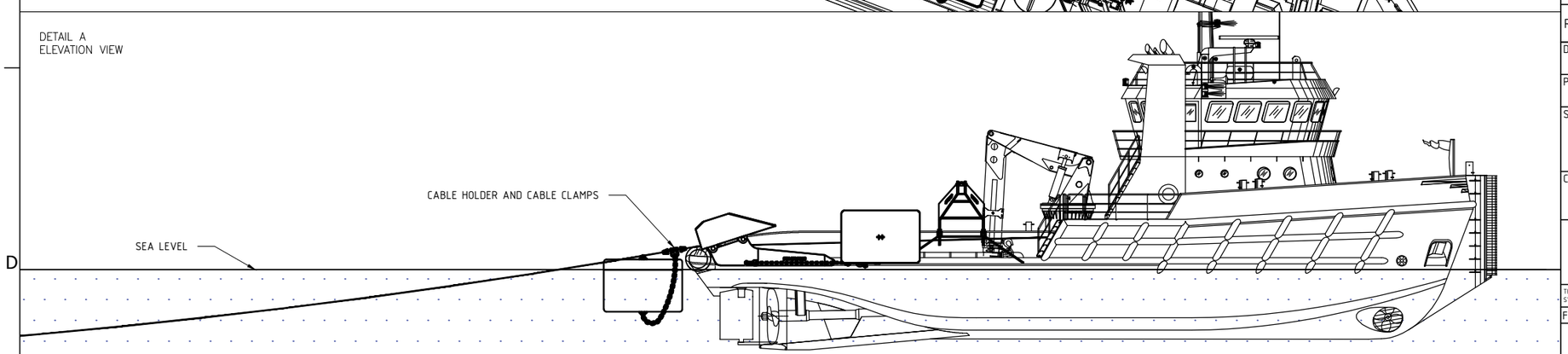
STEP 2

PLAN OVERVIEW SCALE 1:1200





DETAIL A
ELEVATION VIEW



NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 2:

- (8) PLACE ANCHOR WIRE BETWEEN THE TOWING PINS (IF APPLICABLE WITH SAILING DIRECTION).
- (9) AHT SAIL TO FIRST/NEXT MIDLINE BUOY LOCATION (SAILS FORWARD OR BACKWARD, DEPENDING ON AHT CONFIGURATION, DECISION IS MADE BY AHT CAPTAIN).
- (10) INSTALL THE CABLE HOLDER AND CABLE CLAMPS ON THE ANCHOR WIRE.
- (11) CONNECT THE MIDLINE BUOY CHAIN WITH A SHACKLE TO THE CABLE HOLDER, AS PER DRAWING IN APPENDIX C/06.
- (12) AHT OVERBOARD MIDLINE BUOY AND POLYPROPYLENE ROPE (ATTACHED TO MIDLINE BUOY TO RECOVER THE MIDLINE BUOY) ABOVE CABLE AND START PAYING OUT AHT WORK WINCH WHILE SAILING TO ANCHOR DROP POSITION.
- MIDLINE BUOY IS CONNECTED TO THE WINCH WIRE AND IS DEPLOYED AS THE ANCHOR WIRE IS PAID OUT OVER THE AHT STERN.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT
LIVERPOOL BAY CCS PROJECT

SUBJECT
MID-LINE BUOY AND ANCHOR DEPLOYMENT
-

CLIENT
LIVERPOOL BAY CCS

liverpool bay ccs

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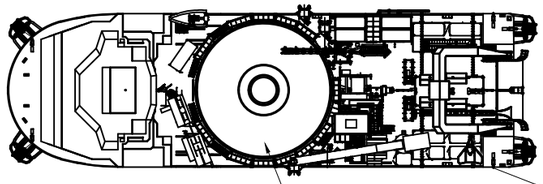
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-

SCALE	BOSKALIS DRAWING NO.	SHEET	REV.
1 : 1	0059359-BOS-CAD-DRW-5011	02 of 03	A

STEP 3

PLAN OVERVIEW SCALE 1:1200



CLV nDURANCE

MIDLINE BUOY

DETAIL A

AHT

DETAIL A

ANCHOR WIRE

ANCHOR

PENNANT WIRE

PENNANT BUOY

RECOVERY BUOY

DETAIL A
ELEVATION VIEW

SEA LEVEL

NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 3:

- ONCE IN POSITION SPOOL OFF THE REMAINING WIRE OFF THE AHT WINCH (IF NECESSARY).
- CONNECT THE ANCHOR WINCH WIRE ON TO THE ANCHOR, AS PER DRAWING IN APPENDIX C/01 OR C/02.
- AHT CREW CONNECTS THE PENNANT WIRE TO THE WINCH AND SPOOLS THE WIRE ON THE WINCH.
- CONTINUE WITH TP/01 STEP 9

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: MID-LINE BUOY AND ANCHOR DEPLOYMENT

-

CLIENT: LIVERPOOL BAY CCS

liverpool bay ccs

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FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-

SCALE	BOSKALIS DRAWING NO.	SHEET	REV.
1 : 1	0059359-BOS-CAD-DRW-5011	03 of 03	A

Appendix C5 Midline buoy and anchor recovery

STEP 1 PLAN OVERVIEW SCALE 1:1200

CLV nDURANCE

MIDLINE BUOY

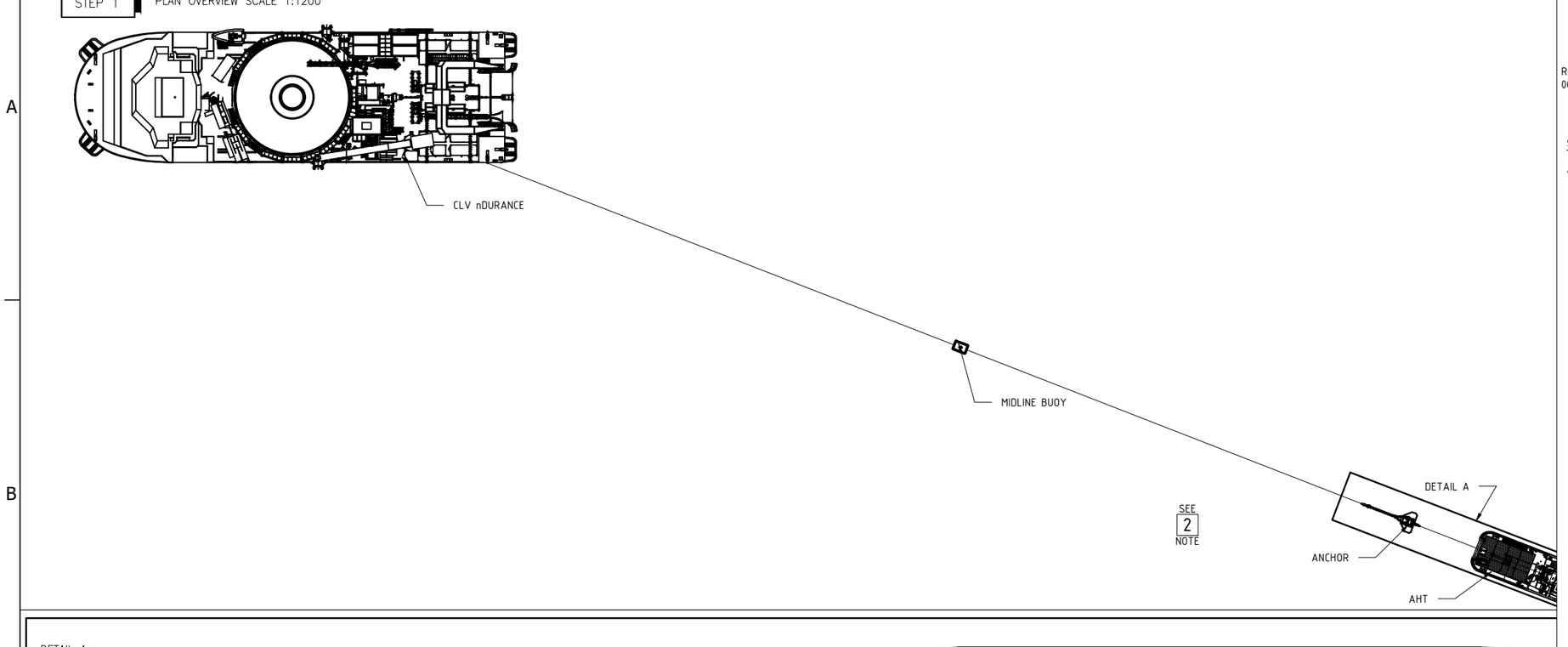
SEE 2 NOTE

DETAIL A

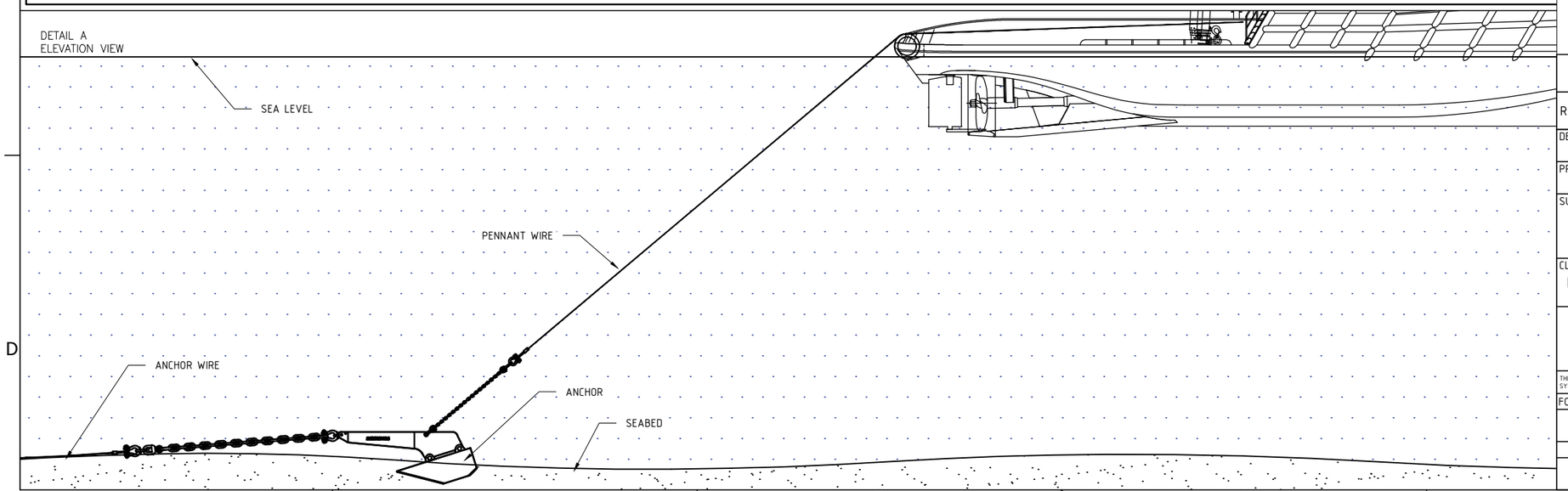
ANCHOR

AHT

DETAIL A
PLAN VIEW



DETAIL A
ELEVATION VIEW



GENERAL NOTES

1. ALL MEASUREMENTS ARE IN mm UNLESS NOTED OTHERWISE
2. ANCHOR: STEVPRIS / DELTA FLIPPER (TBC)

Reference is made to:
0059359-BOS-ENG-PRO-5005-Anchor procedure

STEP 1:

- (3) START WITH THE RECOVERY OF THE ANCHOR, FOLLOWING RELEVANT TASK PLAN.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: MID-LINE BUOY AND ANCHOR RECOVERY

-

CLIENT: LIVERPOOL BAY CCS

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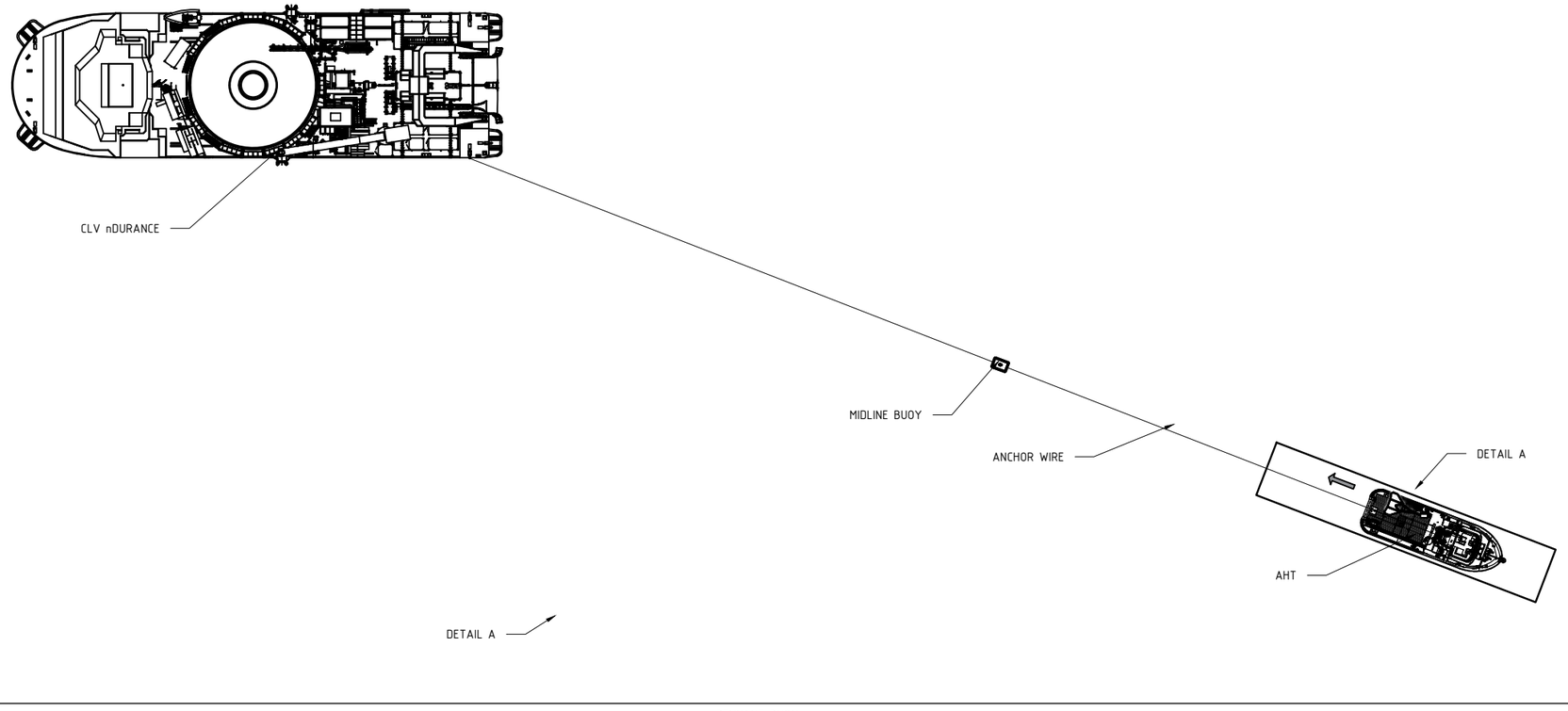
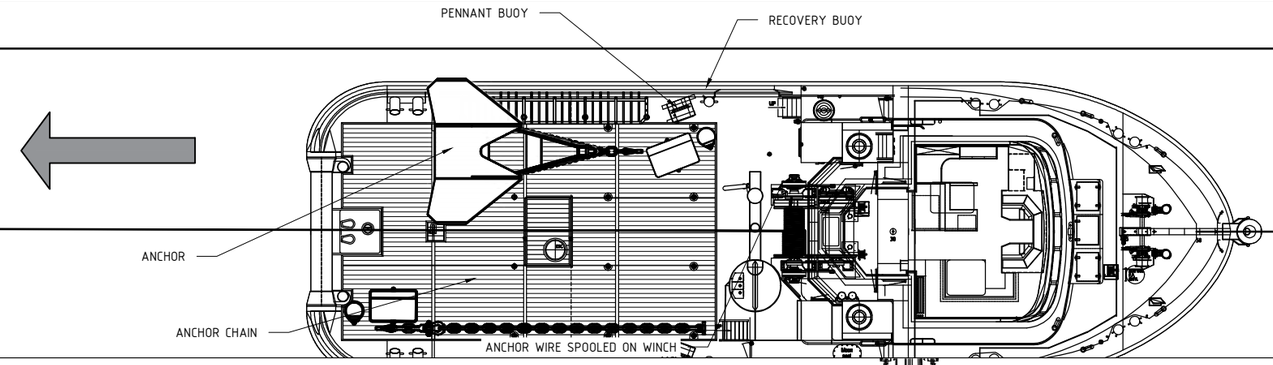
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
1 : 200		0059359-BOS-CAD-DRW-5012	01 of 04 / A

