LBA CCS TRANSPORT AND STORAGE PROJECT

POINT OF AYR TO NEW DOUGLAS PLATFORMS

NEW DOUGLAS PLATFORM - INSTALLATION METHOD STATEMENT

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CD-FE	01	08/06/2023	ISSUED FOR FINAL	D. Mirzaie	B.Ćurić	B.Ćurić	
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Revision Index							

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REVISION LIST

00	ISSUED FOR COMMENT
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HOLD RECORD

01	Douglas CCS Jacket (section 5.3.2, pending Jacket Weight Report)

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1.0 INTRODUCTION

1.1 Project Overview

Eni's Liverpool Bay CCS Transport & Storage Project (LBA CCS T&S Project) is being developed in parallel with and as a key part of the HyNet Northwest full-chain hydrogen and CCS industrial decarbonisation project (the HyNet Project, see [Ref 16]), which is designed to transform a region of the UK into the world's first low carbon industrial cluster by 2030. The HyNet Project was conceived in 2016 with the objective of decarbonising the entire industrial cluster to Net Zero. The HyNet Project is being developed on a phased approach based on CO_2 emissions capture from existing industrial facilities, alongside capture from new-build hydrogen generation facilities. While industrial decarbonisation is the anchor, the HyNet Project builds the infrastructure backbone for a full regional hydrogen economy and leverages the opportunity to repurpose for future CCS service the existing oil and gas facilities at Point of Ayr (PoA) and offshore in Liverpool Bay. CO_2 storage is provided in well-known gas fields that are owned and operated by Eni UK.

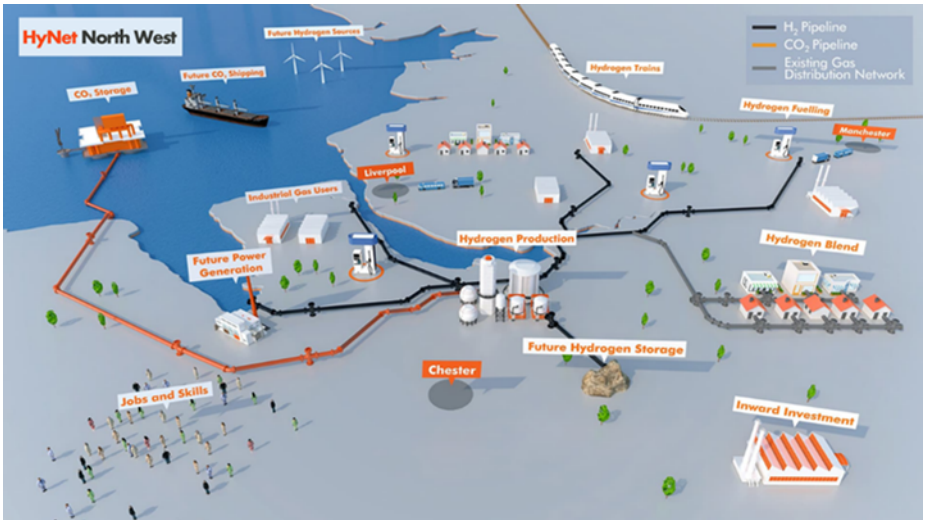


Figure 1.1 HyNet Project North West Project Overview

As part of Onshore Scope, CO_2 emissions from these sources will be transported along a new-build pipeline which will connect Ince AGI (Above Ground Installation) with Stanlow AGI and then run from Stanlow AGI to the south of Chester, and then on to the Flint AGI located in the vicinity of Connah's Quay power station which is the termination point of the existing pipeline (P852). At the Flint AGI the new-build pipeline will connect to the existing pipeline (owned and operated by Eni). The existing onshore natural gas import pipeline will be re-purposed to become a CO_2 export pipeline and will transport the CO_2 to the existing PoA gas terminal.

As part of Offshore Scope, the existing offshore natural gas import pipeline from PoA gas terminal will be re-purposed to become a CO_2 export pipeline and will transport the CO_2 to the Douglas Platform. From the Douglas complex, CO_2 will be transported along re-purposed natural gas pipelines to the Hamilton platform for injection into the Hamilton reservoir, to the Hamilton North platform for injection into the Hamilton North reservoir and to the Lennox platform for injection into the Lennox reservoir.

The present document defines indicative key project data and criteria to be used for Offshore Project Scope (PoA, Douglas & Satellite platforms).

2.0 PURPOSE OF DOCUMENT

The purpose of this document is to describe the outline procedure for load out, transportation and installation, of New Douglas Platform (Topside and Jacket) to enable relevant Contractors to develop their own proposals for executing the Works.

The outline procedure Shall be updated during the next design phase taking into account criteria, methods, information reported in this document and according to Company specifications and project actual information/data (e.g. transportation and installation marine spread characteristics, load-out and transportation analyses results, construction yard facilities and quay characteristics and so on). Based on updated procedures, the relevant Contractor Shall then develop detailed Installation, Load-out, Load-In, Transportation Manual, including relevant contingency plans, defining methods and resources that they intend to employ for the execution of the marine operation activities. Contractor procedures for installation, removal, load-out and transportation Shall comply with Company specifications and with MWS criteria / requirements.

3.0 DEFINITION AND ABBREVIATION

3.1 Definition

Term	Definition
Company	The party that initiates the project and ultimately pays for its design and construction i.e. Eni UK. COMPANY will generally specify technical requirements. The term "COMPANY" also includes agents or consultants authorised to act for, and on behalf of, COMPANY.
Contract	An acceptance of legal relations between two or more parties for the transfer of goods or services for value.
Contractor	A person or organisation that undertakes responsibility for the execution of a contract.
Supplier	The party (Manufacturer or Vendor) that manufactures or supplies equipment or services to perform the duties specified by the Company or Contractor
Shall	A mandatory provision
Should	An advisory provision

3.2 Abbreviations

AHT	Anchor Handling Tug
CB	Cargo Barge
CCS	Carbon Capture and Storage
CO_2	Carbon Dioxide
CoG	Centre of Gravity
CWC	Concrete Weight Coating
DA	Douglas Accommodation Platform
DAF	Dynamic Amplification Factor
DD	Douglas Production Platform
DESNZ	Department for Energy Security and Net Zero
DMA	Dead Man Anchor
DP	Dynamic Positioning
DSV	Diving Support Vessel
DW	Douglas Wellhead Platform
FCG	Flushing, Cleaning and Gauging
FEED	Front End Engineering and Design
FOC	Fibre Optic Cable
HAT	High Astronimical Tide
HH	Hamilton Main Platform
HLV	Heavy Lift Vessel
HN	Hamilton North Platform
H_2S	Hydrogen Sulphide
Hs	Significant Wave Height
HTV	Heavy Transport Vessel

ILI	Inline Inspection
JSA	Job Safety Analysis
KP	Kilometer Point
LAT	Lowest Astronomical Tide
LBA	Liverpool Bay Area
LD	Lennox Platform
MSL	Mean Sea Level
MT	Metric Tonne
MWS	Marine Warranty Surveyor
OD	Outside Diameter
OSI	Oil Storage Installation
PoA	Point of Ayr
RFHU	Ready For Hook Up
ROV	Remotely Operated Vehicle
SMTS	Specified Minimum Tensile Stress
SMYS	Specified Minimum Yield Stress
SPMT	Self-Propelled Modular Trailer
SRD	Soil Resistance to Driving
TBC	To Be Confirmed
TOP	Top of Pipe
WD	Water Depth
WT	Wall Thickness.

4.0 REFERENCES

4.1 Company Standards

[Ref 1] Eni Doc. Nr. 08832.ENG.MME.SDS "General Specification – Offshore Steel Structures", Rev. 9, Dec 2020.
[Ref 2] D-500-SR-001, Rev. 2J "Weight Engineering Report No. 30 Vol 1 & 2, October 2019.
[Ref 3] Eni Doc. Nr. 08833.ENG.MME.SDS "General Specification – Offshore Platforms – Offshore Structures Construction", Rev. 7, Dec 2019.
[Ref 4] Eni Doc. Nr. 23001.ENG.MET.PRG "Design of Fixed Offshore Structures", Rev. 2, Dec 2020.
[Ref 5] Eni Doc. Nr. 23002.ENG.MET.ORG "Functional Specification – Fixed Offshore Structures", Rev. 1, March 2009.
[Ref 6] Eni Doc. Nr. 193130BGPU01587 "List of Applicable Codes and Standards".
[Ref 7] Eni Doc. Nr. 23006.SLI.OFF.FUN "Functional Specification for Positioning".
[Ref 8] Eni Doc. Nr. 23027.STR.NAV.FUN "Installation of Offshore Structures".
[Ref 9] Eni Doc. Nr. 23015.SLI.OFF.FUN "Pre-Construction Marine Surveys".
[Ref 10] Eni Doc. Nr. 23016.SLI.OFF.FUN "Functional Specification for As-Laid and As-Built Surveys".
[Ref 11] Eni Doc. Nr. ENI E&P Standard 1.3.3.27 "Minimum Safety Standard for protecting against Hydrogen Sulphide (H2S).
[Ref 12] Eni Doc. Nr. 27953.ENG.SAF.STD "Mechanical Isolation Philosophy and Procedures".
[Ref 13] 23026.COS.CNS.ST "Load-Out, Sea-fastening and Transportation od Offshore Structures"

4.2 International Codes and Standards

[Ref 14] API RP 2A-WSD "Planning, Designing and Constructing Fixed Offshore Platforms – Working Stress Design", 22nd Ed. November 2014.
[Ref 15] AISC 335-89 "Specification for Structural Steel Buildings – Allowable Stress Design and Plastic Design", 9th Ed. June 1989.
[Ref 16] ISO 19902 "Petroleum and natural gas industries — Fixed steel offshore structures"
[Ref 17] ISO 19901 "Petroleum and natural gas industries — Specific requirements for offshore structures.
[Ref 18] DNV-ST-F101 "Submarine Pipeline Systems, latest edition"
[Ref 19] DNV Rules for Classification of Ships DNV Part 3, Chapter 1, 2012.
[Ref 20] BS 5975 "Code of Practice for temporary works, procedures and the permissible stress design of false work", 2008.
[Ref 21] DNV-ST-N001: 2020, "Noble Denton Marine Services Warranty Standard".
[Ref 22] DNV-RP-F105 "Free Spanning Pipelines"
[Ref 23] EN 10025 "Hot rolled Products of structural Steels",
[Ref 24] EN 10204 "Metallic products – types of inspection documents".
[Ref 25] ISO 2768 "General Tolerances", 1989.
[Ref 26] ISO 13920 "Welding — General tolerances for welded constructions — Dimensions for lengths and angles — Shape and position", 1996.
[Ref 27] AWS D1.1 "Structural Welding Code – Steel", 2015.
[Ref 28] IMCA M179 "Guidance on Use of Cable Laid Slings and Grommets".
[Ref 29] Requirements for the Planning of and Consent to UKCS Field Development 2018.
[Ref 30] UK Petroleum Act 1998.
[Ref 31] Pipeline Safety Regulations 1996.
[Ref 32] (OIS) 4/2013 "Health and Safety Executive Offshore Information Sheet.