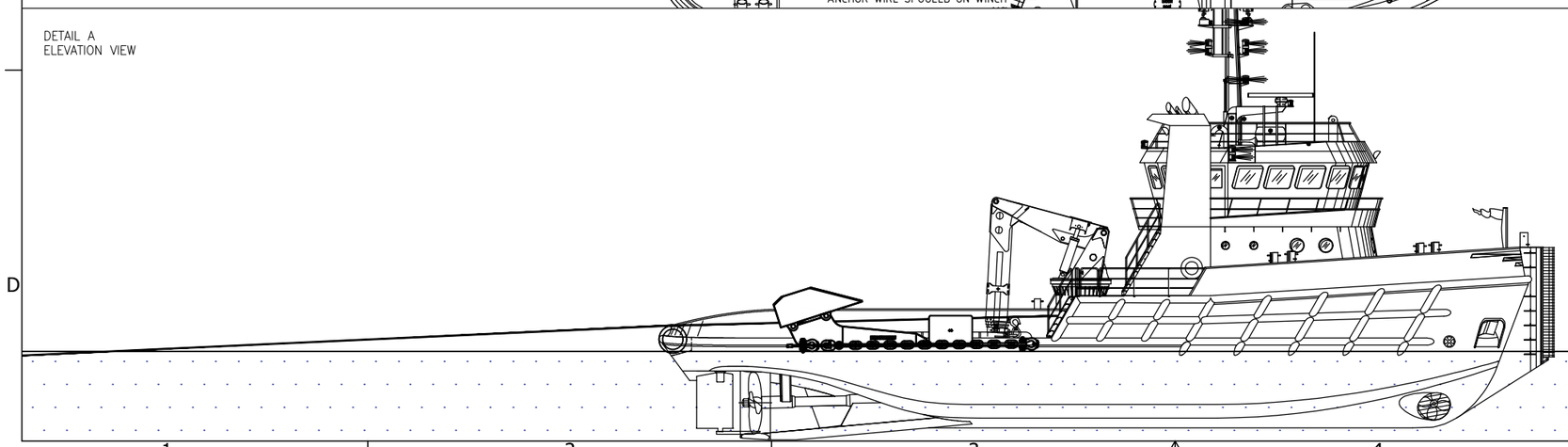
STEP 2 PLAN OVERVIEW SCALE 1:1200



DETAIL A
PLAN VIEW



DETAIL A
ELEVATION VIEW



NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 2:

- (5) AHT SPOOL OFF PENNANT WIRE FROM THE WORK WINCH.
- (6) AHT DECK CREW DISCONNECT ANCHOR WIRE SHACKLE.
- AHT SPOOL ANCHOR WIRE ON WORK WINCH AHT.
- (7) THE AHT WILL SAIL TO MIDLINE BUOY POSITION AND AT THE SAME TIME REELING IN ANCHOR WIRE ON THE WORK WINCH.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: MID-LINE BUOY AND ANCHOR RECOVERY

-

CLIENT: LIVERPOOL BAY CCS

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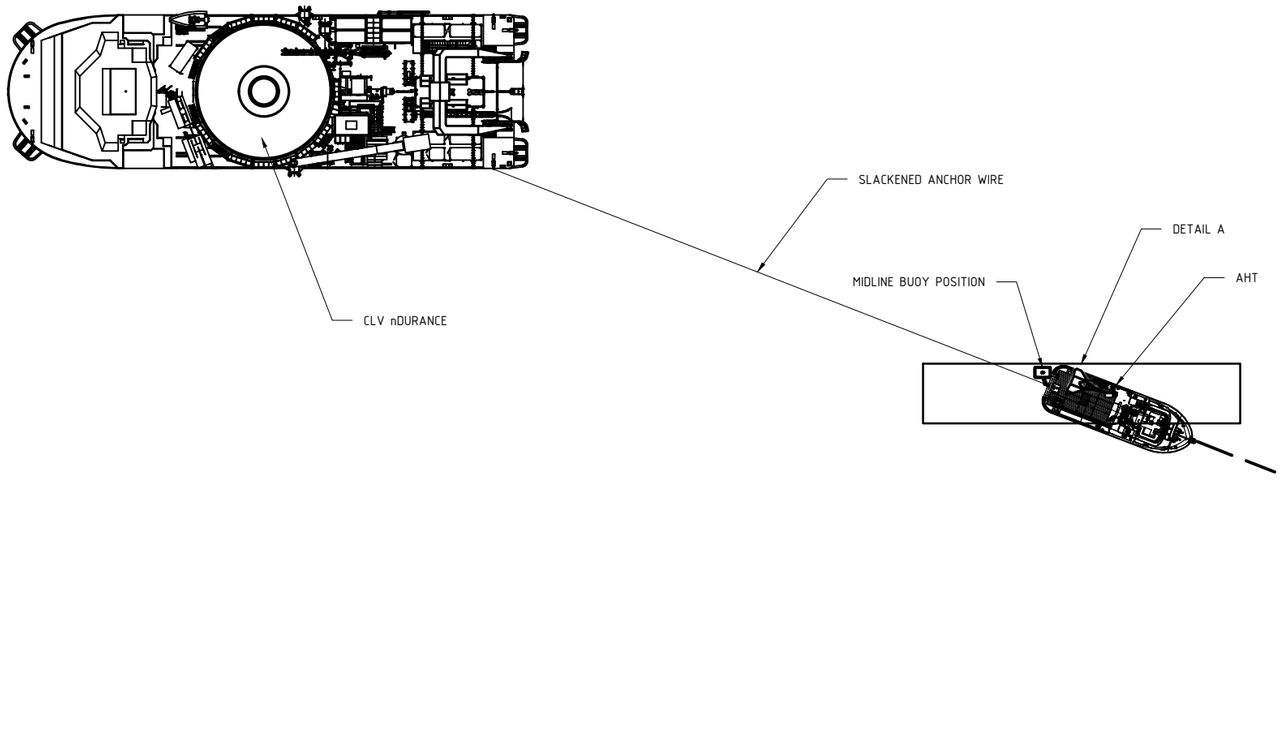
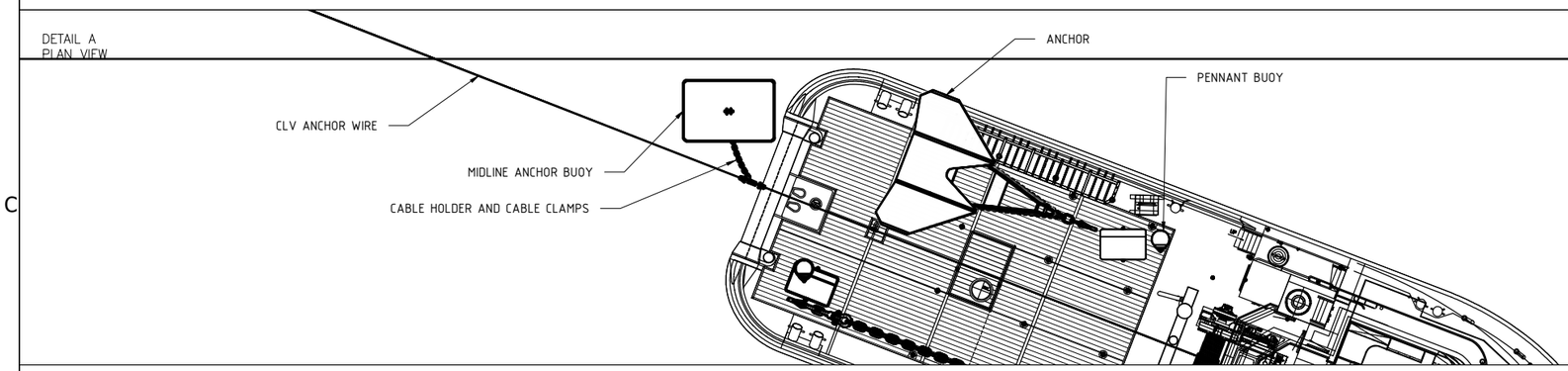
A3		-	-

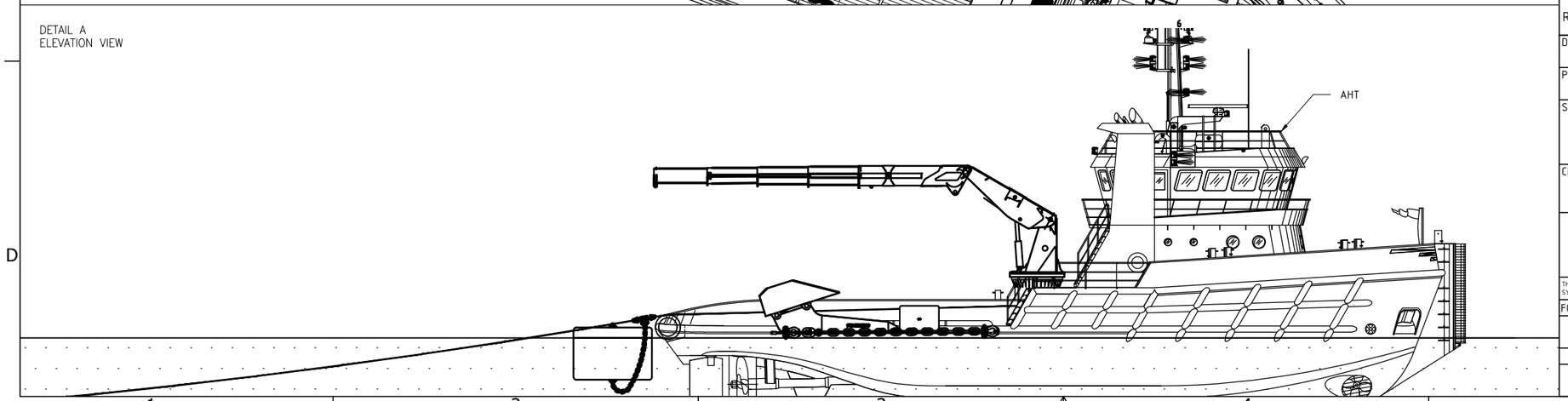
SCALE	BOSKALIS DRAWING NO.	SHEET	REV.
1 : 200	0059359-BOS-CAD-DRW-5012	02 of 04	A

STEP 3

PLAN OVERVIEW SCALE 1:1200







NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 3:

- (8) AHT DECK CREW DISCONNECT THE MIDLINE BUOY.
- (9) AHT DECK CREW REMOVE THE CABLE HOLDER AND CABLE CLAMPS FROM THE ANCHOR WIRE.
- DECK CREW TO EXAMINE WIRE TO ENSURE CLAMPS HAVE NOT CAUSED ANY DAMAGE.
- IF DAMAGE ALL STOP TO BE CALLED AND OCM NOTIFIED.
- (10) FOR RECOVERING FOLLOWING MIDLINE BUOY (ON SAME ANCHOR WIRE) CONTINUE WITH STEP 7. CONTINUE WITH STEP 12 WHEN ALL MIDLINE BUOYS ARE RECOVERED (FROM THE SAME ANCHOR WIRE).
- (11) THE AHT SAIL TO CLV AND AT THE SAME TIME REELING IN ANCHOR WIRE ON THE WORK WINCH OF THE AHT

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT
LIVERPOOL BAY CCS PROJECT

SUBJECT
MID-LINE BUOY AND ANCHOR RECOVERY
-

CLIENT
LIVERPOOL BAY CCS

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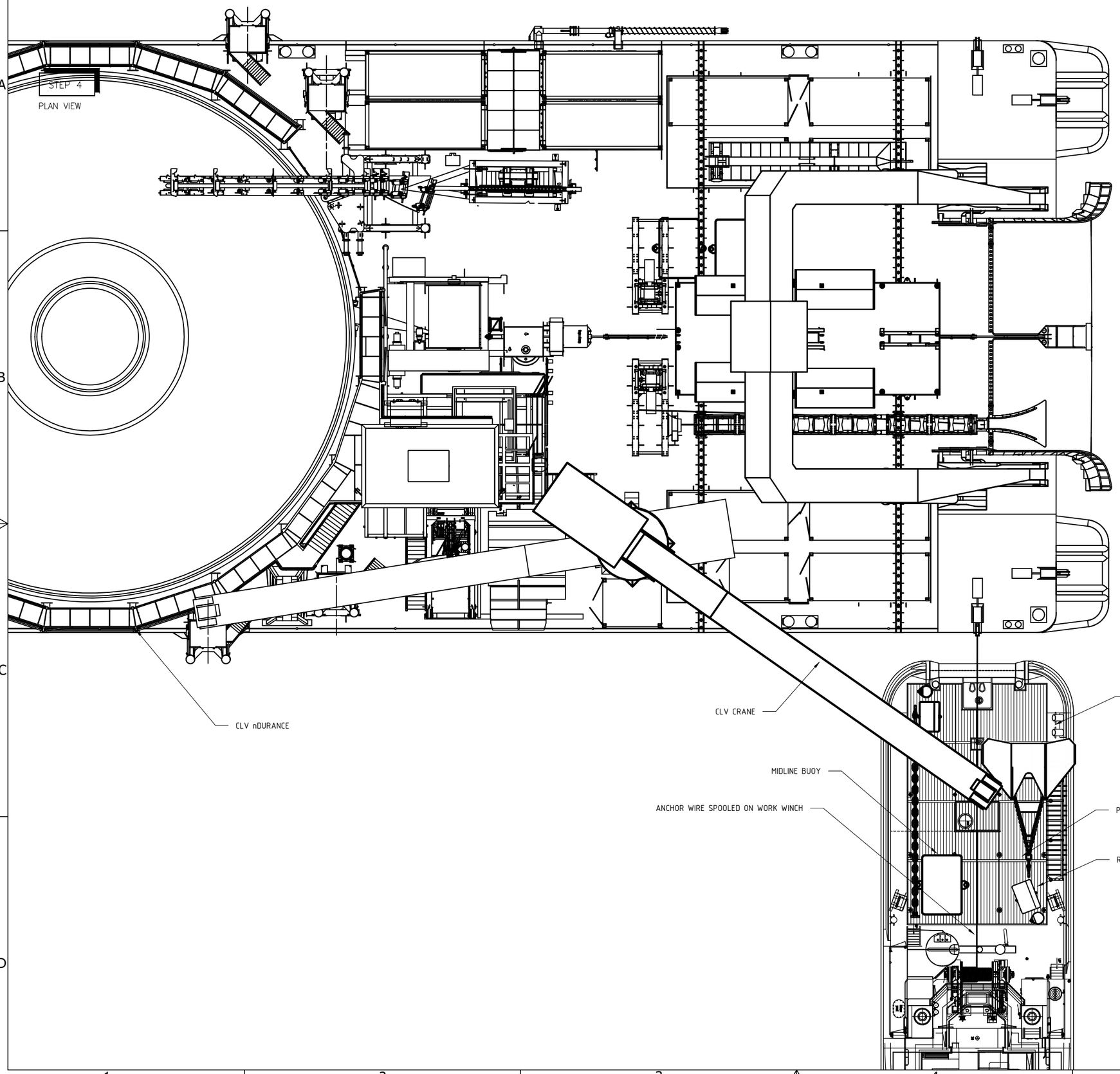
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
1 : 200		0059359-BOS-CAD-DRW-5012	03 of 04 / A