[Ref 33] 23026.STR.NAV.FUN "Load-out, Sea-fastening and Transportation of Offshore Structures"

4.3 Project Documents

[Ref 34]	1025H0BGQB09801	"Project Quality Plan"
[Ref 35]	1025H0BFRB09510	"Poa & OFFSHORE HAZID REPORT".
[Ref 36]	1025H0BFRV09511	"Poa & OFFSHORE ENVID REPORT".
[Ref 37]	105600BORV90115	"Jacket Weight Control Report – New Douglas"
[Ref 38]	105600BORV90215	"Topside Weight Control Report – New Douglas"
[Ref 39]	102327D0BLRV80003	"Offshore Method Statement For Pipeline Decommissioning".
[Ref 40]	1025H0BNSC85022	"Marine Warranty Surveyor Scope Of Work".
[Ref 41]	D-500-SB-002	"Metocean Criteria for Douglas Platform Vol.1.".
[Ref 42]	D-500-SB-003	"Metocean Criteria for Douglas Platform Vol.2.".
[Ref 43]	D-500-SB-004	"Metocean Criteria for Douglas Platform Vol.3.".
[Ref 44]	1025H0BOPT89004	"Weight Control Procedure".
[Ref 45]	105600BOCZ90203	"New Douglas Topside Transportation Structural Analysis".
[Ref 46]	105600BTDG62100	"Overall Layout (Douglas CCS Platform)"
[Ref 47]	105600FORF89990	"Douglas CCS Platform, Structural Feasibility Study"
[Ref 48]	105600BNRZ85025	"Douglas CCS Transportation Analysis"
[Ref 49]	105600BOCZ90105	"Douglas CCS Jacket Lifting Analysis"
[Ref 50]	105600BOCZ90203	"Douglas CCS Topside Transportation Analysis"
[Ref 51]	105600BOCZ90202	"Douglas CCS Topside Lifting Analysis"
[Ref 52]	105600BORV90115	"Douglas CCS Jacket Weight Control Report"
[Ref 53]	105600BORV90215	"Douglas CCS Topside Weight Control Report"
[Ref 54]	105600BJRV09240	"Constructibility Report Offshore New Douglas CCS Platform"
[Ref 55]	105600BODE90130	"Douglas CCS Jacket and Pile – Drawings List and General Notes"
[Ref 56]	105600BJRV09244	"Constructability Report Offshore WP2 New Douglas Platform"
[Ref 57]	105600BNDD85026	"Douglas Platform – Lifting and Transportation Drawings"
[Ref 58]	1056H0BFRB09131	"New Douglas CCS – Basis of Design"

5.0 DESIGN DATA

5.1 New Douglas Jacket Overview

The Jacket for the New Douglas platform will consist of 4 legs and the water depth it will be installed in has been anticipated to be of around 29.2m (relative to LAT). The Jacket will support a number of appurtenances listed below in Table 5-1:
Note: for the location of the Douglas CCS platform, refer to section 5.4 Table 5-9.

Item	Quantity	12”	14”	16”	18”	20”
Riser	8	2	1	3	-	2
J-Tube	5	-	-	3	2	-
Caisson (3 x OD800mm + 1 x OD1000mm)	4 for risers	-	-	-	-	-
Caisson (1 x OD1000 mm)	1 J-Tube support	-	-	-	-	-
Cathodic protection monitoring J-Tube	1	-	-	-	-	-
Zodiac landing platform on leg A1	1	-	-	-	-	-

Table 5-1 Jacket Risers and J-Tubes

The main Jacket levels are located at the following elevations as shown in Table 5-2 below:

Jacket Level	Elevation (Relative to LAT)
Top of Jacket Leg	EL. +20.00m
Centre of Upper-Level Horizontal Framing Members	EL. +15.00m
Centre of Intermediate-Level Horizontal Framing Members	EL. -7.00m
Centre of Lower Horizontal Framing Level members	EL. -27.20m
Mudmat underside	EL. -29.20m

Table 5-2 Jacket Elevations

The preliminary gross weight of the Jacket has been shown below in Table 5-3 below:

Jacket Lifted Weight	Weight $_{gross}$ (Te)
Jacket main structure (incl. sleeves & mudmats)	1436
Permanent appurtenances	566
Grout	168
Total (Deck)	**2170**
Dynamic Hook Load [Ref 21]	2495.5

Table 5-3 Jacket Lifted Weight

Here are the dry weights of the piles in Table 5-4:

Description	Contingency [%]*	W_{gross} [Te]
Piles Above Mudline within sleeves	10%	375.6
Piles Below Mudline *	10%	452.8
TOTAL	**10%**	**828.39**

Table 5-4 Pile Above and Below the Mudline Dry Weight
Note: * Percentage forTechnical Allowance on Estimation

Pile dimensions are provided in Table 5-5:

Diameter [m]	Thickness [m]	QTY of Piles	Penetration depth [m]	Total Length [m]
1.524	0.065	8	22.0	40.25

Table 5-5 Pile Dimensions and Penetration Depth

5.2 New Douglas Topside Overview

The main characteristics of the new Douglas platform are as follows:

- Stab-in (Jacket leg – deck connection) = 20.00m;
- Cellar Deck dim. at El (+) 26.00m = 22.40m x 26.00m;
- Weather deck dim. at El (+) 36.00m, approx. = 18.00 m x 13.00m;
- Topside Gross Dry Weight[1&2] = 2388.2 MT[Ref 38];
- Live loads Incl. fluid & content weight = 300 MT;
- Static Hook Load* = 2509.443 MT;
- Dynamic Hook Load = 2898.4 MT (DAF=1.10 as per [Ref 21]).

Notes:

1: The dry weight includes the structural steel work (about 1243.41 tons), bulk, equipment, piping loads and modules/items, building, radio tower, and equipment supports supported on the topsides main deck.

2. It is assumed riser spools, caissons spools, piping spools are transited on the topsides main deck elevation and are offshore installed and are included in the gross total load.

**Considering Gross Dry Weight and Including rigging, installation appurtenances (5%) and 5% Weight Contingency.*

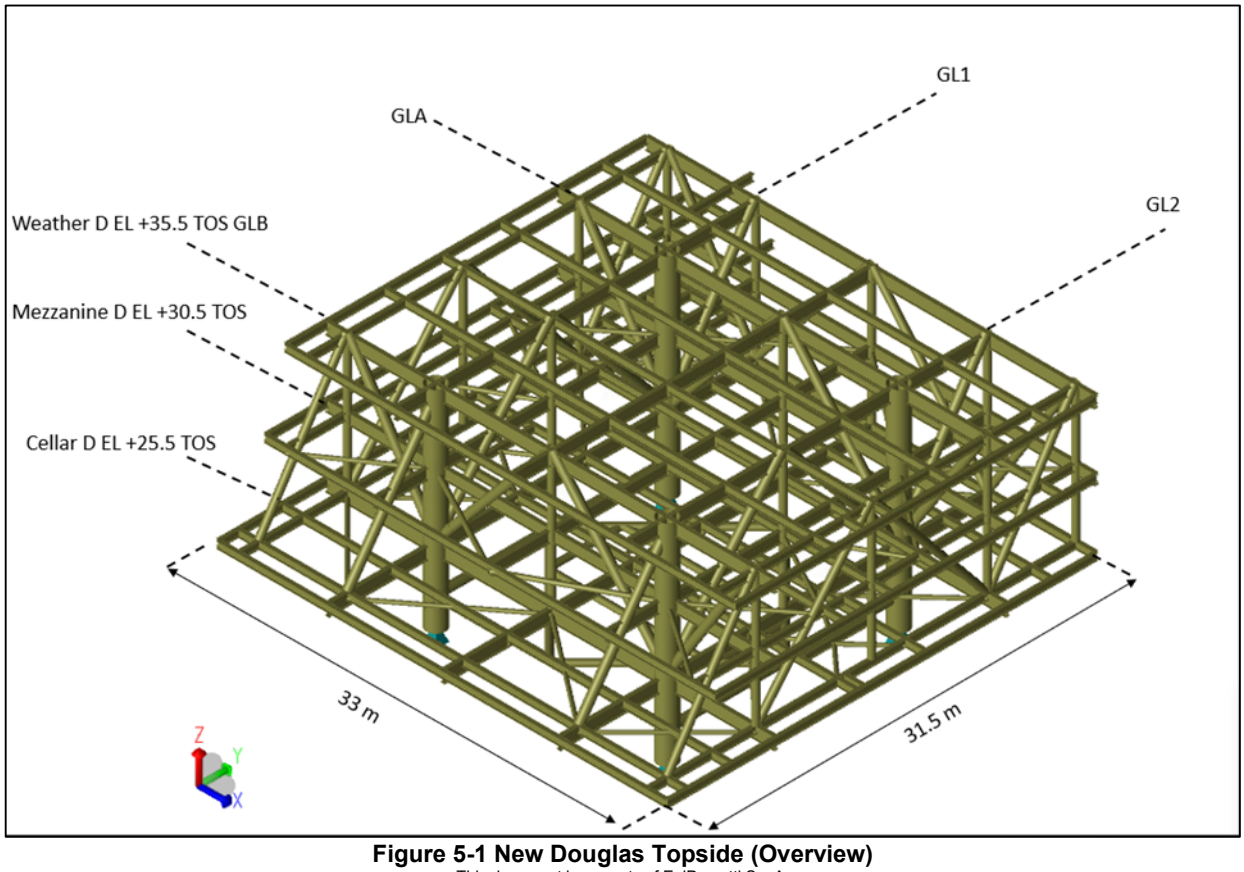


Figure 5-1 New Douglas Topside (Overview)

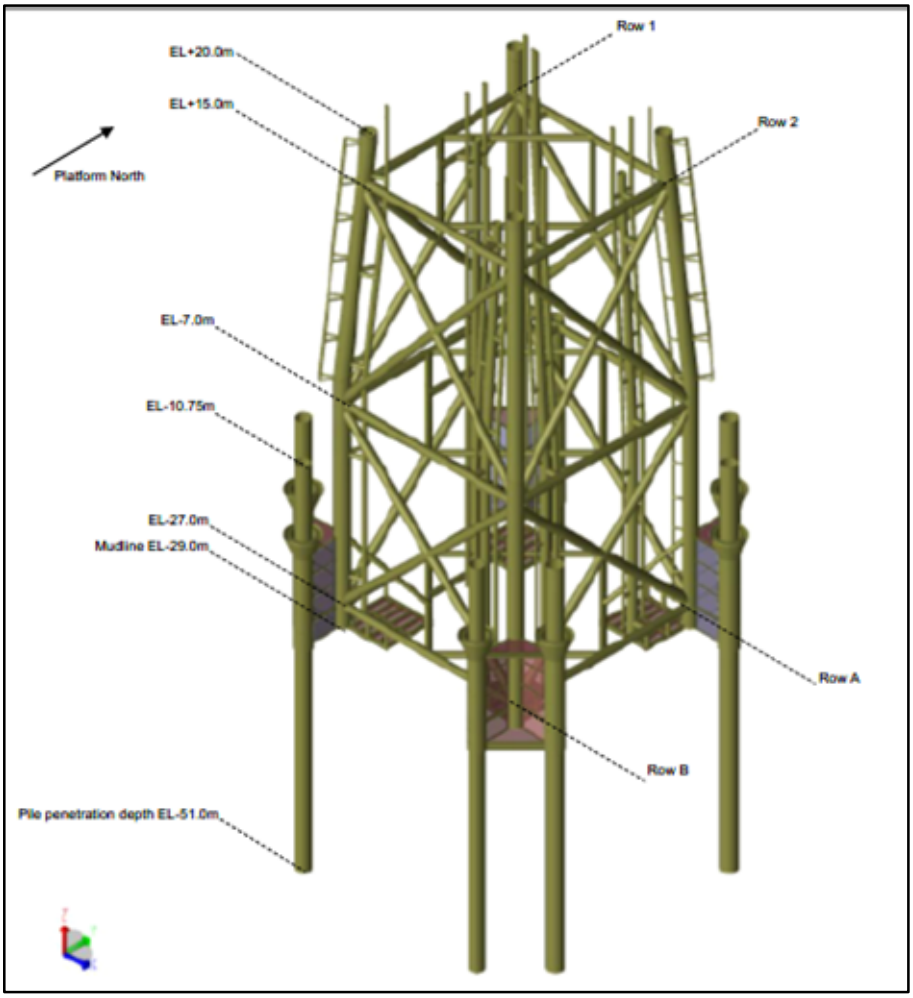


Figure 5-2 New Douglas Jacket with 8 sleeve Pile Arrangement (Overview)

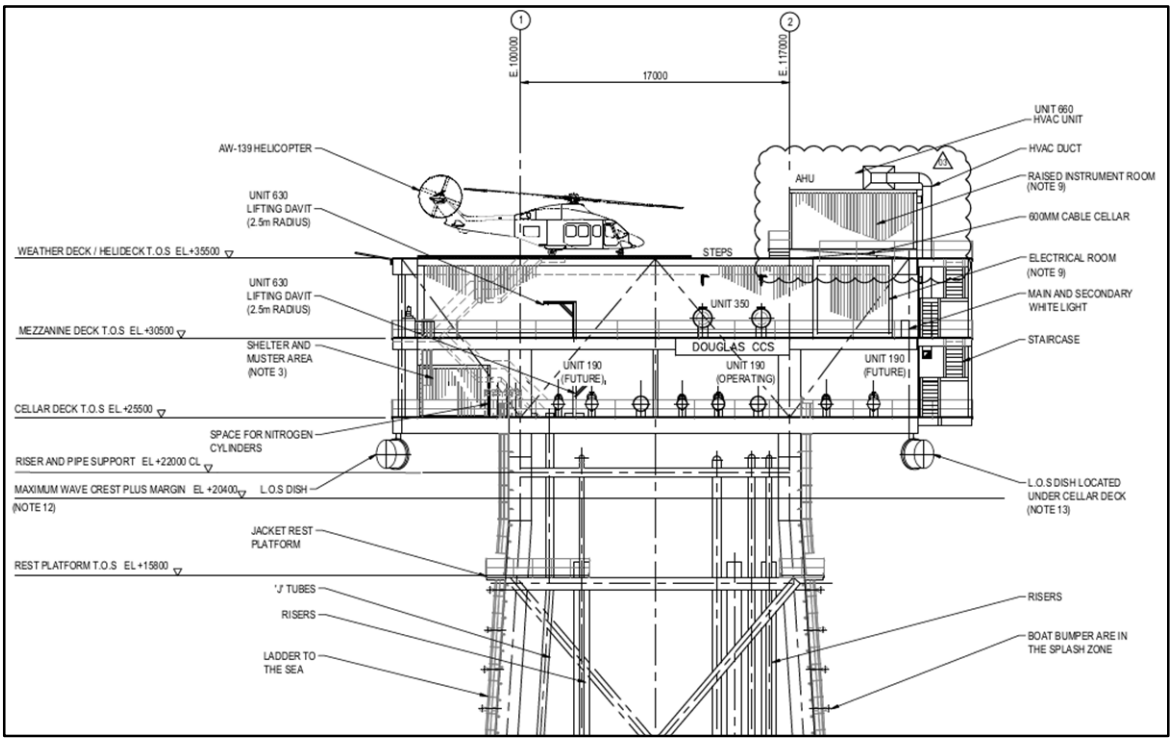


Figure 5-3 New Douglas Topside on New Jacket (Elevation Looking North)

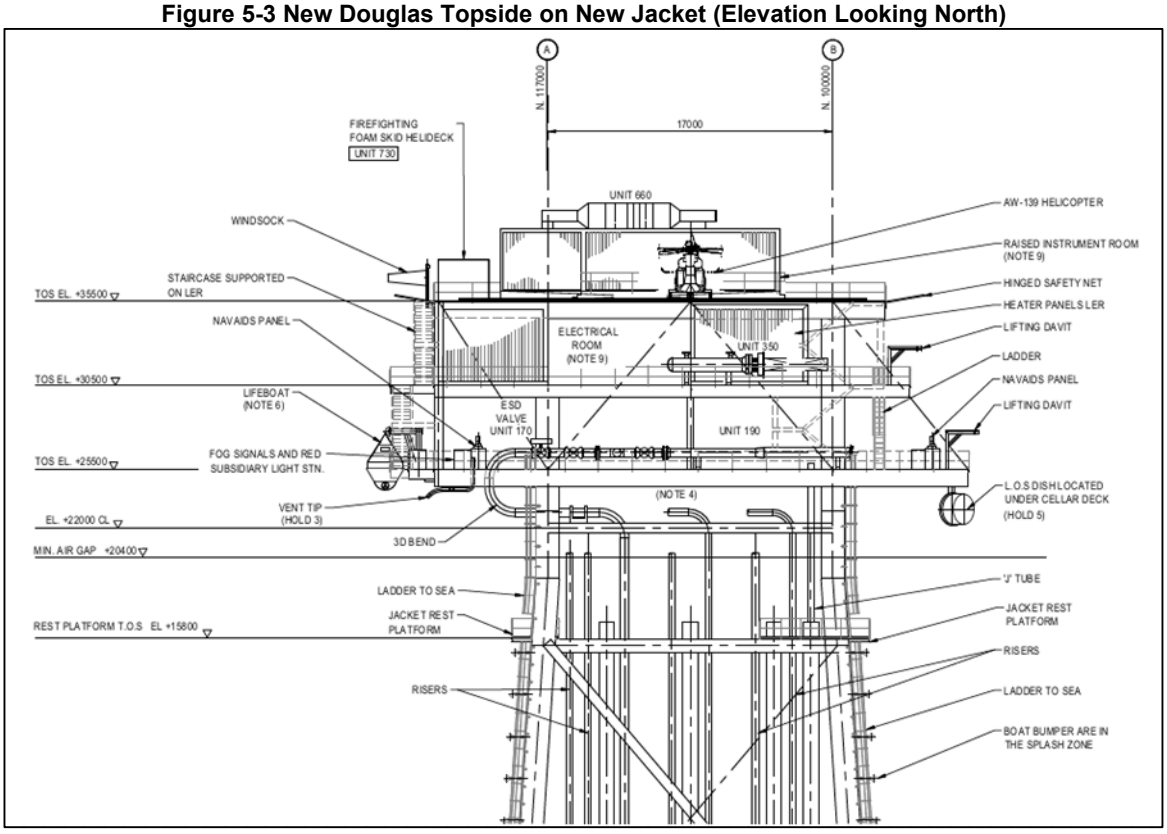


Figure 5-4 New Douglas Topside on New Jacket (Elevation Looking East)

5.3 New Douglas Jacket and Topside CoG

The Easting and Northing values as defined in the key plan below, are the basis for the topsides weight summary CoG co-ordinates [Ref 37] and [Ref 38].