STEP 4

PLAN VIEW



NOTES

1. FOR GENERAL NOTES AND REFERENCES, SEE SHEET 01

STEP 4:

- (12) AHT SPOOL ANCHOR WIRE OFF AND CLV RETREAT THE ANCHOR WIRE.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	MLPZ	ELSC	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: MID-LINE BUOY AND ANCHOR RECOVERY

-

CLIENT: LIVERPOOL BAY CCS

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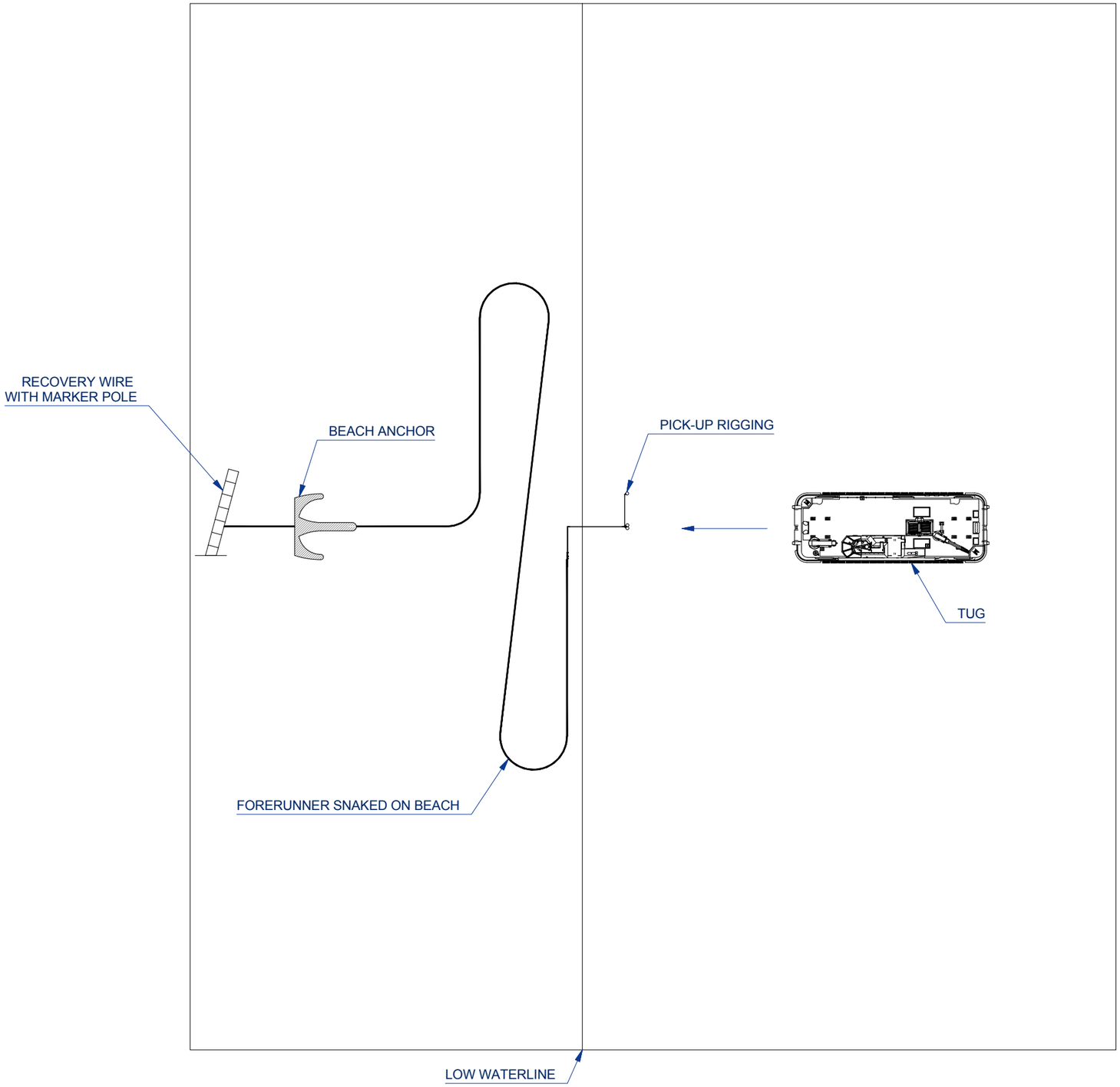
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3		-	-
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
1 : 200		0059359-BOS-CAD-DRW-5012	04 of 04 / A

Appendix C6 Connect to pre-installed beach anchors [HOLD03]

STEP 1



FOR PROCEDURE SEE TP/07 CONNECT / DISCONNECT TO PRE-INSTALLED BEACH ANCHORS

1. ONSHORE CREW TO PRE-INSTALL BEACH ANCHORS
2. TUG TO MOVE TOWARDS PRE-INSTALLED FORERUNNER PICK-UP RIGGING
3. TUG TO RECOVER THE FORERUNNER PICK-UP RIGGING WITH A GRAPPLE HOOK OR BOAT HOOK
4. CONNECT RIGGING TO TUGGER WINCH
5. PULL FORERUNNER END ON DECK
6. APPLY HOLDBACK (STOPPER) TO SECURE FORERUNNER TO DECK PINS

Example

REV No.	DATE OF DRG	DRAWN BY	STATUS	CHECKED BY CAD	APPROVED BY PE
P1	02-03-20	HICO	FOR IFORMATION		
P0	25-02-20	HICO	FOR INTERNAL REVIEW		

COMPANY:

Boskalis

Subsea
Rosmolenweg 20, 3356 LK Papendrecht,
PO Box 282, 3350 AG Papendrecht
The Netherlands
T +31(0)78 696 9000
www.boskalis.com/offshore

PROJECT NAME: HORNSEA II

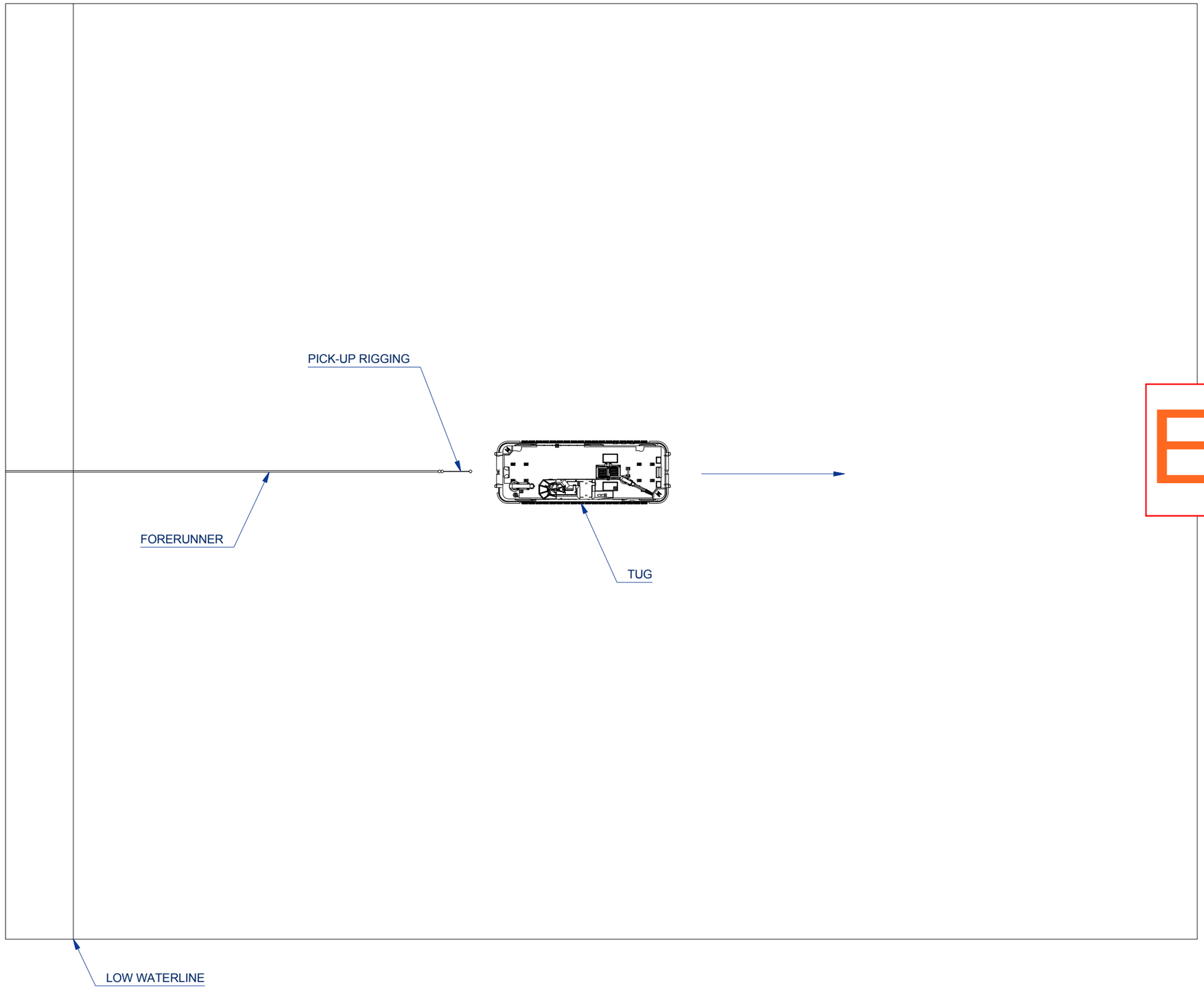
CLIENT COMPANY NAME: **ØRSTED**

DRAWING TITLE:

ANCHOR HANDLING PROCEDURE NDURANCE
CONNECT TO PRE-INSTALLED BEACH ANCHOR

DOCUMENT No:		MATERIAL: N/A	WEIGHT: N/A	
SCALE:	SIZE: A3	DRAWING NUMBER: P0036341-BSCF-STB-DWG-13395	SHEET: 1 OF 4	REV.No.: P1

STEP 2



FOR PROCEDURE SEE TP/07 CONNECT / DISCONNECT TO PRE-INSTALLED BEACH ANCHORS

1. TUG TO MOVE AWAY FROM COAST AND PULL FORERUNNER TOWARDS CLV
2. SNAKED FORERUNNER SLOWLY PULLED FROM BEACH INTO SEA UNTIL ALMOST STRAIGHTENED
3. TUG AHT TO REMOVE DECK PIN HOLDBACK TO FORERUNNER AND DEPLOY ONTO SEABED

REV No.	DATE OF DRG	DRAWN BY	STATUS	CHECKED BY CAD	APPROVED BY PE
P1	02-03-20	HICO	FOR IFORMATION		
P0	25-02-20	HICO	FOR INTERNAL REVIEW		

COMPANY:
Boskalis
Subsea
Rosmolenweg 20, 3356 LK Papendrecht,
PO Box 282, 3350 AG Papendrecht
The Netherlands
T +31(0)78 696 9000
www.boskalis.com/offshore

PROJECT NAME: HORNSEA II

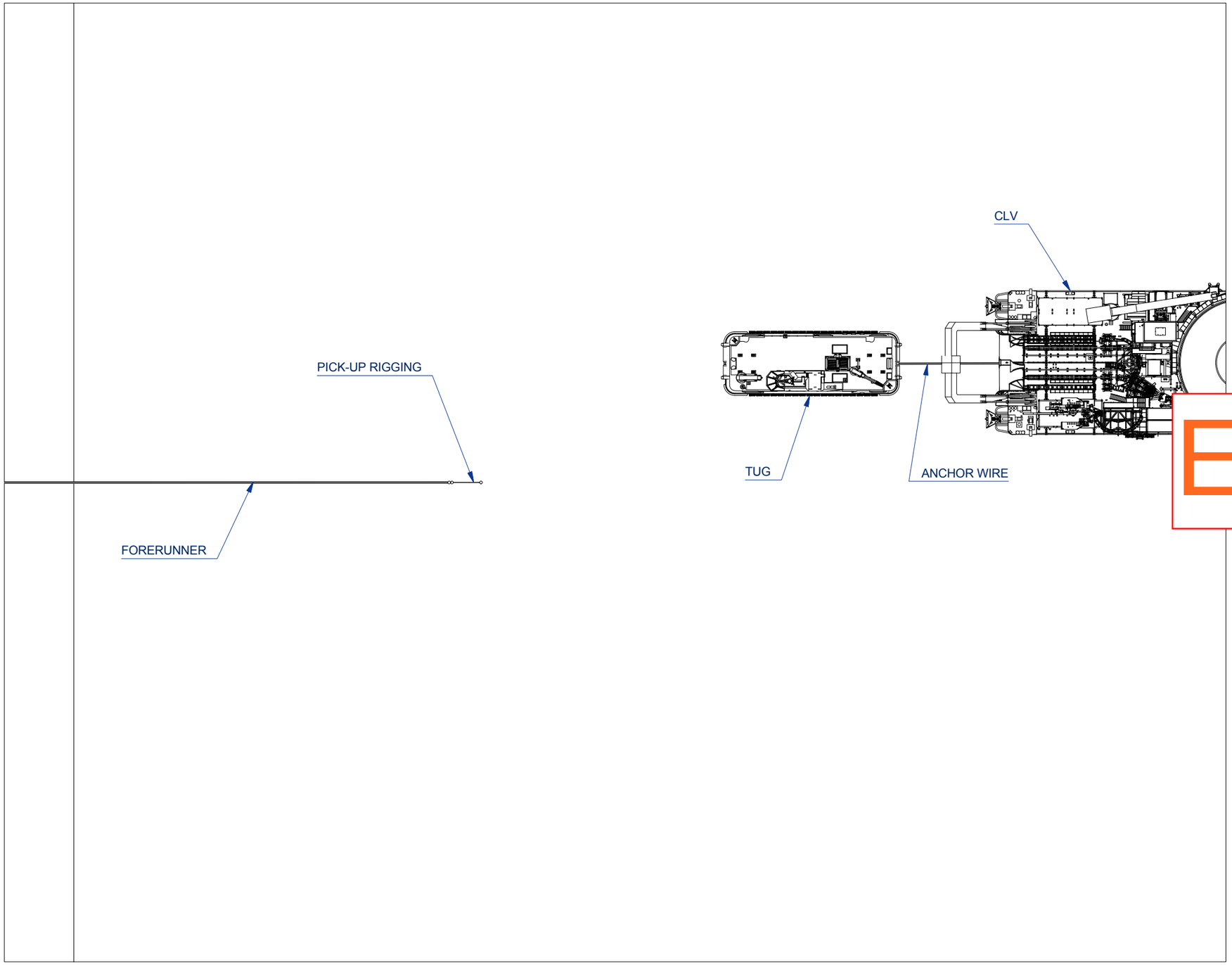
CLIENT COMPANY NAME: **ØRSTED**

DRAWING TITLE:

ANCHOR HANDLING PROCEDURE NDURANCE CONNECT TO PRE-INSTALLED BEACH ANCHOR

DOCUMENT No:			MATERIAL: N/A	WEIGHT: N/A	3rd ANGLE PROJECTION
SCALE:	SIZE: A3	DRAWING NUMBER: P0036341-BSCF-STB-DWG-13395		SHEET: 2 OF 4	REV.No.: P1

STEP 3



FOR PROCEDURE SEE TP/07 CONNECT / DISCONNECT TO PRE-INSTALLED BEACH ANCHORS

1. TUG TO COME ALONGSIDE CLV IN PREPARATION TO RECEIVE ANCHOR WIRE
2. CLV TO PASS ANCHOR WIRE TO AHT VIA MESSENGER WIRE
3. CLV TO PAY OUT ANCHOR WIRE AND AHT TO SPOOL IT ON WINCH UNTIL SUFFICIENT AMOUNT IS SPOOLED
4. TUG TO MOVE BACK TOWARDS THE FORERUNNER PICK-UP RIGGING. CLV TO INSTRUCT WHEN CLV STOPS PAYING OUT ANCHOR WIRE AND AHT IN TURN STARTS PAYING OUT ANCHOR WIRE

REV No.	DATE OF DRG	DRAWN BY	STATUS	CHECKED BY CAD	APPROVED BY PE
P1	02-03-20	HICO	FOR IFORMATION		
P0	25-02-20	HICO	FOR INTERNAL REVIEW		

COMPANY:

Boskalis

Subsea
Rosmolenweg 20, 3356 LK Papendrecht,
PO Box 282, 3350 AG Papendrecht
The Netherlands
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www.boskalis.com/offshore

PROJECT NAME: HORNSEA II

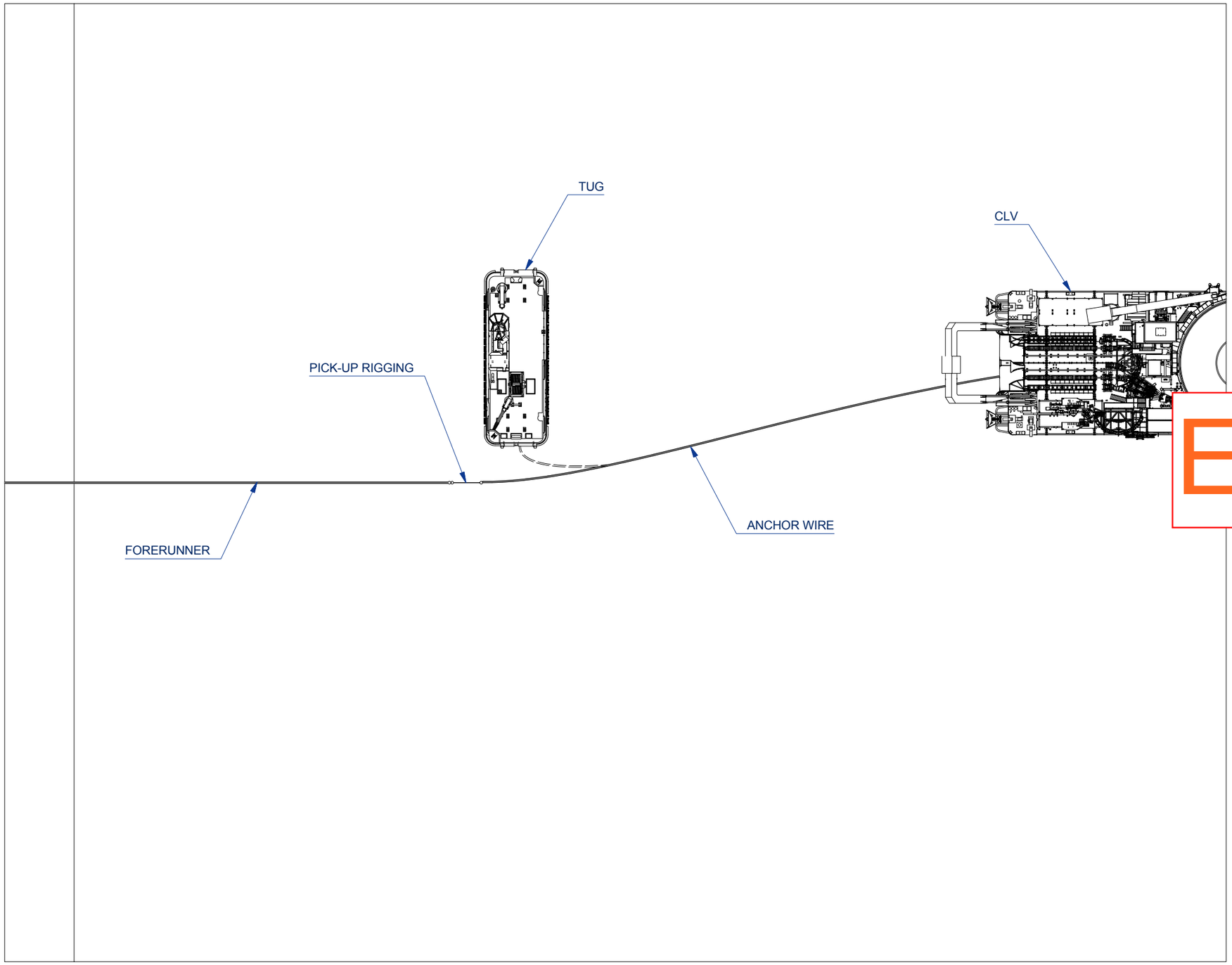
CLIENT COMPANY NAME: **ØRSTED**

DRAWING TITLE:

ANCHOR HANDLING PROCEDURE NDURANCE CONNECT TO PRE-INSTALLED BEACH ANCHOR

DOCUMENT No:		MATERIAL: N/A	WEIGHT: N/A	ISO PROJECTION
SCALE:	SIZE: A3	DRAWING NUMBER: P0036341-BSCF-STB-DWG-13395	SHEET: 3 OF 4	REV.No.: P1

STEP 4



FOR PROCEDURE SEE TP/07 CONNECT / DISCONNECT TO PRE-INSTALLED BEACH ANCHORS

1. TUG TO PICK UP FORERUNNER THROUGH PICK-UP RIGGING AND SECURE TO DECK PINS USING HOLDBACK (STOPPER)
2. TUG TO CONNECT ANCHOR WIRE TO FORERUNNER END VIA SHACKLES (85t) AND SWIVEL (231t MBL)
3. TUG TO REMOVE DECK PIN HOLDBACKS TO BOTH ANCHOR WIRE AND FORERUNNER AND PAY OUT FROM DECK TUGGER WINCH TO DEPLOY CONNECTION ONTO SEABED
4. AFTER CONNECTION, CLV TO SLOWLY INCREASE TENSION ON ANCHOR WIRE TO CHECK IF THE PRE-INSTALLED BEACH ANCHOR IS HOLDING IN POSITION

NOTE: FORERUNNER PICK-UP RIGGING, INCL. BUOYS, SHALL REMAIN AS PART OF THE DEPLOYED SYSTEM FOR FUTURE RECOVERY

REV No.	DATE OF DRG	DRAWN BY	STATUS	CHECKED BY CAD	APPROVED BY PE
P1	02-03-20	HICO	FOR IFORMATION		
P0	25-02-20	HICO	FOR INTERNAL REVIEW		

COMPANY:
Boskalis
Subsea
Rosmolenweg 20, 3356 LK Papendrecht,
PO Box 282, 3350 AG Papendrecht
The Netherlands
T +31(0)78 696 9000
www.boskalis.com/offshore

PROJECT NAME: HORNSEA II

CLIENT COMPANY NAME: **ØRSTED**

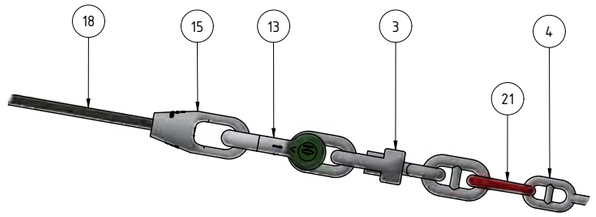
DRAWING TITLE:

ANCHOR HANDLING PROCEDURE NDURANCE CONNECT TO PRE-INSTALLED BEACH ANCHOR

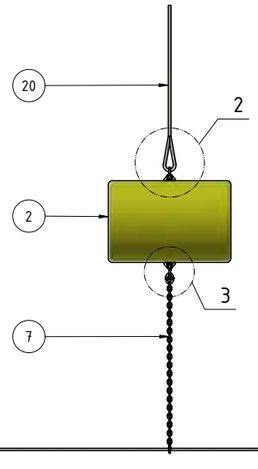
DOCUMENT No:	MATERIAL:	WEIGHT:	3rd ANGLE PROJECTION
	N/A	N/A	

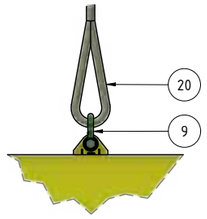
SCALE:	SIZE:	DRAWING NUMBER:	SHEET:	REV.No.:
	A3	P0036341-BSCF-STB-DWG-13395	4 OF 4	P1

Appendix D Overview anchor buoy connection Stevpris anchor (plough 7th anchor)

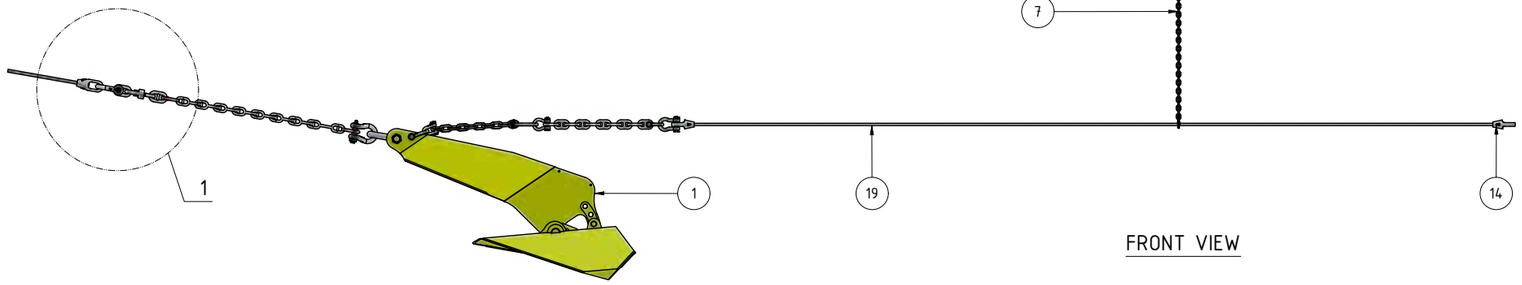


DETAIL 1
SCALE 1 : 40

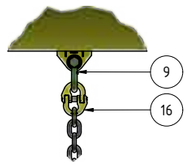




DETAIL 2
SCALE 1 : 50



FRONT VIEW



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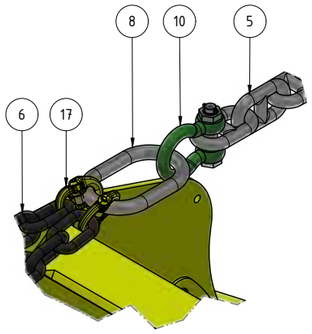
SCALE 1 : 50



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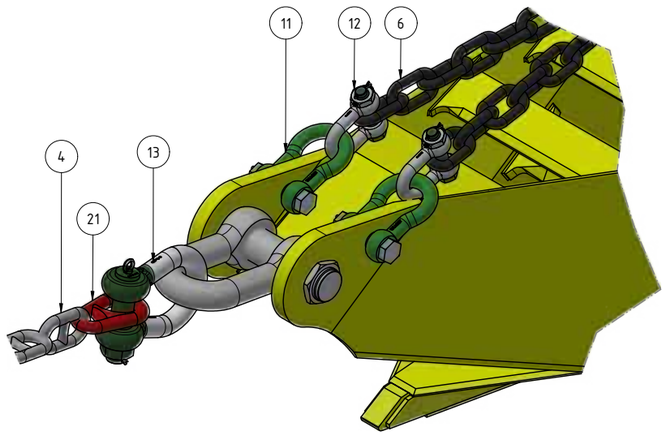
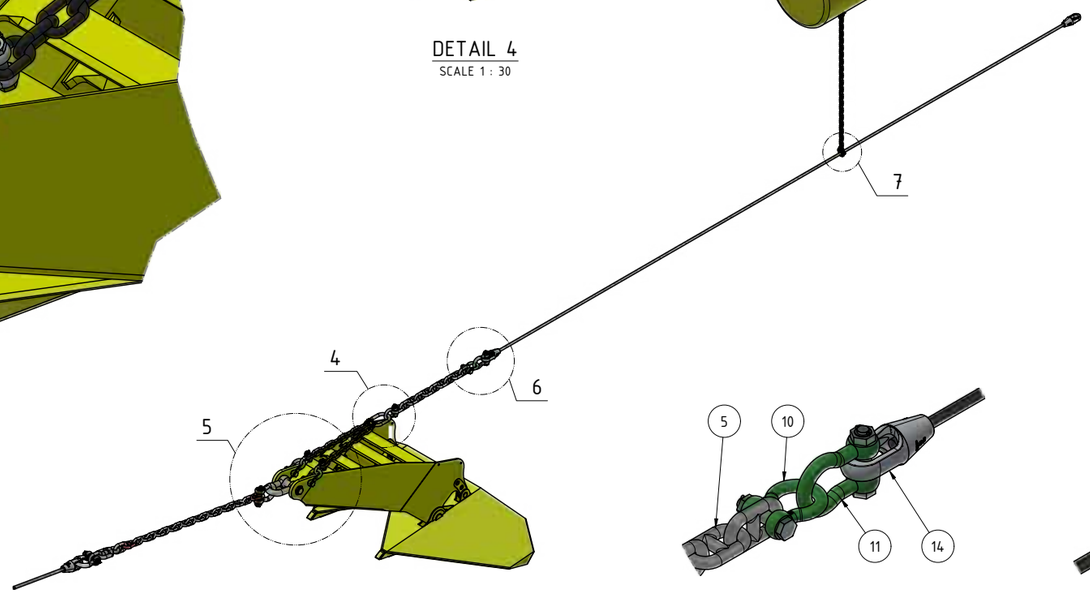
SCALE 1 : 30

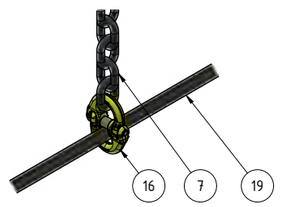


DETAIL 5
SCALE 1 : 30



ISO VIEW
N.T.S.

DETAIL 6
SCALE 1 : 30



DETAIL 7
SCALE 1 : 25

RIGGING LIST

POS	QTY	DESCRIPTION	TYPE	MBL [t]	WLL [t]	LENGTH [m]	DIAMETER [mm]
1	1	VRYHOF STEVPRIS ANCHOR	MK6 12000 KG				
2	1	MIDLINE ANCHOR BUOY				3	2000
3	1	SWIVEL FORERUNNER		438			
4	1	ANCHOR CHAIN-Ø72			185		
5	1	ANCHOR CHAIN-Ø64		318			
6	2	CHAIN SLING-Ø52	GRADE U3	200			
7	1	CHAIN-Ø32			31.5	4	
8	1	MASTER LINK			84		
9	2	GP BOW SHACKLE BN	G-4163		25		
10	2	GP BOW SHACKLE BN	G-4163		55		
11	3	GP BOW SHACKLE BN	G-4163		85		
12	2	GP DEE SHACKLE FN	G-4133		55		
13	2	GP POLAR HEAVY DUTY BOW SHACKLE BN	P-6031		150		
14	2	GP CLOSED SPELTER SOCKET (Ø55-60mm)		360			
15	1	GP CLOSED SPELTER SOCKET (Ø69-75mm)		460			
16	2	COUPLING LINK	G-32-8		32		
17	2	COUPLING LINK	G-32-10		40		
18	1	ANCHOR WIRE		292			70
19	1	PENNANT WIRE		247		20	58
20	1	POLYPROPYLENE ROPE		41		4	68
21	2	PEAR LINK No.7 - TYPE SC4					

GENERAL NOTES

1. ALL DIMENSIONS ARE IN mm U.N.O.
2. ALL MATERIALS AND FABRICATION SHALL BE ACCORDING TO OE-GE-ENG-SPE-0001, FABRICATION SPECIFICATIONS: STEEL STRUCTURES.
3. PENNANT WIRE MAY CHANGE WITH WATER DEPTHS AND MAY CONSIST OF MULTIPLE SECTIONS OF PENNANT WIRE. CONNECTION TO BE MADE WITH 85t SHACKLE.
4. IN SHALLOW WATER DEPTHS A 35m OR 40m PENNANT WILL BE USED.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	SHAS	MLPZ	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: RIGGING 12T STEVPRIS ANCHOR
ANCHOR-BUOY CONNECTION OVERVIEW

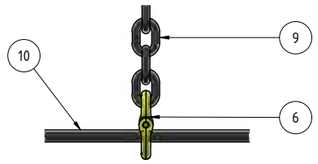
CLIENT: Liverpool Bay CCS

BOSKALIS SUBSEA CABLES
P.O.BOX 43, 3350 AA PAPENDRECHT - EMAIL: ROYAL@BOSKALIS.COM

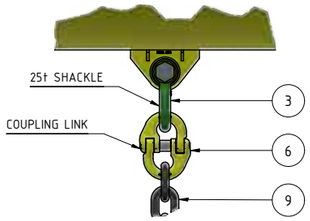
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3			

SCALE	BOSKALIS DRAWING NO. SH NO.	SHEET	REV.
1 : 150	0059359-BOS-CAD-DRW-4007	1 of 1	A

Appendix E Overview Anchor Buoy Connection Deltaflipper Anchor (mooring 1,2,3,4,5 & 6 anchors)



DETAIL 1
SCALE 1 : 25



DETAIL 2
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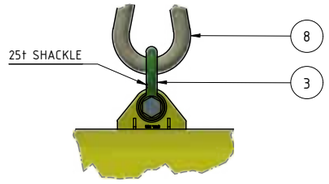

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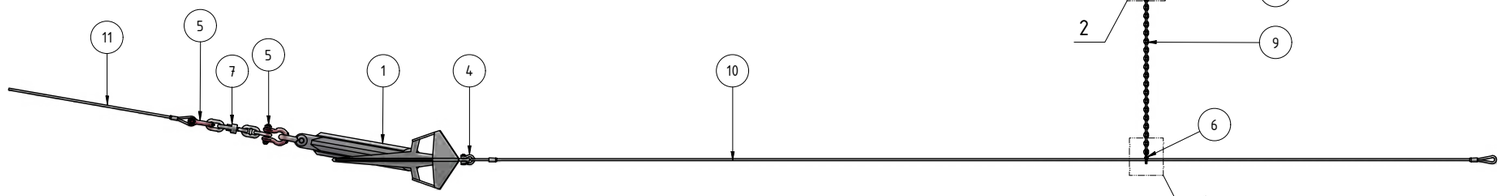
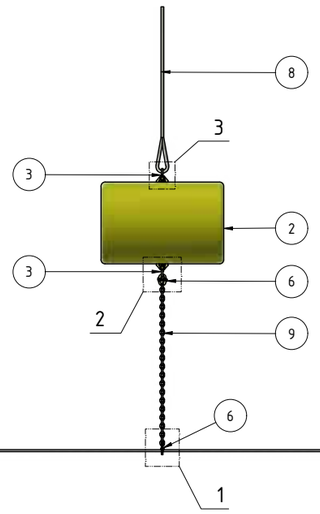
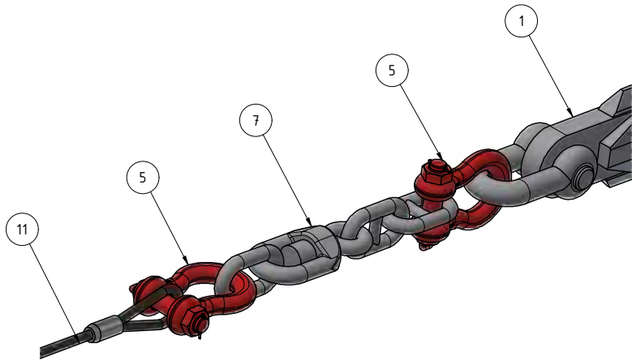
SCALE 1 : 25

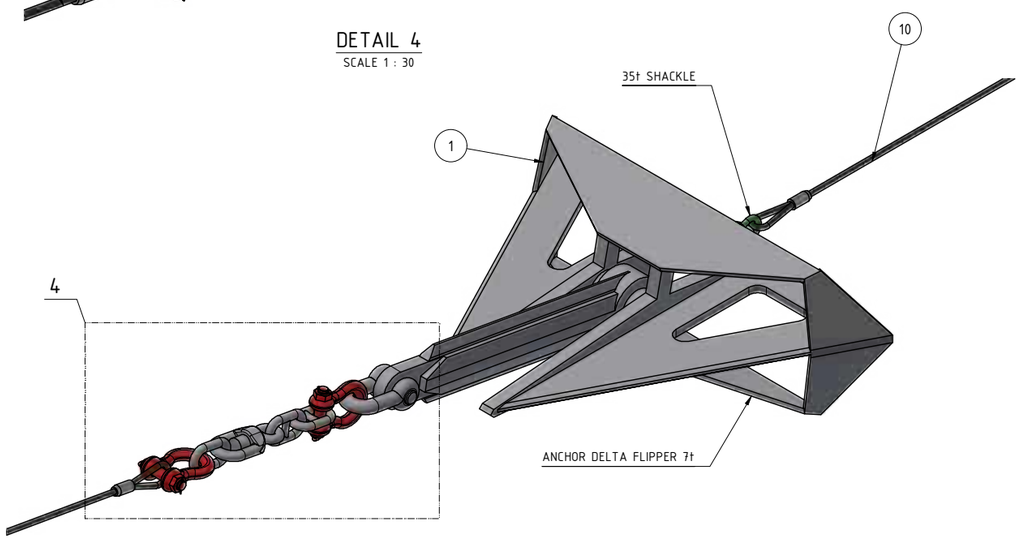




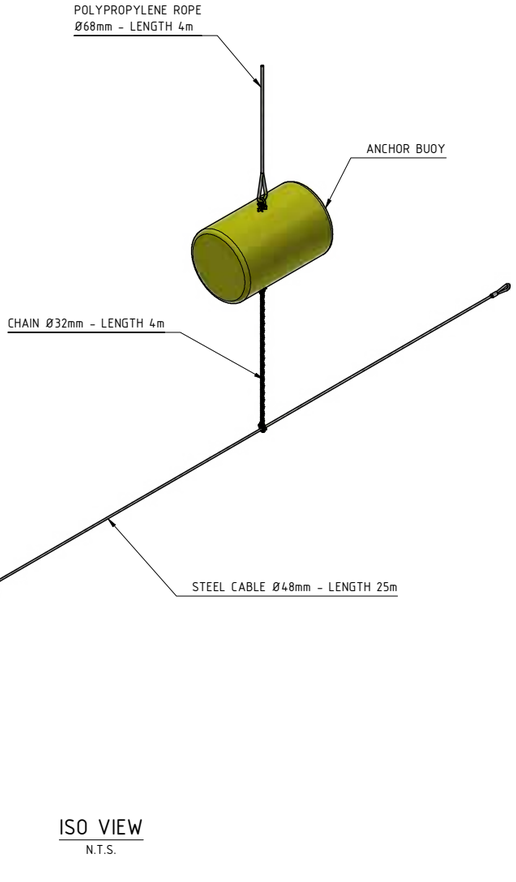
FRONT VIEW



DETAIL 4
SCALE 1 : 30



DETAIL 5
SCALE 1 : 50



ISO VIEW
N.T.S.

RIGGING LIST

POS	QTY	DESCRIPTION	TYPE	MBL [t]	WLL [t]	LENGTH [m]	DIAMETER [mm]
1	1	ANCHOR DELTA FLIPPER					
2	1						
3	2	GP BOW SHACKLE BN	G-4163		25		
4	1	GP BOW SHACKLE BN	G-4163		35		
5	2	ANCHOR SHACKLE CROSBY	G-2130		85		
6	2	COUPLING LINK	G-32-8		32		
7	1						
8	1	POLYPROPYLENE ROPE				4	68
9	1	CHAIN			31.5	4	32
10	1	STEEL CABLE				25	48
11	1	ANCHOR WIRE					48

GENERAL NOTES

1. ALL DIMENSIONS ARE IN mm U.N.O.
2. ALL MATERIALS AND FABRICATION SHALL BE ACCORDING TO OE-GE-ENG-SPE-0001, FABRICATION SPECIFICATIONS: STEEL STRUCTURES.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	16/12/2025	ISSUED FOR REVIEW	SHAS	MLPZ	WALR	N/A	TIPL

DEVELOPMENT

PROJECT
LIVERPOOL BAY CCS PROJECT

SUBJECT
OVERVIEW ANCHOR BUOY CONNECTION
DELTA FLIPPER ANCHOR

CLIENT
Liverpool Bay CCS

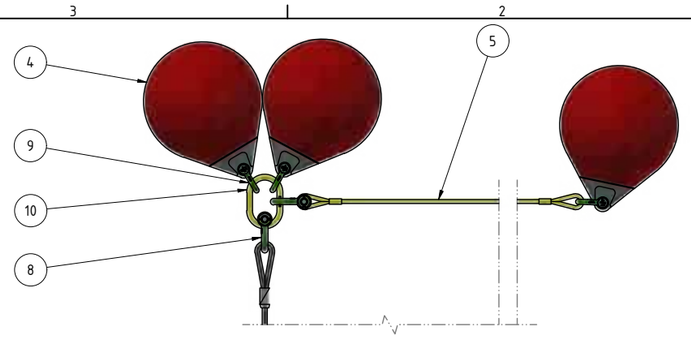
BOSKALIS SUBSEA CABLES
P.O.BOX 43, 3350 AA PAPENDRECHT - EMAIL: ROYAL@BOSKALIS.COM

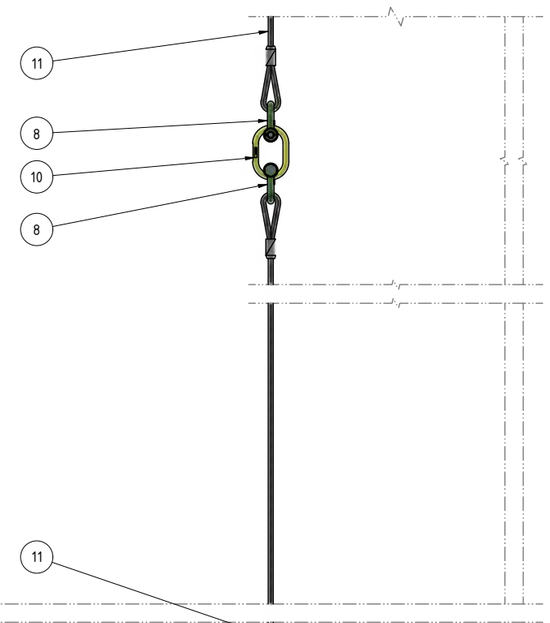
FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3			
SCALE	BOSKALIS DRAWING NO. SH NO.	SHEET	REV.
1 : 150	0059359-BOS-CAD-DRW-4001	1 of 1	A

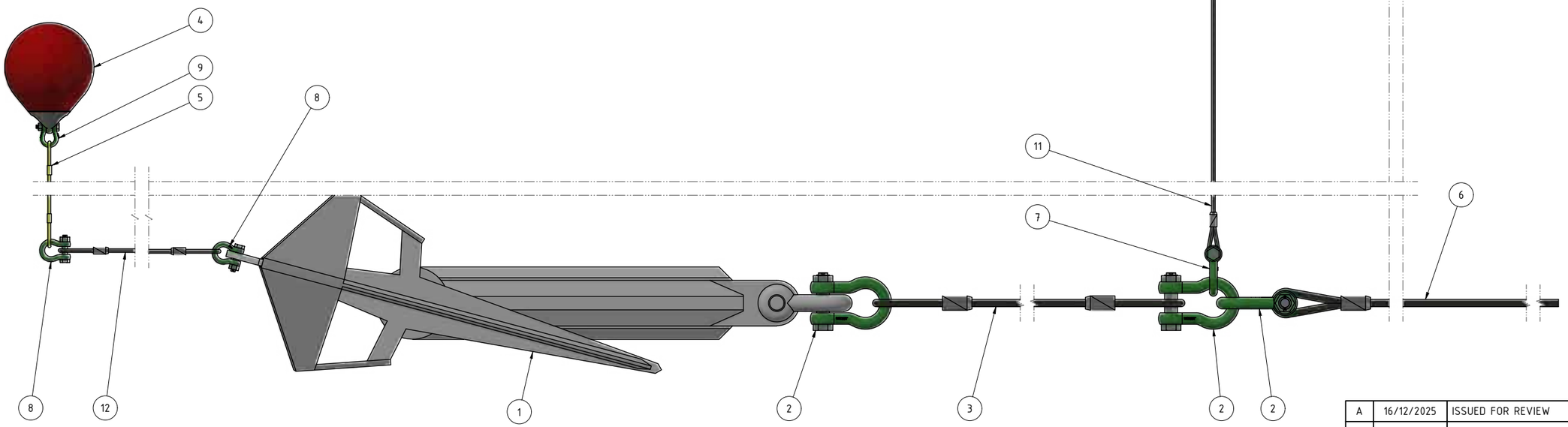
Appendix F Rigging Beach anchor and recovery [HOLD03]