5.3.1 Topside

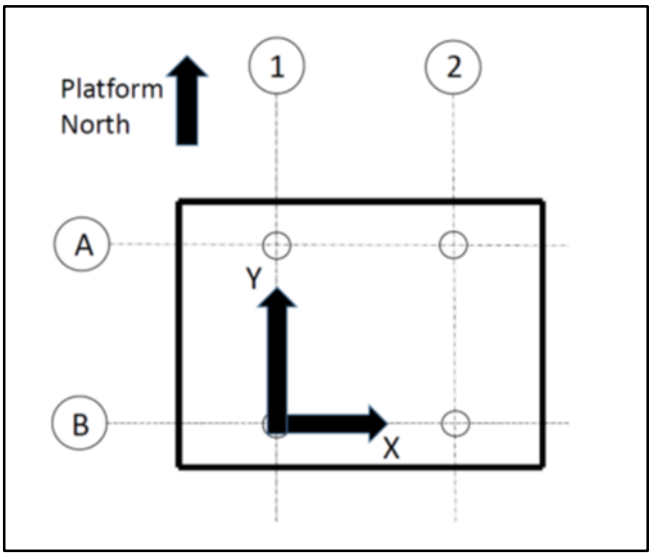


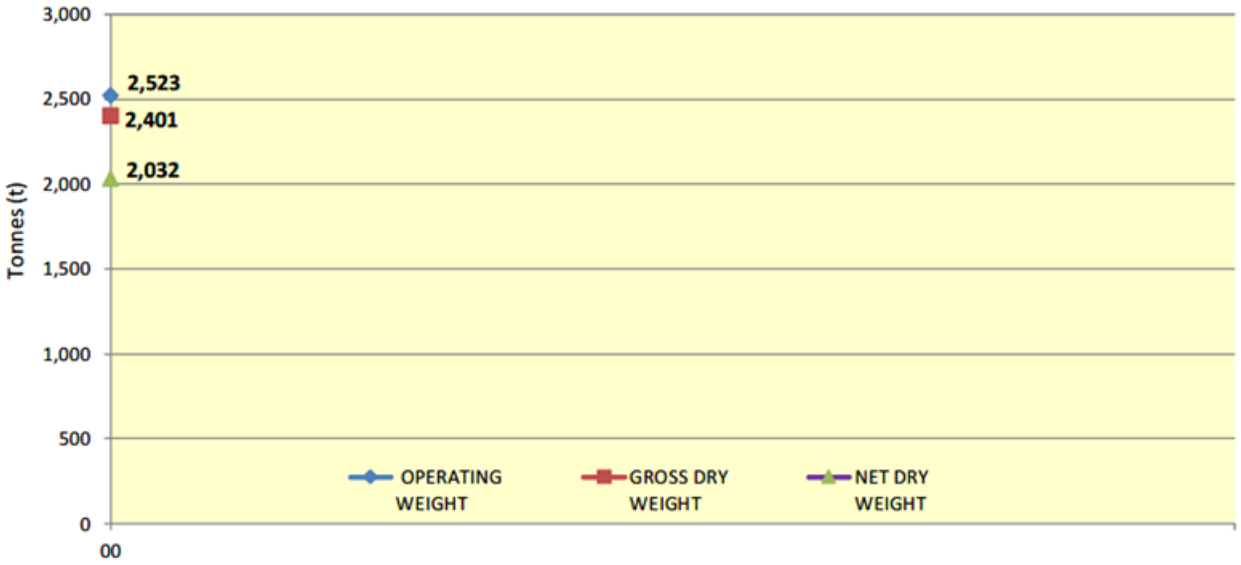
Figure 5-5 Topsides Key Plan

	Current WCR Operating				Delta previous Report			
Item	Oper Wt (t)	X GI (Easting)	Y GI (Northing)	Z GI From 0 PLD	Oper Wt (t)	X GI (Easting)	Y GI (Northing)	Z GI From 0 PLD
Douglas Future Operating Weight	2,522.507	9.031	9.292	30.133	0.000	0.000	0.000	0.000
Douglas Initial Operating Weight	2,495.646	9.015	9.346	30.174	0.000	0.000	0.000	0.000

Table 5-6 Topsides Gross Operating Weights & CoG's [Ref 38]

	Current WCR Lifts				Delta previous Report			
Item	Oper Wt (t)	X GI (Easting)	Y GI (Northing)	Z GI From 0 PLD	Oper Wt (t)	X GI (Easting)	Y GI (Northing)	Z GI From 0 PLD
Douglas Lift Weight	2,388.202	9.211	9.805	30.370	0.000	0.000	0.000	0.000
Douglas Hook-Lift Weight	2,509.443	9.211	9.805	30.642	0.000	0.000	0.000	0.000

Table 5-7 Topsides Gross Lift & Hook Lift Weights and CoGs [Ref 38]



	00
OPERATING WEIGHT (t)	2,523
GROSS DRY WEIGHT (t)	2,401
NET DRY WEIGHT (t)	2,032
Allowance Applied	*18.18%*

Table 5-8 Topsides Future Gross Operating, Gross Dry and Net Dry Weights [Ref 38]

5.3.2 Jacket

Hold due to Jacket Weight Report not being issued yet (HOLD 01).

5.4 New Douglas Platform Location

New Douglas Platform (Jacket and Topside) will be installed at a new location within the vicinity of the exsiting platform. Table below shows the location:

Platform	Typology	Water Depth [m] LAT	Latitude	Longitude
New Douglas (DD)	CCS platform	29.2	5 932 596.1 N	461 607.79 E

Table 5-9: New New Douglas Topside Location and Water Depth

5.5 Installation Tolerances

- Helideck horizontal planes ± 15 mm;
- Transition top to deck connections ± 15 mm;
- Transition top to transition top center line ± 10 mm (diagonal and vertical);

- East-west and north south planes: main decks. ± 0·2°.

5.6 Environmental Limits/ Criteria

Contractor Shall provide during execution phase a full list of limiting sea states for whole spread invloved in New platform (Topside and Jacket) Installation, including but not limited to:

- Anchor Handling;
- DP Positioning;
- Cargo Barge Mooring;
- Topside Lifting;
- Operations with work boat;
- Diving Operations;
- Personnel Transfer by Man Basket;
- Main Vessel in standby position in the vicinity of the New Douglas Platform location.

Note: The environmental criteria in which the operation will be commenced i.e. Wave Hs, Wind and current speed Shall be analysed for the marine spread involved in the installation operation during the detailed design. For details on the marine spread refer to section 7.0.

5.7 Unit System

Unless otherwise indicated, the units used in the analysis are:

- Length: [m];
- Force: [kN];
- Stress: [MPa];
- Mass: [Metric Tons] (equivalent to Mg in S.I.);
- Acceleration of gravity 9.81 [m/s^2];
- Sea water density 1025 [kg/m^3].

5.8 Environmental Data

Environmental data are reported from [Ref 41] to [Ref 43] where the descriptions and main characteristics of the following data and relevant document references are reported:

- Meteorological Characterisation;
- Wind conditions;
- Wave conditions;
- Current conditions;
- Sea surface variability;
- Marine growth;
- Hydrology.

5.9 Weather Forecasting

Contractor will use the weather forecasting provided by two independent and dedicated forecast services and monitor the weather at 12-hour intervals. The forecasting will commence one (1) week prior to the proposed mobilisation date. As a minimum, the forecasts Shall comply with the Weather Forecast Levels defined in: DNV-ST-N001, “Noble Denton Marine Services Warranty Standard”, [Ref 21].

These forecasts will be received two (2) times daily, six (6) days ahead.

The above forecast will be relevant to a location determined from the last reported position of the vessel and will contain, but not limited to, the following information:

- Meteorological situation;
- Warnings section;
- Weather summary;
- Tabular representation of forecast winds and weather at three (3) hourly intervals;
- Graphical representation of forecast winds and weather at three (3) hourly intervals.

In addition to the above detailed forecast, twenty-four (24) hour weather consultation by telephone will be available.

Above weather forecasts may be used for decision making by Contractor to alter course to avoid storms or high seas.

5.10 Order of Precedence

Engineering activities have to be performed in compliance with local laws, International Standards, ENI Standards, quality procedures and best engineering practice.

Where no local rules are present, the design shall comply with ENI Standards, International Standards, and engineering good practice. In case of conflict, priority shall be given according to the following list (in descending order):

- Local statutory laws and regulatory requirements;
- Contractual agreements;
- Project Specification and Drawings;
- ENI standards;
- International codes and standards;
- Best practice, industry guidelines and standards.

In the event of conflicting requirements from different rules, codes or standards, the most stringent one shall apply. In all cases Company shall be informed and Company Approval shall be provided.

6.0 INSTALLATION OF NEW DOUGLAS JACKET AND TOPSIDE

This section Shall be read in conjunction with the following documents:

- 105600BNRZ85025 Douglas CCS Transportation Analysis [Ref 48];
- 105600BNRZ85024 Douglas CCS - Lifting Analysis
- 105600BOCZ90105 Douglas CCS Jacket Lifting Analysis [Ref 49];
- 105600BOCZ90203 Douglas CCS Topside Transportation Analysis [Ref 50];
- 105600BOCZ90202 Douglas CCS Topside Lifting Analysis [Ref 51];
- 105600BORV90115 Jacket Weight Control Report [Ref 52];
- 105600BORV90215 Deck Weight Control Report [Ref 53].

6.1 Jacket, Piles and Topside Load-Out Activities

The load-out shall be performed with SPMTs/trailers for Piles, Jacket and Topside at Contractor discretion.
Note: Loadout methodologies will be confirmed by Contractor and Company Approval to be obtained.

Load-out procedure shall account for the possibility of interruption or reversal of the operations. The non-return point shall be defined.

It shall include but may not be limited to:

- Load-out sequence definition. Contractor Shall demonstrate the possibility of carrying out the operation safely, together with estimated time according to adopted ballast pump capacities;
- Barge ballasting analysis. Ballast shall be distributed in such a way to maintain the same trim during all load-out phases and to have adequate bending moments. Tanks used to compensate tidal effects should be different from tanks used to correct the load change;
- Mooring analysis and quayside foundation verification;
- Ground capacity checks/approvals prior to load-out taking place;
- Load-out route to be provided and get Approval.

The analysis shall account for:

- Breakdown of ballasting pumps;
- Delays during load-out due to repair work;
- Unexpected tide variation and current if applicable, over the predicted design values;
- Possible flooding of a barge compartment;
- Drawing of stability curves for intact and damaged barge, including the effect of wind forces;
- Barge mooring analysis and barge strength verification during load-out;
- Design of the bridge frame between quay and transporting barge;
- Definition of SPMTs characteristics, considering the theoretical number of support points.

Contractor must define allowable weather conditions for load-out and comply with the load-out requirement stated in [Ref 33] and [Ref 21].

The loadout analysis shall be based on the NTE jacket/topside weight and centre of gravity, derived from the Weight Control Report. Final loadout analysis shall be assessed after object weighing, in particular to consolidate the ballast procedure.The loadout analysis shall consider the following contingencies depending on the weight reference:

- Same contingencies on the weight as in the weight control report;
- A global contingency that corresponds to the weighing accuracy, with a minimum of 3%;
- The extremes of a CoG envelope centered on the calculated CoG.

The loadout scenario shall be documented in detail and all specific loads generated in the object during loadout operation shall be identified. A calculation note shall be presented to Company and MWS to demonstrate the acceptability of these loads and any corresponding reinforcement required for the jacket.

The maximum barge draft shall be such to ensure a minimum free board of 1.0 m as per [Ref 21].

The minimum under-keel clearance throughout the load out operation shall be 1.0 m as per [Ref 21].
Note: The seabed in front of the loadout quay shall be inspected for obstacles by divers or by an adequate survey method if the barge under keel clearance is considered as critical.

The Contractor Shall define the number of SPMT axles and power pack units for the operations. The equipment shall be available at loadout site, and subject to periodic inspections; moreover prior to commencement of the operations the equipment will be checked according to the inspection check lists.

Below a preliminary list of equipment to be supplied but not exhaustive:

- Fenders, winches, and mooring equipment;
- Transport beams, relative spreader, and support equipment;
- Steel spreading plates, shims, and interfaces with the jacket;
- Grillage and sea-fastening;
- Site lights for Quay and Storage Area;
- Site lights for Barge;
- Service cranes;
- Service forklift(s);
- Equipment and tools for installing grillage and sea-fastening;
- Gangway with safety net.

6.2 Jacket and Topside Transportation

Transportation Procedure and Transportation Barge for both Jacket&Pile and Topside, shall comply with transportation requirement as per [Ref 33] and [Ref 21].

The Jacket is planned to be transported and lifted in vertical configuration.The Topside is planned to be longitudinally positioned on a transportation barge transversally alligned with the center of the barge.

The barge ballasting pattern for tow will be defined by Transportation Contractor and shall be finally agreed by the MWS and towing master.