PART LIST

POS	QTY	DESCRIPTION	TYPE	MATERIAL	LENGTH [m]	DIA [mm]	WLL [t]	TOTAL WEIGHT [kg]
1	1	Flipper-Delta Anchor						5000
2	3	GP BOW SHACKLE BN	G-4163	Steel			85	
3	1	Steel Wire Forerunner with Flemish Eye		Steel	TBC	48		
4	4	A4 Norweigen Buoy	A4	Generic				
5	2	Polpropylene rope		Polypropylene	6	20		
6	1	Anchor Wire		Steel		48		
7	1	GP BOW SHACKLE BN	G-4163	Steel			35	
8	6	GP BOW SHACKLE BN	G-4163	Generic			12	
9	4	GP BOW SHACKLE BN	G-4163	Steel			8.5	
10	2	MASTER LINK	MS-28mm-WLL 12.8T	Steel			12.8	
11	2	Steel Wire Forerunner with Flemish Eye		Steel	10	24		
12	1	Steel Wire Forerunner with Flemish Eye		Steel	100	24		







GENERAL NOTES

1. ALL DIMENSIONS ARE IN mm U.N.O.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	16/12/2025	ISSUED FOR REVIEW	HASA	MLPZ	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: BEACH ANCHOR AND RECOVERY RIGGING

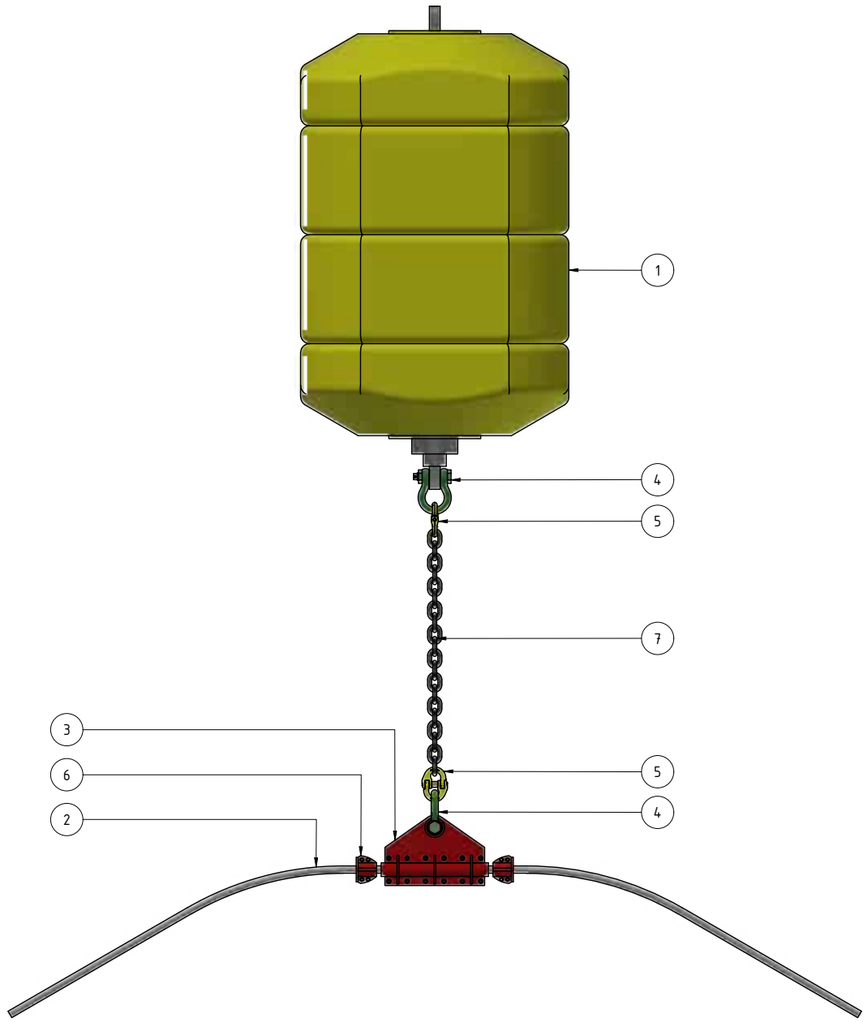
CLIENT: LIVERPOOL BAY CCS

BOSKALIS SUBSEA CABLES

P.O.BOX 43, 3350 AA PAPENDRECHT - EMAIL: ROYAL@BOSKALIS.COM

FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3			
SCALE	BOSKALIS DRAWING NO. SH NO.	SHEET	REV.
1 : 30	0059359-BOS-CAD-DRW-4004	1 of 1	A

Appendix G Rigging midline buoy arrangement



FRONT VIEW

ISO VIEW
N.T.S.

RIGGING LIST

POS	QTY	DESCRIPTION	TYPE	MBL [t]	WLL [t]	LENGTH [m]	DIAMETER [m]
1	1	MIDLINE BUOY				3.2	2
2	1	ANCHOR WIRE					
3	1	CABLE SUSPENSION BRACKET			4		
4	2	BOW SHACKLE	G-4163		25		
5	2	COUPLING LINK	G-26-8		21.6		
6	2	CABLE CLAMP					
7	1	CHAIN	26-8		21.2	1.6	

GENERAL NOTES

1. ALL DIMENSIONS ARE IN mm U.N.O.
2. ALL MATERIALS AND FABRICATION SHALL BE ACCORDING TO OE-GE-ENG-SPE-0001, FABRICATION SPECIFICATIONS: STEEL STRUCTURES.

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	09/12/2025	ISSUED FOR REVIEW	SHAS	MLPZ	WALR	N/A	TIPL

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

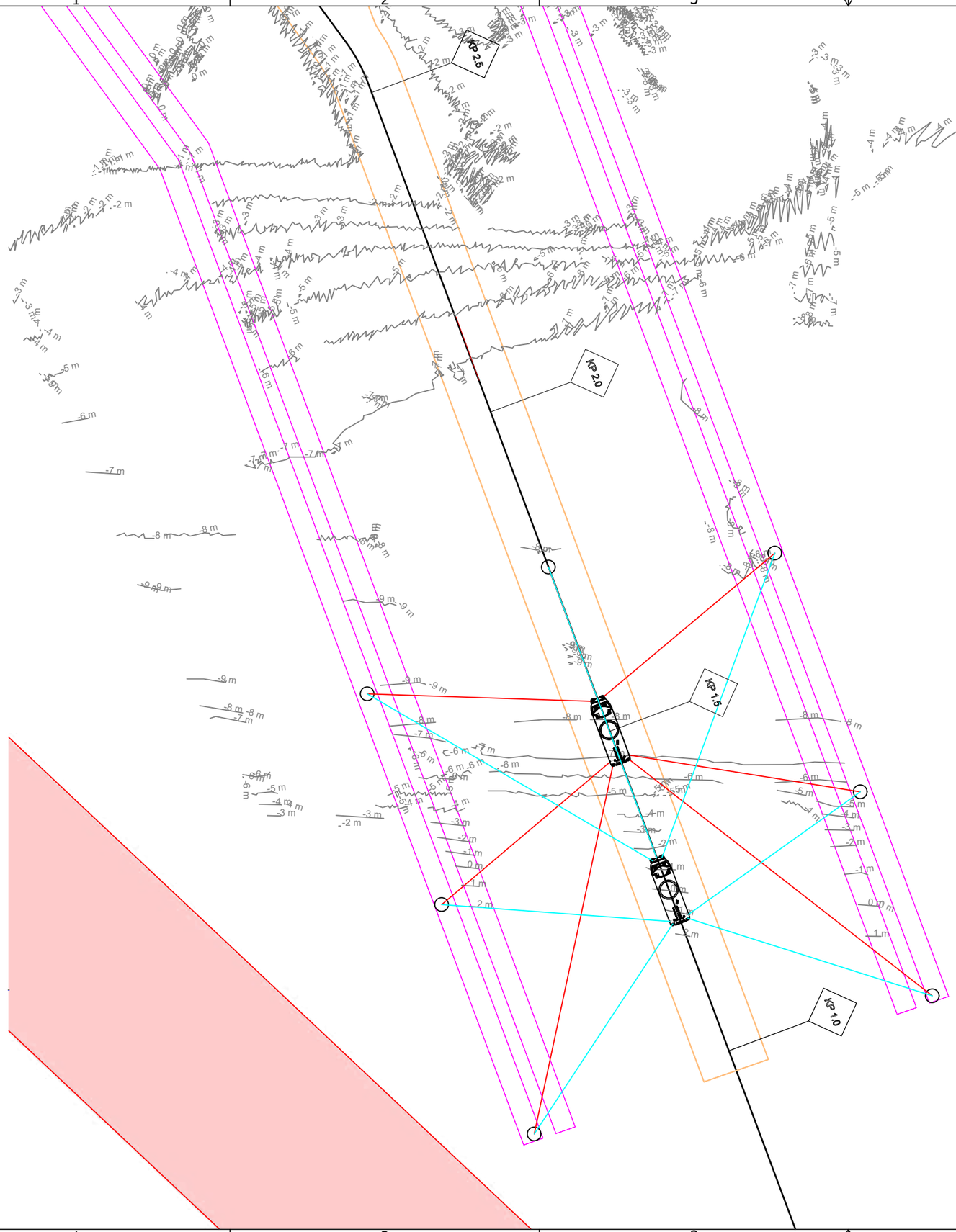
SUBJECT: MID-LINE BUOY ARRANGEMENT

CLIENT: Liverpool Bay CCS

BOSKALIS SUBSEA CABLES
P.O.BOX 43, 3350 AA PAPENDRECHT - EMAIL: ROYAL@BOSKALIS.COM

FORMAT	PROJECTION	CLIENT DRAWING NO.	REV.
A3			
SCALE		BOSKALIS DRAWING NO. SH NO.	SHEET / REV.
1 : 40		0059359-BOS-CAD-DRW-4006	1 of 1 / A

Appendix H Indicative anchor patterns – Nearshore, Standard, Crossing with buoys (Survival)



LEGEND	
	ANCHOR CORRIDOR
	EXCLUSION ZONE
	RPL

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	07/11/2025						

DEVELOPMENT

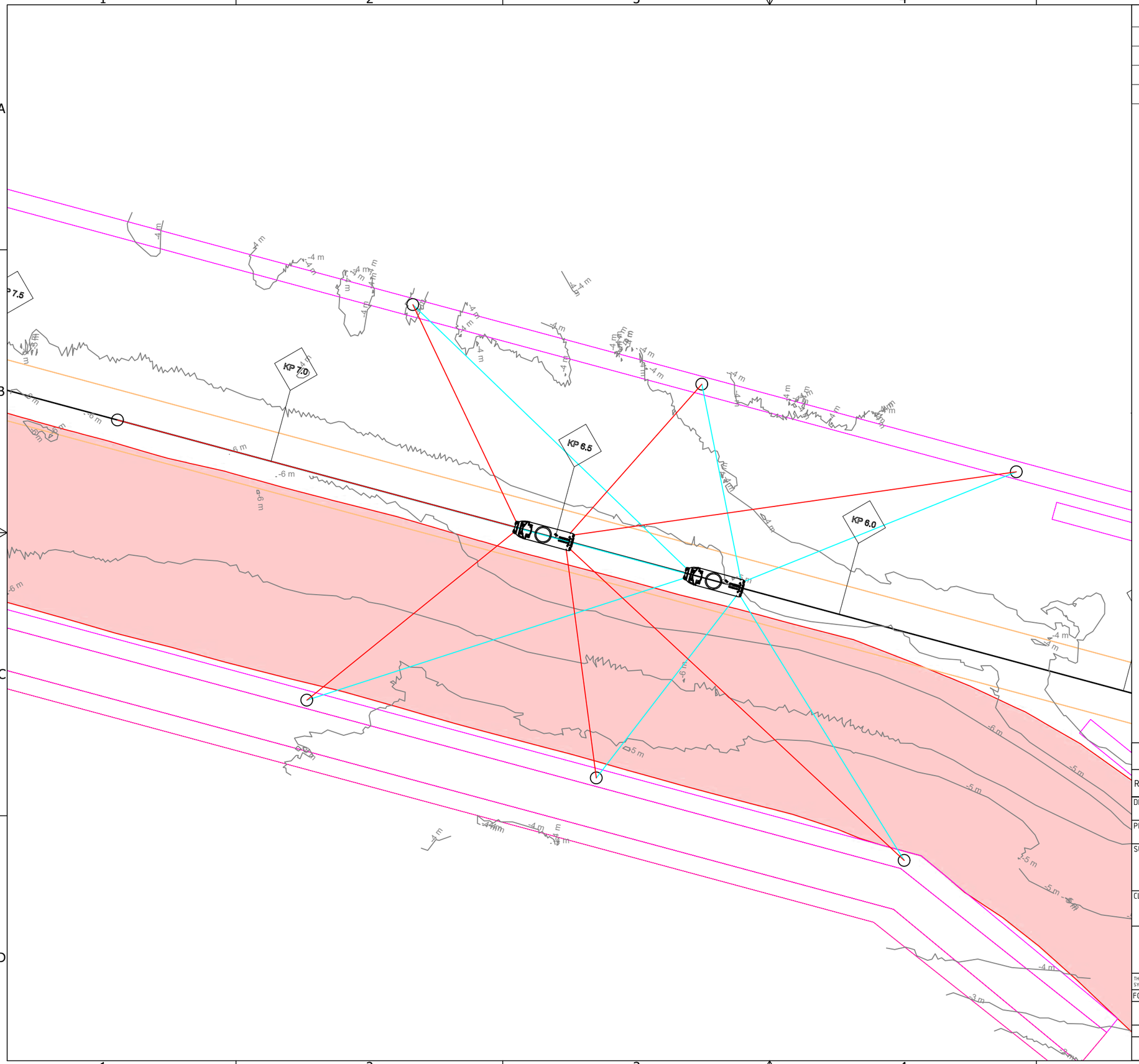
PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: NEARSHORE ANCHOR PATTERN

CLIENT: liverpool bay ccs

BOSKALIS SUBSEA CABLES
P.O.BOX 43, 3350 AA PAPENDRECHT

FORMAT	PROJECTION		REV.
A3			
SCALE		BOSKALIS DRAWING NO. / SHEET	REV.
		0059359-ANCHOR PATTERN DRAWINGS / 03 of 03	A



LEGEND

	ANCHOR CORRIDOR
	EXCLUSION ZONE
	RPL

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	07/11/2025						

DEVELOPMENT

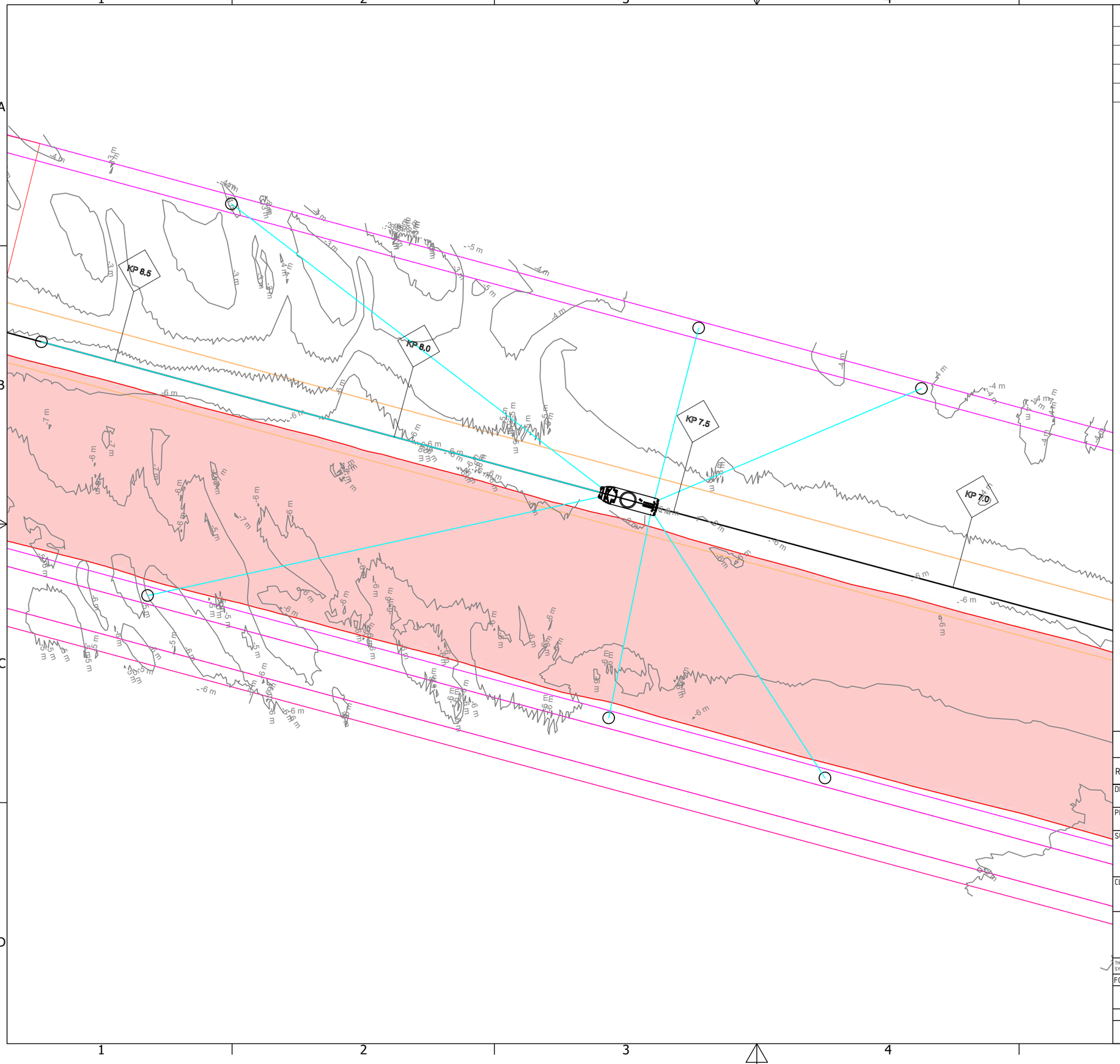
PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: STANDARD ANCHOR PATTERN

CLIENT: liverpool bay ccs

BOSKALIS SUBSEA CABLES
P.O.BOX 43, 3350 AA PAPENDRECHT

FORMAT	PROJECTION		REV.
A3			
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
		0059359-ANCHOR PATTERN DRAWINGS	01 of 03 / A



LEGEND	
	ANCHOR CORRIDOR
	EXCLUSION ZONE
	RPL

REV.	DD/MM/YYYY	REVISION REASON	CKD. ORG.	CKD. DISP.	CKD. INT.	APP. OPS.	APP. PM.
A	07/11/2025						

DEVELOPMENT

PROJECT: LIVERPOOL BAY CCS PROJECT

SUBJECT: CROSSING ANCHOR PATTERN
WITH MID-LINE BUOYS (SURVIVAL)

CLIENT: liverpool bay ccs

BOSKALIS SUBSEA CABLES
P.O.BOX 43, 3350 AA PAPENDRECHT

FORMAT	PROJECTION		REV.
A3			
SCALE		BOSKALIS DRAWING NO.	SHEET / REV.
		0059359-ANCHOR PATTERN DRAWINGS	02 of 03 / A

Survival pattern Welsh Channel – [HOLD03]

Appendix I Specification sheet CLV Ndurance

Boskalis

EQUIPMENT SHEET

NDURANCE
CABLE LAYING VESSEL

CONSTRUCTION/CLASSIFICATION

Built by	Samsung C&T corporation ZPMC - Shanghai Zhenhua Heavy Industries Co.Ltd
Year of construction	2013
Classification	Bureau Veritas, offshore multifunctional accommodation barge, bottom strengthened for loading and unloading aground

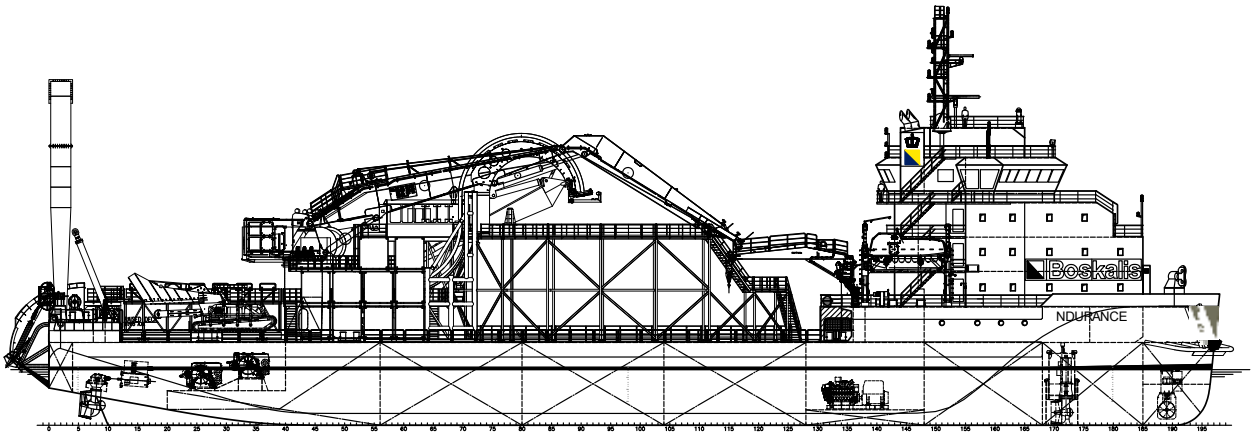
FEATURES

Completely new ship and turntable design.
Diesel electric propulsion system.
Accommodation on fore ship, total for 98 persons
Two engine rooms.
Beaching capability.
Corridor under accommodation to handle projects at the bow.
7 point mooring system due to Ploughing modus (bow 7th anchor wire).
Launch & recovery trencher with A-frame is used for: Trenchformer, SMD HD3 Plough, joint repair, Quadrant MBR 5 m
Wheelpair Tensioner in Gooseneck
Suited for Workclass Schilling ROV
Pull anchor winch + clamp
Friction 7th anchor winch

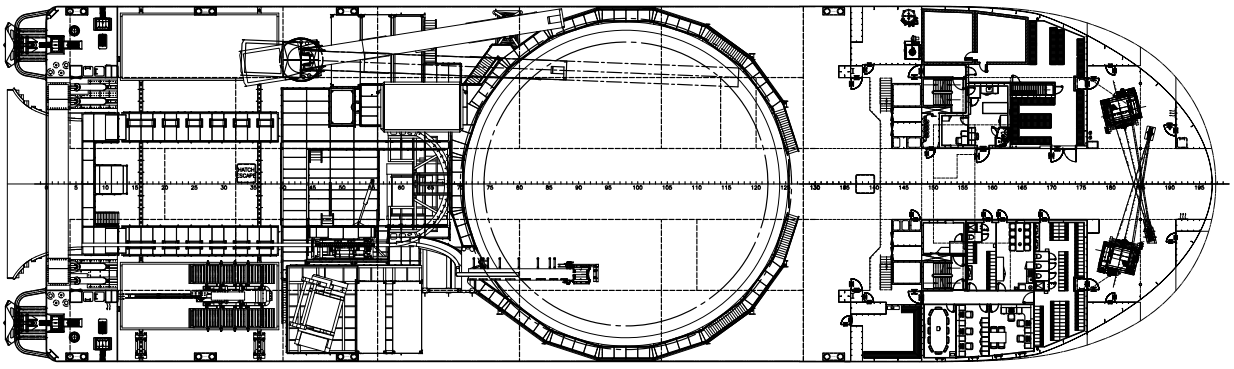
MAIN DATA

Dynamic positioning system	DP-2
Length overall	99.00 m
Breadth	30.00 m
Moulded depth	7.00 m
Design draught	4.8 m
Displacement	12,285 t
Turntable capacity	4,300 t
Outer diameter	26 m
Inner diameter	3-6 m (adjustable)
Product cable size	50-300 mm
Cable speed range	0-1000 m/h
MBR cable highway	5.00 m
Cable tensioners	15 t
Crane	25 t SWL at 25 m
Cable handling area	35 m x 30 m
Max. sailing speed	11.5 kn
Total installed power	7,500 kW
Main engines	7,280 kW
Azimuth thrusters	2 x 1,250 kW + 2 x 1,000 kW
Bow thruster	1 x 550 kW

NDURANCE
CABLE LAYING VESSEL



SIDE VIEW



TOP VIEW DECK LEVEL

Boskalis
PO Box 43
3350 AA Papendrecht
The Netherlands
T +31 78 69 69 000
offshore.energy@boskalis.com

www.boskalis.com/offshore

Appendix J Specification sheet typical AHT Lingestroom

LINGESTROOM

ANCHOR HANDLING TUG SUPPLY VESSEL

IMO nr.	9819404
Call sign	PICW
Flag	Dutch
Type	Shoalbuster 3512
Constructed	2017
Bollard Pull	61.8 tons
Speed	11.5 knots
Free deck space	145 m²
Deckload	15.0 - 3.0 ton/m²

Basic functions: Towing, Mooring, Pushing, Anchor Handling, Supplying, Surveying, Ploughing, Crew Transfer

GRT / NT	476 / 142
Dimensions	34.80 x 12.00 x 4.30 mtr.
Draft (min. / max.)	2.90 / 3.40 mtr.
Air draft (min. / max.)	10.86 / 17.88 mtr.
Displacement	597 tons
Engines	3x Caterpillar, type C32-TTA SCAC, each 970 kW / 1.319 HP @ 1800 rpm
Gear Boxes	3x Reintjes, type WAF 675L reduction 7.07:1
Generator Sets	2x Caterpillar, type C7.1, each 187.5 kVA, voltage 230/400 VAC - 50 Hz
E-Power Generator	Combined with center C32 main engine, 600 ekW @ 1800 rpm - 440 VAC
Hydro Set	Electric drive with 3x E-motor, 2x 110 kW / 1x 52 kW
Propulsion	3x Fixed pitch propeller in Van der Giessen Optima Nozzle (Ø 2250 mm)
Bow Thruster	Electrical driven FPP, 243 kW / 320 HP (Ø 960 mm)

Tank capacities

Fuel oil	255.0 m³	Lub oil	3.7 m³	Hydr. Oil	2.0 m³
Gear oil	3.3 m³	Dirty oil	4.5 m³	Sludge	2.0 m³
Fresh water	67.0 m³	Sewage	5.8 m³	Bilge water	5.0 m³

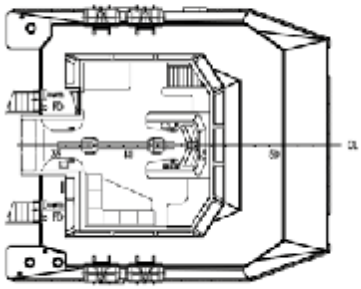
Transfer pumps	Fuel / Fresh water, type SIHI - 50 m³/hr. @ 4.8 bar
Nautical equipment	2x Radar (sea/river) - Magnetic compass - Gyro compass - Auto pilot - GPS / Satellite navigation system ECDIS - AIS - 2x Echosounder - Speedlog - Windindicator 2x VHF + DSC - 1x VHF - SSB Radio + DSC - Navtex - VSAT system - 2x Inmarsat-C - EPIRB - SART 2x HH VHF - Satcom + GSM
Deck equipment	Hydr. crane, HS Marine, type AKC290-LHE3, 11.3T - 16.5 mtr. / 24.4T - 7.89 mtr. Towing winch, Kraaijeveld, WF - 1000 mtr., Ø 48 mm steel wire, 59.1 / 115 tons + incl. AH winch, 600 mtr., Ø 48 mm steel wire, 101.7 / 150 tons Tugger winch, power 12 tons - Hydr. Towing pins + Chain stopper, SWL 100T Stern roller, L. 5.00 mtr., Ø 1180 mm, SWL 165T - Towing hook & Gob eye, SWL 55T Container locks (7x 20 ft. / 3x 10 ft.) - Push bow
Special equipment	HV/AC installation - Sewage treatment plant - (fresh) Watermaker - Fuel oil separator Moonpool (Netto: 700 x 600 mm)
Optional	A-frame (with plough) / 4p-Mooring system Waterinjection Dredging system / ROV - Diving Ops. platform
Accommodation	11 persons (conform 'ILO 2006 rules')
Classification	BV - I ✠ HULL • MACH / Tug, Special service - multi purpose ship / Unrestricted navigation • AUT-UMS - Notation: Anchor Handling / Notation: Clean ship NSI - Unrestricted navigation # IMO - Inventory of Hazardous Materials (Green Passport)

VAN WIJNGAARDEN MARINE SERVICES B.V.