The following activities shall be performed before sail away:

- Cargo barge inspection;

- Testing of all the equipment to be used during installation;
- Testing of mooring equipment;
- Check of the sea-fastening;
- Check of the barge ballast;
- Check that towing lines are properly connected to the barge;
- Verification of safety appurtenances and lighting system;
- Verification of barge safe accesses and boat landing for crew boarding;
- Verification of side protection and border of the working area.

Towage from fabrication yard to installation site (by means of a suitable towing tug and followed by an escort tug both selected mainly on the basis of bollard pull requirements) shall be performed according to the selected tow route continuously monitoring the weather forecast.

The cargo barge should arrive earlier than HLV at site and the stand by time is envisaged to be more than two/three days the convoy shall be sent in a sheltered area waiting for arrival of the Installation Vessel.

6.3 Jacket Installation Sequence

The comprehensive list of main installation activities Shall be provided by Contractor during execution phase. Preliminary list is as follows:

- Preparatory Works on the seabed (this will have been completed prior to the arrival of the Jacket on the cargo barge);
- Cargo barge transporting the Jacket has arrived at the site;
- HLV to move in position to receive the cargo barge;
- Obtain all necessary approvals from the field authorities to approach the location and commence of the Work;
- All procedure and risk assessments approved by Company and MWS;
- Obtain Certificate of Approval from MWS if applicable;
- Carry out all necessary communications, JSA and Toolbox talks and receive permit to work;
- Vessel Shall arrive and moor on allocated and approved location;
- Inspect New Jacket for any anomalies;
- Install and weld lifting aids as per rigging arrangement;
- Perform a walkthrough on cargo barge and perform the Jacket pre-lifting inspection;
- Ballast Cargo Barge as per lifting analysis;
- Ballast HLV to the required lifting capacity, ensure the tilt/trim of HLV will not exceed allowed parameters after lifting the Jacket;
- Lower down the main hook and connect pre-installed lift rigging to main hook and rise the hook to recover the slack of lifting slings;
- With favorable weather forecast and acceptance of lift preparation, send crew and cutting tools to cargo barge to cut sea-fastening;

- Connect tugger lines to the control bollards;
- Start increasing the load gradually up to when the Jacket detaches from the barge grillage, raise the main hook until approx. 3.0 m clearance between deck and highest obstruction on the cargo barge is achieved;
- Cast-off cargo barge from underneath the Jacket structure by pulling with tugs;
- Rotate crane above the target box location if required;
- Lower the structure until the Jacket slowly lands on target box (ROV to confirm);
- Once Jacket legs are landed in their position on the seabed release completely the load from the crane hook;
- Continue lowering the main block until lower rigging gets slacked;
- Perform elevation and horizontal level survey check;
- Obtain Company approval for the Jacket installed;
- De-rig lifting slings, shackles, and tugger lines on successful Jacket landing on the seabed;
- Ensure the following information for As-built documentation has been collected (As-installed Jacket elevation, orientation, and level;
- ROV to conduct the as-left survey on the seabed;
- Piling operation to commence;
- 8 piles with the diameter of 1.524m to be driven;
- Completion of Works;
- Move away from Platform (and recover all anchors if anchor vessel is utilised).

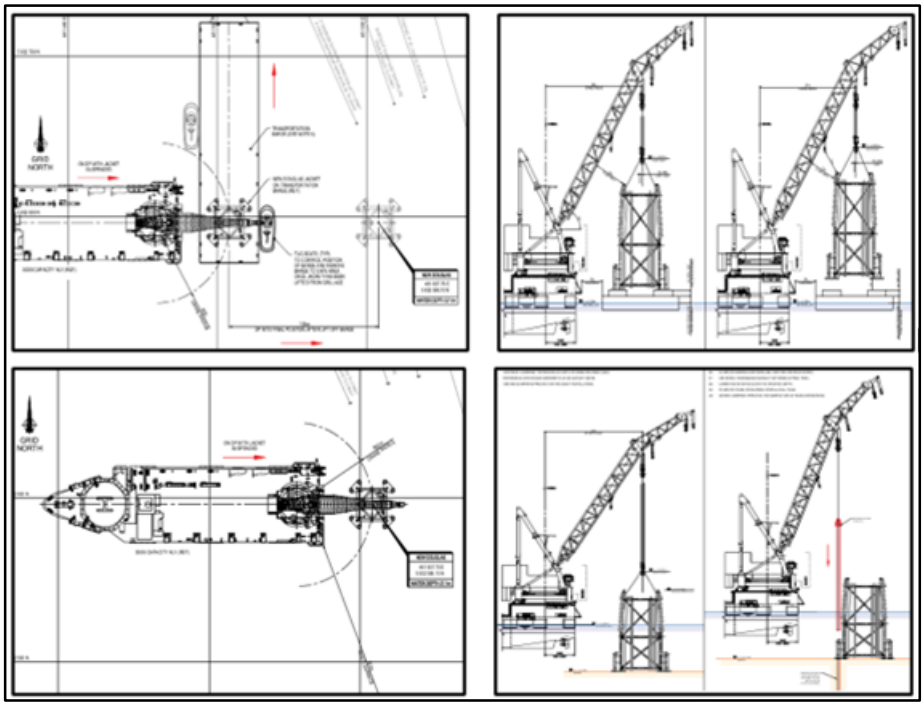


Figure 6-1 Jacket Installation Sequence Pictorial [Ref 57]

Detailed description and methodology Shall be provided by Contractor. The Contractor Shall be responsible for supplying and using lifting lugs, stabbing guides and any other installation accessories required.
In case Contractor opt to use Jack-up barge instead of HLV, then it Shall provide verification of soil data for Jack-up spud down area, investigation of approach corridor, subsea debris or any other requirements specified in DNV-ST-N001,[Ref 21] (clearance form subsea asset etc.).

The jacket installation procedure shall be established by Contractor as per [Ref 33] and [Ref 21]. Suitable Crane vessel equipped with all systems necessary for installation operations, with relevant support/survey/anchor handling vessels, has been considered to carry out the installation operations.

Contractor Shall check any significant dimension before installation to ensure that installation operations can be carried out in complete safety.

The Platform installation tolerances (PIT) are:

- +/- 2m radius;
- +/- 0.5degree for the levelling;
- +/-1 degree on the heading.

The jacket location and orientation are frozen by the PDT position and the two docking piles that will be previously installed and approved by Company.

The jacket level shall be within the tolerance of +/- 0.5degree. If this tolerance is not met, Contractor shall perform the jacket levelling operations to bring the jacket within the required tolerance.

During Detailed Engineering, Contractor Shall assess the bathymetry and soil condition at site and, should it be deemed necessary, perform any corrective measure on Jacket Design and/or plan relevant corrective actions on seabed at site, in order to mitigate the risk of Jacket out-of-level.

The purpose of the installation studies is to check the structural behaviour of the Jacket to be installed, and to calculate and design all the relevant installation aids such as pad eyes, trunnions, shackles, spreader bars or spreader frames, slings, bumpers and guides, etc.

Installation operations shall be avoided as much as possible when the wave energy/period is close to the natural periods of the system over the whole operation sequence, starting from the lift off up to the final and secured position of the object.

The free surface effect shall be minimised in ballast compartments.

For critical operations, - “critical” means here when resonance effects are anticipated -, in addition to the analysis described hereunder, time domain non-linear coupled analysis modelling the vessel, the lifted jacket (during docking phase) and all kind of required connections (tugger lines, fenders, guiding system, bumpers etc..) shall be performed for all the sequences of the operation.
Those analyses shall clearly identify:

- The natural frequencies of the system for all the sequences;
- The relative motions between the jacket/topside and the vessel;
- The loads in the connections;
- Constant length of the tugger / mooring lines shall be considered (more severe than constant stiffness for short length);
- The consequences of the failure of one of the connections (“Domino effect”);
- The stability of the vessel during the crane slewing (if any) due to inclining loads;

- The effect of any variable loads (horizontal set downward loads, connection release, etc.);
- And, finally, the weather conditions limits (Hs, Tp).

The monitoring system of the crane shall be calibrated prior to the operation. A careful preparation of the tugger lines and the mooring/positioning lines shall be considered with an adequate arrangement to avoid interferences, difficult access (if lines need to be changed) and to secure properly the jacket during the whole operation.

In particular, any horizontal relative motions of the lifted jacket should be avoided at any time. The vertical relative motions shall be less than +/- 0.5 m.

Tugger and mooring lines shall be designed taking into account the maximum dynamic loads and at least 3 deg out of plumb (side-lead and off-lead).

The following minimum safety factor shall apply to the maximum dynamic loads and out of plumbs:

- 1.5 for the tugger lines to the braking capacity;
- 3.0 in intact and 2.0 in damage (single failure) for the mooring lines to the minimum breaking load.

For any lifting analysis, the calculations carried out shall combine and include the following loads and factors:

- for a weighed structure, the calculations shall consider the weighed weight plus a tolerance factor of 3 % due to weighing inaccuracy.

When the maximum expected lift weight is above 90 % of the maximum lift capacity, the maximum lift capacity shall be considered for the lifting analysis. In such a case a lifting dynamic motion analysis shall be performed to assess accurate DAF.

Whenever the results of a weighing (if any) would show a weighed weight greater than the maximum expected weight and/or an excessive COG shift, the lifting calculations shall be revised to consider the weighed weight plus 3 %, and the structure shall be reinforced accordingly if required.

Lifting analyses during detailed engineering phase shall consider:

- The variation of the calculated location of the CoG within an envelope for the jacket;
- The variation of the minimum sling angle.

The lifting rigging shall be designed according to [Ref 21] taking into account:

- DAF;
- skew load factor;
- yaw effect factor;
- Tilt effect factor;
- consequence factor etc.

During installation of jacket and piles, care shall be taken to avoid damaging the jacket or any equipment already installed on the jacket. If damage does occur, the Contractor shall inform the Company's representative and carry out any repairs in agreement with the Company's representative.

Welded joints shall be 100 % inspected by ultrasonic, as stipulated by the procedure.

All weld inspection operations shall have been completed, to the Company's representative's satisfaction before any demobilisation of lifting cranes.

Once the jacket has been landeded on seabed, Contractor Shall install all the piles and complete the Jacket foundation works. After pile installation and grouting, Contractor Shall install the topside.

Material and accessories intended to be used for installation operation shall be submitted to MWS and Company for approval.

Unless indicated otherwise, all lifting operations shall be carried out by a crane. The crane shall have a sufficient certified capacity and the crane vessel shall have a sufficient stability to allow for:

- Jacket docking;
- Jacket setting down on seabed;
- Pile installation;
- Jacket levelling (if necessary).

The lift rigging shall be composed by 4 slings connected to the 4 lifting point on jacket structure. The lifting slings shall be attached above the jacket center of gravity to avoid any damage during lifting operation, also the sling tolerance limitations to be stated. On the hook, the sling arrangement shall be symmetrical to avoid a tilt of the block and an angle between the wires and the sheaves.

In the following figure a preliminary jacket rigging arrangement is shown.

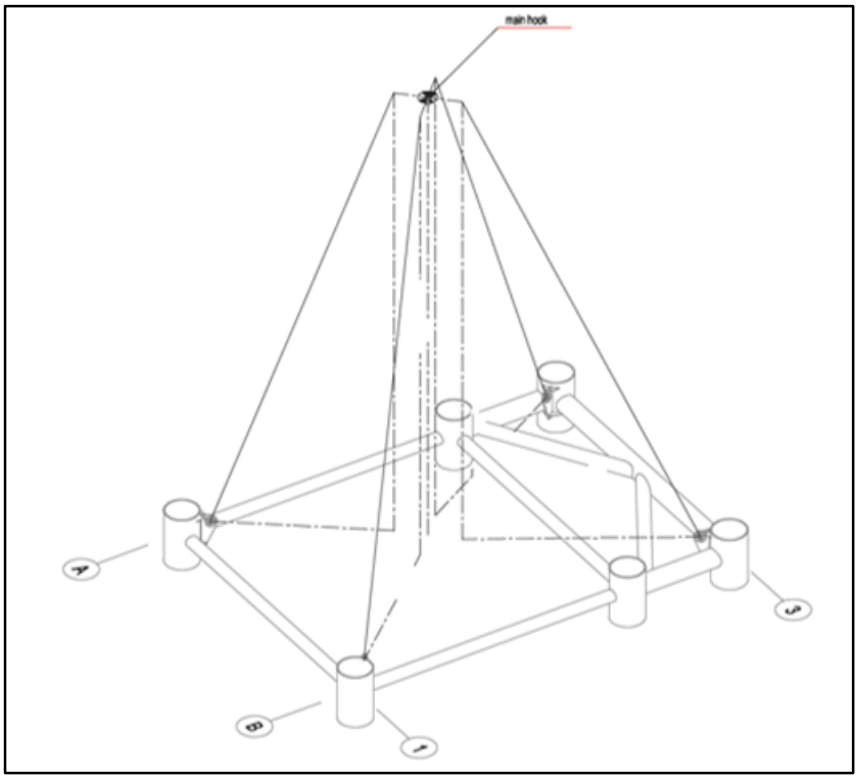


Figure 6-2 Indicative Jacket Lifting Arrangement

Contractor Shall supply the drawings showing the jacket rigging points, center of gravity, installation scenario, and the capability of the crane used for operations listed above.
The slings shall be pre-installed at yard on the structures and secured for the transit duration to facilitate the lifting operations at sea. In that purpose, access and rigging platforms shall be designed and installed to

support the slings and to facilitate the access to the sling eyes and lifting points, and to perform safely the removal of the slings and shackles.
The slings shall:

- Be well identified, with material and inspection certificate;
- Be positioned to allow rapid lifting;
- Be tied to the structure for transport;
- Not be hanging inside of the object;
- Be clear of any obstruction with a minimum clearance of 3 meters.

The rigging design report shall be issued/reviewed and approved by Company and MWS.

As soon as the jacket is set on seabed, prior to disconnect lifting slings, jacket verticality will be checked. The level and verticality measurements shall be carried out by Contractor by suitable systems. In case the jacket is out of required tolerances after positioning on the seabed, the Installation Contractor will decide upon the necessary remedial action required to be taken; upon satisfactory result of such verticality survey the lifting slings shall be disconnected and recovered on HLV deck.

In case levelling will be required levelling procedures and timing shall be agreed between Contractor and Company.

6.3.1 Pile Installation

An internal lifting tool (ILT) should be used for upending and lifting of the foundation pile.

Proper installation of piling is vital to the life and permanence of the platform and requires each pile to be drilled, or driven (TBD during detailed design phase) and grouted to the design target penetration, without damage, and for all field-made structural connections to be compatible with the design requirements.

Basic requirements are following:

- Two (2) hammers on the same capacity (1 as backup);
- All hammers tested onshore prior to sail to site during Mobilisation;
- Personnel to cover 24hours activity.

The Contractor Shall mark the piles every 0.25 m to allow the hold length to be read during pile driving (zero reference level: Pile tip at seabed). The Contractor Shall ensure that the piles pass freely through the legs. Jacket member closures if any shall be either removed or destroyed as the pile passes.

The Contractor Shall be responsible for supplying and using lifting lugs, stabbing guides and any other accessories required. Hydraulic gripper/lifting tools shall be of good condition and tested at 125% of their nominal capacity.

To reach the design pile penetration the following techniques shall be used:

- Driving;
- Drilling (if necessary);
- Drilling (if necessary) to assist driving;
- Drilling for drilled and grouted piles.

Contractor Shall perform a driveability study in order to assess the driveability of the piles with the proposed hammers, with due consideration to stress levels induced in the piles and setup effects. The driveability analysis shall include the following:

- The characteristics of the piles and hammers to be used;
- The review of the soil conditions encountered;
- The calculation of the Soil Resistance to Driving (SRD) for each type of pile, with the method used and the references;
- The results of the drivability analyses, including:
    - Driving simulation curves (blow count versus SRD for each hammer, hammer global efficiency, pile, and soil conditions);
    - The corresponding predicted blow count curves versus penetration;
    - The maximum stick-up length including the cut-off length.

Contractor shall take all measures necessary to operate the hammer at the nominal energy as defined by Manufacturer.

The assessment of the maximum stress induced by the hammer impact into the pile steel at the top of pile shall be performed prior the installation and using driving simulation programmes based either or the wave equation theory or on the characteristic methods. In case of driving in hard soil layers, the stress amplification at the bottom part of the pile shall be assessed using the driving simulation programmes.

Pile driving monitoring shall be performed at least for the two first piles or groups of piles. The pile driving monitoring system shall be able to provide for each hammer blow:

- Hammer global efficiency;
- Impact driving energy in the pile;
- Driving stresses, including impact stress at pile top and reflected stress at bottom of pile;
- Estimated soil resistance to driving.

Contractor equipment shall allow the monitoring of the totality of the length of the pile to be driven into the soil.

Contractor Shall take all measures necessary to drive the piles down to the design penetration. A penetration of less than the design penetration may be acceptable depending on the type of soil encountered, hammer global efficiency and evolution of the soil resistance to driving.

The following information shall be recorded for each pile installed:

- The pile number, leg reference and date;
- The self-penetration under the weight of pile and pile plus hammer;
- The serial number and type of hammer used to install the pile.

For hydraulic hammers:

- Stroke of the ram;
- Oil pressure;
- Ram velocity at impact;
- Calculated impact driving energy;

For Diesel and steam hammers:

- Short fall of the ram during driving;
- The agreed reference level used to determine the pile penetration and blow count;
- The depth of penetration of the pile;
- The cumulated number of blows applied to the pile by each hammer;
- The number of blows for each 250 mm of pile penetration;
- The number of blows per minute during driving measured at intervals no greater than 10 minutes;
- The cushion condition before and after driving and any obvious changes during driving;
- The level of the upper part of the plug inside the pile;
- The beginning and end time of driving each pile;
- The as-built drawing of the pile, with the positions of the welded joints, the penetration and cut lengths, identification of pile sections used, soil plug and water levels;
- The verticality of the jacket prior to the commencement and after the completion of driving of all the piles;
- The time lost due to bad weather or equipment failures, including the pile position at the time.

No follower shall be stabbed if prevailing positions are such that damage to the pile or follower or permanent jacket structure is likely to arise from this operation. Followers shall be visually inspected by the Contractor for damage and conformity to the design length immediately prior to lifting off supply barge and stabbing. Any damage or discrepancy found shall be immediately reported to the Company Representative. The top and bottom of the followers, the driving surfaces, shall be periodically inspected between or during pile driving operations and those showing signs of wear shall be discarded or repaired to the satisfaction of the Company Representative.

Regarding drilling and grouting equipment, Contractor shall submit the following to the Company:

- Detailed specifications and capabilities of the drilling equipment.

<u>Mixing and pumping equipment</u>:

Prior to the mobilisation, the following information shall be submitted to the Company by the Contractor:

- The location of Contractor's and/or Sub-Contractor's supply base, the storage area layout and availability, the relevant equipment to be used and details of access;
- Detailed specifications of the storage, mixing, pumping, generating, and testing equipment the Contractor intends to use together with the details of interconnecting pipework and any power supply requirements;
- Evidence that the mixing equipment is capable of mixing the grout components to the required quality and at the required rate;
- Evidence that the pumping equipment is capable to pump the grout through the piping system at the required density, rate, and pressure;
    - Contractor to have a backup pump in case the pump fails during the operation;

- Proposed field manpower Organisation and manning levels together with brief resumes of experience of supervising and quality control personnel.

Procedure for pile installation to be developed by Contractor shall cover, at the minimum, the following contingency scenarios:

- Jacket levelling contingency;
- Lifting clamp failure;
- Drilling system failure/malfunction
- Hammer breakdown/malfunction;
- Piles refusal;
- Levelling system failure;
- ROV failure;
- Failure of primary grout line;
- Failure of secondary grout line;
- Grout specific gravity inferior to minimum required during grouting;
- Blockage of grout supply line;
- Failure of grout seal;
- Grouting equipment failure.

6.4 Preparatory Works on New Topside in Fabrication Yard

Preparatory works will include preparation of area on cellar deck, under deck, mezzanine and weather deck in order to make sure the Topside is ready to be installed on the New Jacket. Pre-installed pin guide system and remaining structural items to be installed offshore or at Contractor discretionas shown in Figure 6-3, Figure 6-4, Figure 6-5 and Figure 6-6 below.

Contractor Shall provide detailed lifting analysis with proposed Topside installation guiding system or any other verification based on Contractor's previous experience and skill. Contractor to confirm lifiting Topside is feasible with minimal horizontal drift risk and anticipate lifting arrangement in order to ensure Topside structural integrity.