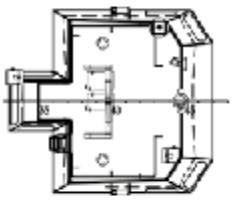
Buitenweistraat 15 • 3372 BC Hardinxveld-Giessendam • The Netherlands • T: +31 (0)184 490 244
F: +31 (0)184 490 265 • E: info@wijngaarden.com • I: www.wijngaarden.com

Forecastle deck

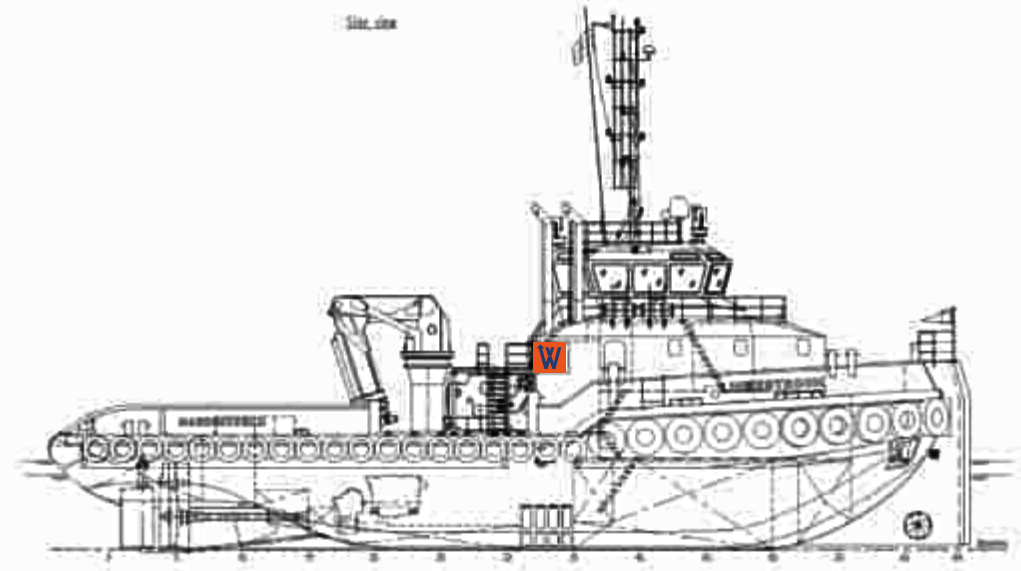
Wheelhouse



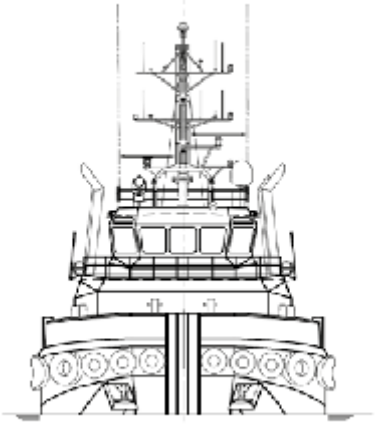
Top deck



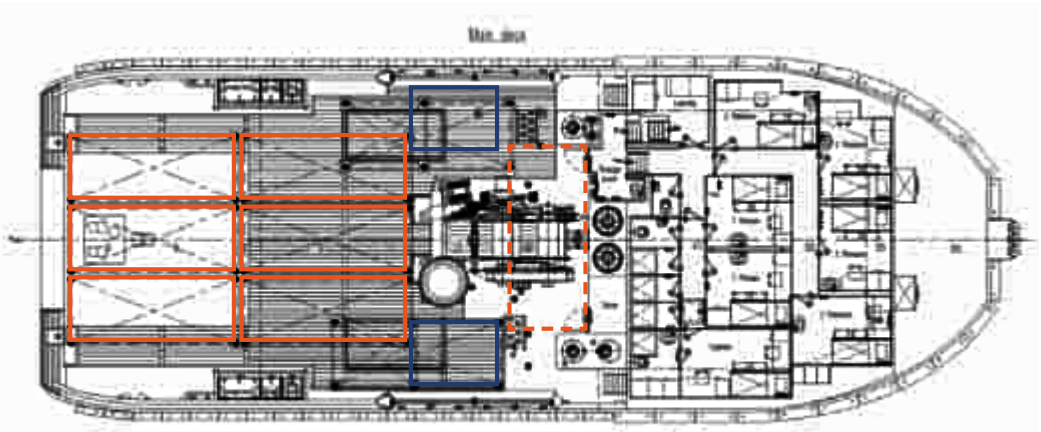
Side view



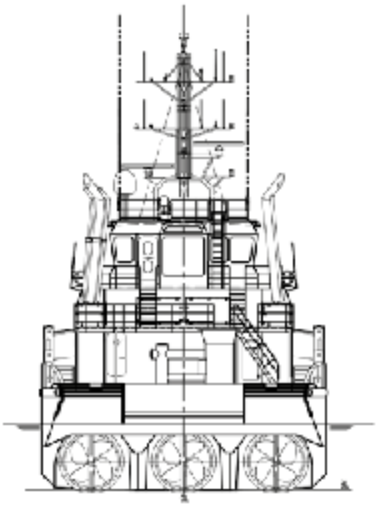
Front view



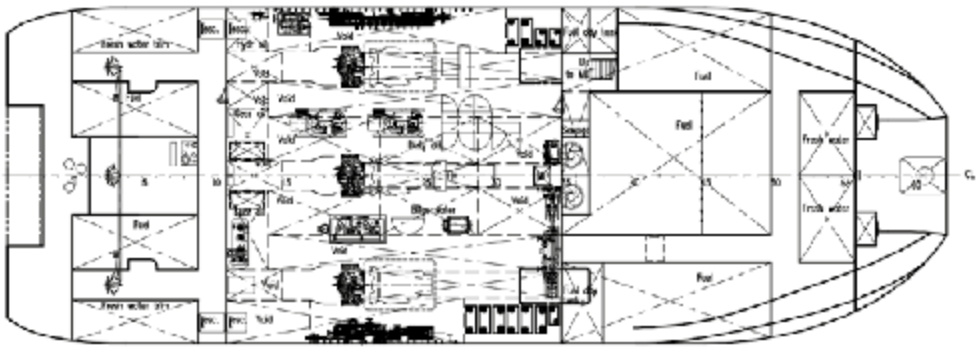
Main deck



Rear view



Below main deck



Note: Similar to "NOORDSTROOM"

Appendix K Specification sheet typical AHT Coastal Crown

Acta Marine

Coastal Crown

DP-2 hybrid triple drive shallow draft Multi Cat

- *The world's first commercial workboat with both Tier-3 engines and hybrid/ battery power.*
- *An operating draft of less than 2,0 m in DP-1 or DP-2 mode.*
- *The most sustainable and fuel efficient workboat in the market, resulting in;*
  - *73% savings on NOx emissions,*
  - *20% savings on Fuel and CO_2 emissions.*
- *Accommodation available for up to 19 persons.*

Coastal Crown

CLASSIFICATION / FLAG

Flag	Dutch
Trading area	World wide
Call sign	PDVW
IMO	9920356
Classification society	Bureau Veritas
Class ship type	Anchor handling Tug, Special Service Multi purpose ship, Unrestricted Navigation
Class notation	1 ✠ Hull ● Mach ✠ AUT-UMS Dynapos AM/AT-R
Safety equipment	Max. 19 persons
Dynamic Position	DP-2 class certified (5 Thrusters)
Installation	

MAIN DIMENSIONS

Length o.a.	37,00 m
Breadth o.a.	11,84 m
Draft	min. draft 1,73 m
	max. draft 2,12 m
Airdraft	max. 18,50 m
GRT	427
NRT	128
Max. deck load	5 ton/m²
Free deck space	207 m²

ACCOMMODATION

Accommodation	Fully airconditioned
	17/19 persons
	1x single berth cabins
	9x double berth cabins

NAVIGATION AND COMMUNICATION SYSTEMS

GMDSS	A1,A2,A3
V-SAT	available

MACHINERY & PROPULSION

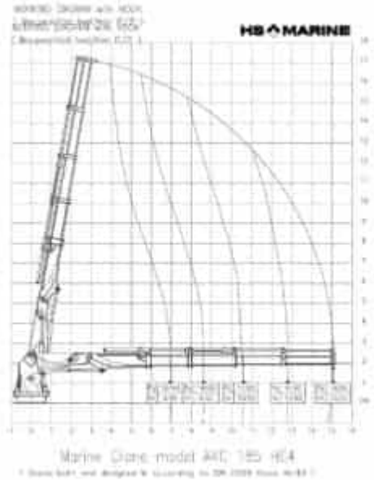
Maximum speed	11 knots
Bollard pull	30 ton
Power output	2988 kW
Propulsion	Twin fixed pitch propellers in nozzles
Main engines	2x Caterpillar C32 Acert SCAC 895 kW
Auxiliary engines	2x Caterpillar C18 Acert SCAC 599 kW;
	1x Caterpillar C4.4 65 ekW
Bow thruster	2x 360 azimuth Compact-Jet
	thruster 249 kW
Stern thruster	1x 360 azimuth thruster 470 kW
DP-2system:	Navis
Batteryset	300 kWh

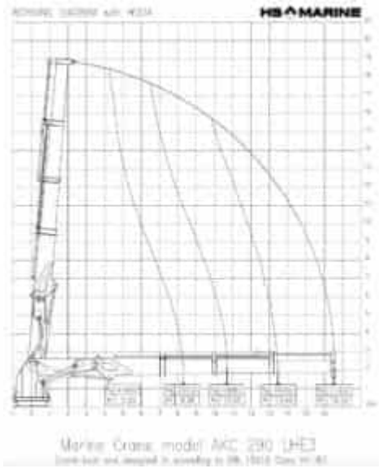
DECK EQUIPMENT

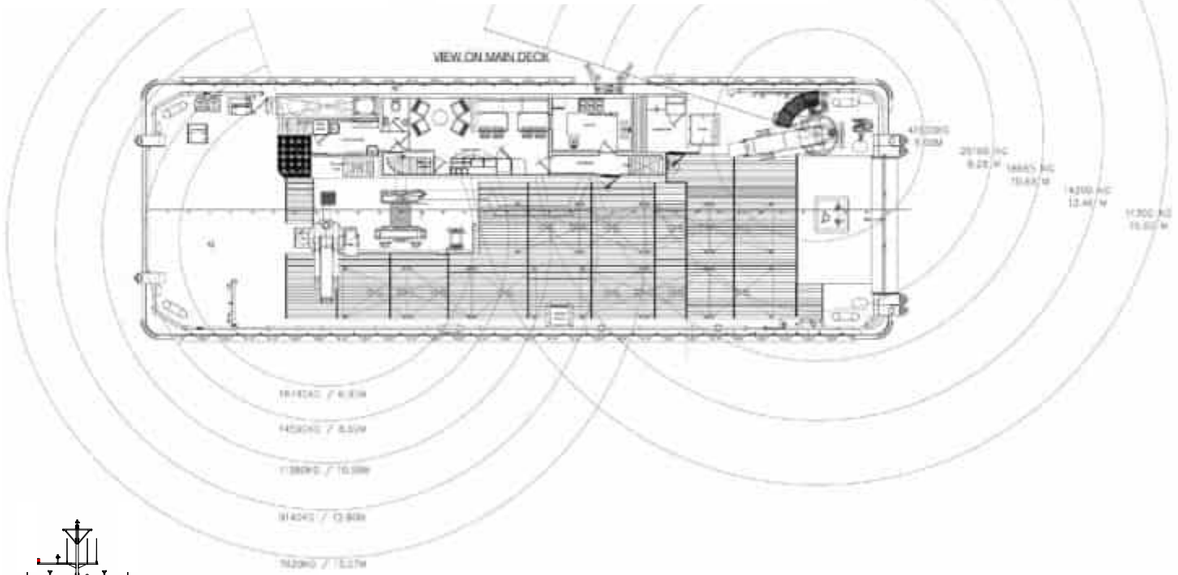
AH winch	100 ton - 9 m/min., 50 ton - 18 m/min.,
	25 ton - 36 m/min.
Tugger winch	10 ton 0-20 m/min.
Hydr.deck crane FS	HS Marine AKC290 LH3
	Fixed hook SWL 11,3 ton at 16,50 m
	- 25,1 ton at 8,28 m
	Wire winch SWL 10 ton
Hydr.deck crane AS	HS Marine AKC185 HE4
	Fixed hook SWL 7,6 ton at 15,07 m
	- 18,7 ton at 6,95 m
Towing Pins foredeck	Tugpins towing pins 70 ton
Chain/wire Stopper foredeck	Tugpins Karm fork 70 ton

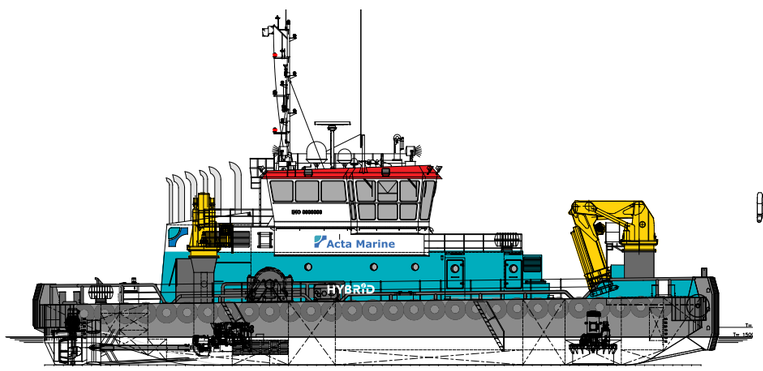
TANK CAPACITIES

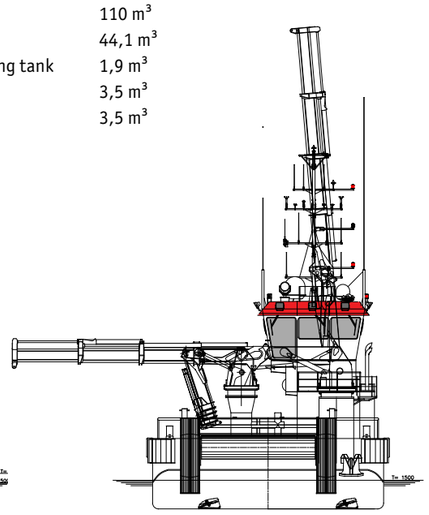
Fresh water	91 m³
Fuel	110 m³
Sewage	44,1 m³
TLQ sewage holding tank	1,9 m³
Dirty oil	3,5 m³
Bilge water	3,5 m³

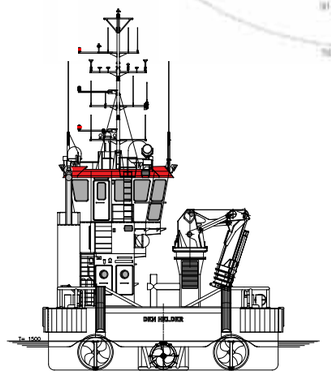


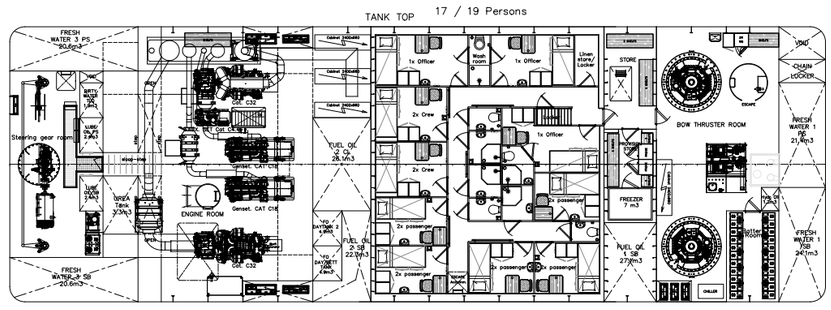












Coastal Crown

HYBRID

TRIPLE DRIVE HYBRID CONFIGURATION

Typical works scope of (DP)Workboats in a project contains a variety of activities with various idle/waiting intervals per day. A smart configuration and use of power and propulsion systems will result in considerable savings of fuel and emissions.

Direct Drive mode: 2 direct drive engines on fixed props. Mainly used during transits and when strong power required like during anchor-/barge handling.

Diesel-electric Drive mode: 2 generators with diesel-electrical drive for azimuth stern and 2 bow thrusters. Mainly used during DP-operations and manoeuvring at the project site.

Battery-Electric Drive mode: 300Kwh Battery pack for DP back-up power and ship's accommodation supply. Mainly used during idle/waiting intervals between activities. Battery capacity can be upgraded when needed.

CARE FOR SUSTAINABLE SUPPLY CHAIN

PROJECTS

Acta Marine DP Multicats have a long track record of various coastal projects. This vessel can effectively perform the work scope ie:

- Ultra shallow draft anchor-handling or as towing tug
- Cable and/or pipelay support
- Pre-lay grapple runs
- Beach pull operations in ultra shallow waters
- Survey/ROV support in DP1 or DP2 modus
- Mass flow excavation support
- UXO support/monitoring/removal from the seabed
- Spray/Jet pontoon for shallow water dredging projects
- CPT/Vibrocore operations
- Dredging support for large Hopper & Cutter dredgers
- General supply vessel, not limited to Fuel supply.

Acta Marine

Offices:
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Rivium Promenade 74, 2909 LM, Capelle a/d IJssel (NL)

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END OF DOCUMENT