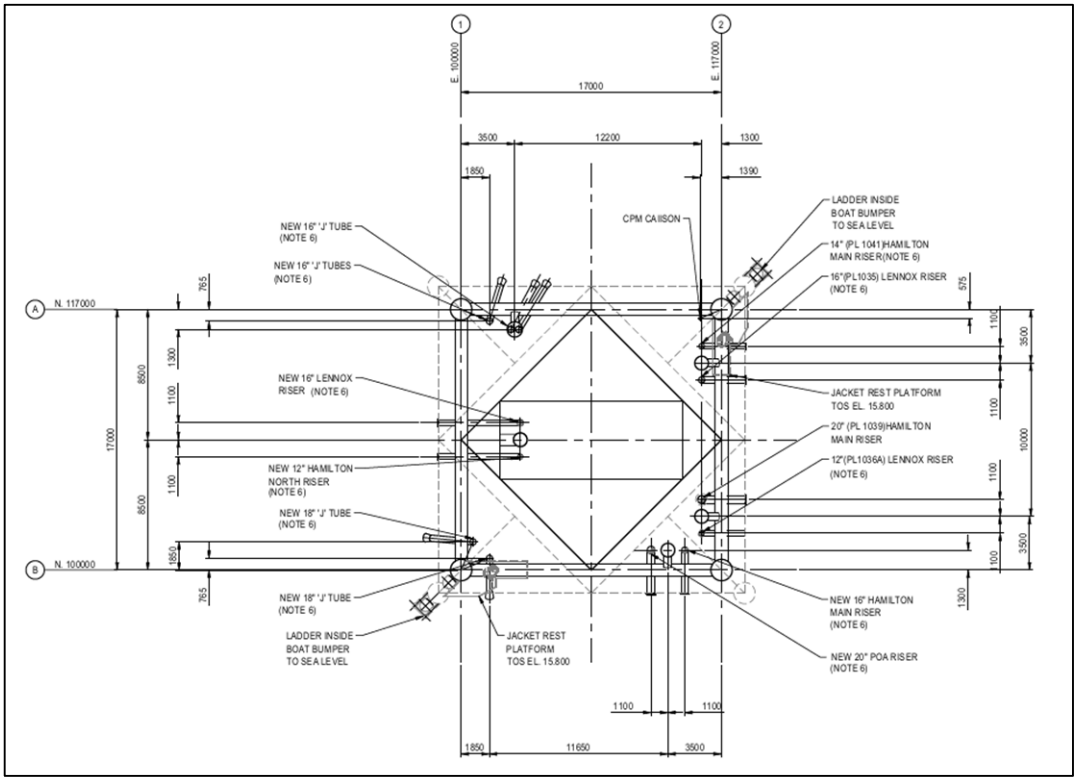


Figure 6-3 New Douglas Platform – J-Tube, Riser and Pipe Support Level +22.00 TOS prior to Installation (Offshore Installed Members)

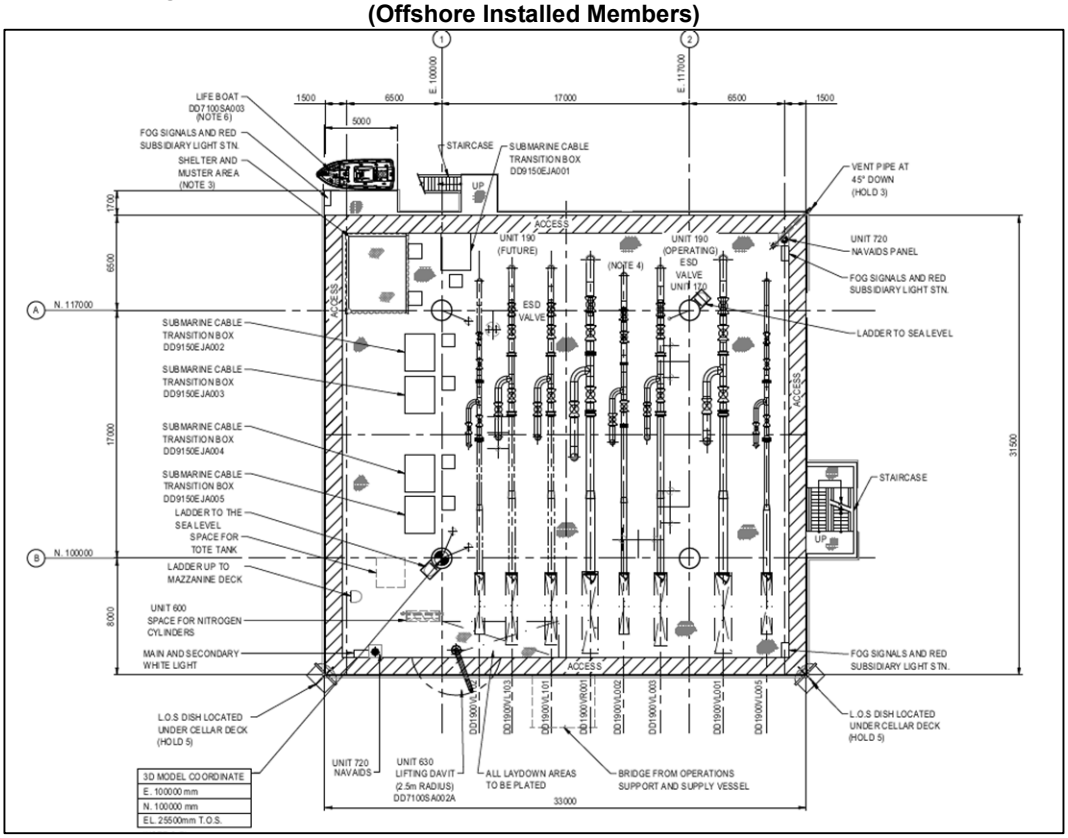


Figure 6-4 New Douglas Platform – Section of Cellar Deck

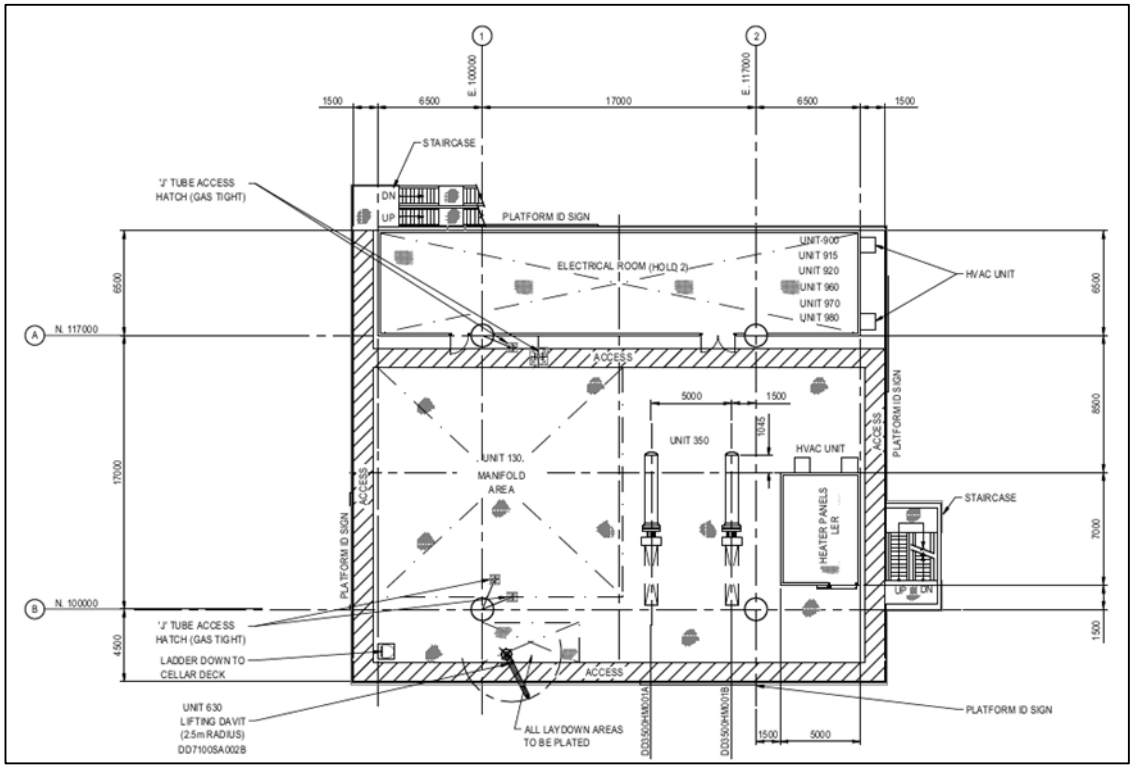


Figure 6-5 New Douglas Platform – Section of Mezzanine Deck

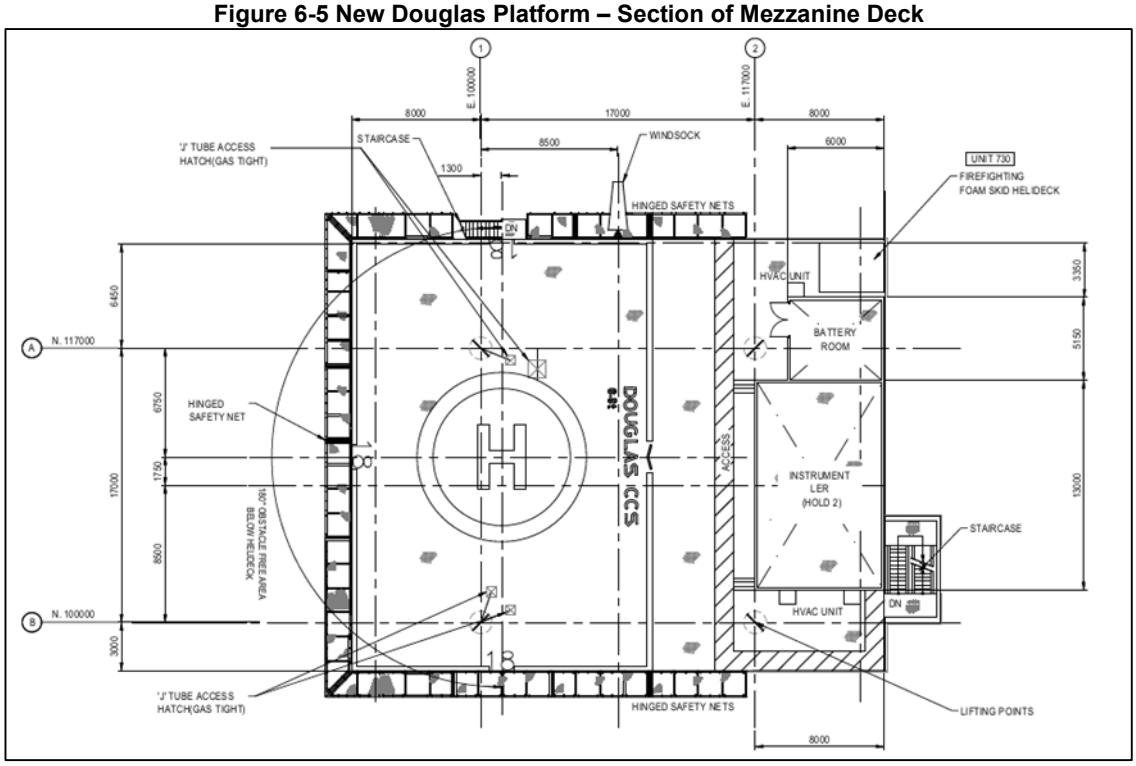


Figure 6-6 New Douglas Platform – Section of Weather Deck

Detailed description and methodology Shall be provided by Contractor. The Contractor Shall be responsible for supplying and using lifting aids, stabbing guides and any other installation accessories required. The Contractor can utillse other means to install lifting aid such as other vessel or Subcontractor. All Works to be finalised for installation of lifting aids Shall be endorsed by the Company and MWS.

6.5 HLV Preparatory Works on Jacket for New Topside Installation

Prior to installation, preparatory Works on Jacket Shall be conducted by the HLV (at appropriate position in relation to the Jacket), following the below outline procedure:

- Install scaffolding around the 4 transition pieces with consideration for scaffolding parts to be removed after completing of the preparatory Works due to potential clash with Topside;
- Send survey team to mark the transition pieces cut off elevation. Considering the Topside legs as built;
- Transition pieces to be beveled if already not done at the fabrication yard;
- Verify the existing stabbing guides on Jacket legs or install as required, weld and perform NDT (Verticality must be ensured before welding);
- Remove from Jacket all items which aren't required for Topside installation;
- Remove gangway and move to deck standby position.

6.6 Topside Installation Sequence

New Topside installation sequence should follow necessary below steps:

- Obtain all necessary approvals from the field authorities to approach the location and commencement of the Work;
- All approved procedures and risk assessments by Company and MWS are in place;
- Obtain Certificate of Approval from MWS if applicable;
- Carry out all necessary communications, JSA and Toolbox talks and receive permit to work;
- Vessel Shall arrive and moor on allocated and approved location;
- Inspect New Topside for any anomalies;
- Install and weld lifting aids as per rigging arrangement;
- Perform a walkthrough on cargo barge and perform the Topside pre-lifting inspection;
- Ballast Cargo Barge as per lifting analysis;
- Ballast HLV to the required lifting capacity, ensure the tilt/trim of HLV will not exceed allowed parameters after lifting the Topside;
- Lower down the main hook and connect lift rigging and rise the hook to recover the slack of slings;
- With favorable weather forecast and acceptance of lift preparation, send crew and cutting tools to cargo barge to cut sea-fastening;
- Connect tugger lines to the control bollards;
- Start increasing the load gradually up to when the Topside detaches from the barge grillage, raise the main hook until approx. 3.0 m clearance between deck and highest obstruction on the cargo barge is achieved;
- Cast-off cargo barge from underneath the Topside structure by pulling with tugs;
- Rotate crane above the Jacket;
- Lower the Topside incrementally;

- Align the Topside legs with the stabbing guides on the Jacket and lower the Topside until the deck slowly sits on all four welding points;
- Once Topside legs are landed in their transition pieces release the load from the crane hook;
- Continue lowering the main block until lower rigging gets slacked;
- Perform elevation and horizontal level survey check;
- Start welding the legs to the transition pieces and perform NDT;
- Obtain Company approval for the Topside installed;
- Apply touch-up paint on welded area;
- Set two temporary navigation lights on the two extreme corners of helideck;
- Remove and grind smooth lifting pad-eyes;
- Ensure the following information for As-built documentation has been collected (As-installed Topside elevation, orientation, and level);
- Deploy ROV on seabed to conduct the as-left survey on the seabed;
- Move away from Platform (and recover all anchors if anchor vessel is utilised).

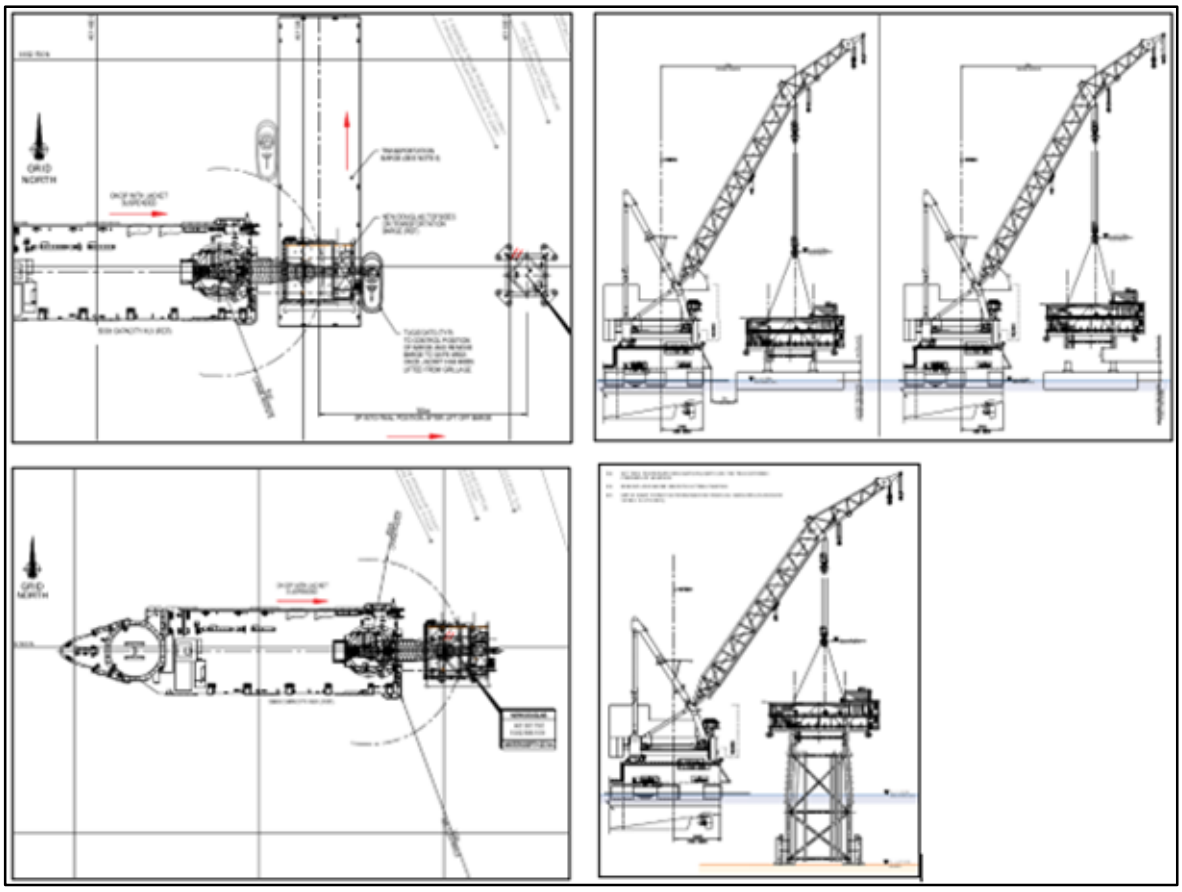


Figure 6-7 Topside Installation Sequence Pictorial [Ref 57]

Detailed description and methodology Shall be provided by Contractor. The Contractor Shall be responsible for supplying and using lifting lugs, stabbing guides and any other accessories required.

In case Contractor opt to use Jack-up barge instead of HLV, then it Shall provide verification of soil data for Jack-up spud down area, investigation of approach corridor, subsea debris or any other requirements specified in DNV-ST-N001,[Ref 21] (clearance form subsea asset, Topside, Jacket legs etc.)

At bidding stage, Contractor Shall submit vessel approaches to New Douglas platform location specifically after the Jacket has been installed demonstrating it is feasible and safe to perform Topside lifting off the cargo barge as per requirements in DNV-ST-N001, [Ref 21]. Contractor will detail the operation in dedicated procedures supported by the structural lifting analysis. This Shall include the following:

- Preliminary Topside lifting design to demonstrate capability of the proposed marine spread versus project requirements and characteristics in all installation phases;
- Installation procedure, sequence and complete set of sketches/drawings showing;
    - Crane/hook residual lifting capacity at each relevant step, crane geometry and clear definition of hook load capacity and factor(s) inclusion;
    - Plan and elevations for all items rigging-up and offloading from cargo barge, shifting, and approaching to existing facilities, lowering, and docking, rigging-down. All sketches/drawing Shall be provided with dimension and Shall be scaled;
- Completion Works to achieve the RFHU milestones;
- Workability analysis (mean time stand-by estimate).

At project execution phase, Contractor Shall submit the below documents, but it is not limited to:

- Installation procedures with detailed step by step sequence;
- Associated Risk Assessment;
- Jacket/Topside lifting analysis from the cargo barge;
- Jacket/Topside structural integrity analysis for lifting off the cargo barge;
- Jacket/Topside lift rigging drawings;
- Jacket/Topside rigging design calculation notes;
- Installation sequence drawings/storyboards;
- Vessel approaches and departures drawings to New Douglas;
- Vessel operational limits for each activity;
- Operation schedule, including weather stand-by;
- Transportation engineering;
- Dropped object study, mitigation measures to minimise any dropped object during installation, barriers in place (no lifting above subsea asset if any);
- Contingency Procedures.

The topside installation procedure shall be established by Contractor as per [Ref 3] and any relevent document mentioned in [Ref 6] and approved by Company. The installation to be performed by T&I Contractor.
The Contractor shall submit bid for New Douglas CCS Topside to-be installed as an integrated unit..

Suitable Crane vessel HLV equipped with all systems necessary for installation operations, with relevant support/survey/anchor handling vessels, has been considered to carry out the installation operations.

Contractor Shall check any significant dimension before installation to ensure that installation operations can be carried out in complete safety.

Prior the topside transportation barge arrival at site, the HLV will be positioned according to approved positioning\mooring plan; the position of crane vessel and its anchors, if any, will be controlled by using a suitable positioning system. The exact position of the crane vessel will be determined by the crane vessel Superintendent after review of the prevailing conditions and weather forecast.

Actual installation layout shall consider the actual crane vessel and transportation vessel characteristics and the site environmental conditions during all installation time, as well as the final topside weight and COG position.

An appropriate positioning\anchoring sequence and procedure shall be chosen, taking into account the actual prevailing environmental conditions and the presence of underwater sealines. The characteristics of such mooring system will be defined by the Contractor; a pre-deployment underwater survey of the installation area, if necessary, will be carried out.

Upon its arrival in the field the transportation barge will be moored by means of the main tow tug and the escort vessel to the HLV stern as required. Sufficient clearance shall be guaranteed between barge/topside and HLV, adequate fenders system shall be deployed between HLV and barge. A visual inspection of the topside (including lift rigging, sea-fastenings, etc.) and transportation barge (including ballasting system) shall be carried out in order to verify that none of the above items (and all other devices/items transported) have suffered any damage during the transportation phase and to determine whether the conditions of topside and barge are acceptable to proceed with the lifting operation.

The topside lift rigging with relevant platforms\guides shall be checked to ensure that they are securely connected/fastened.

In order to allow the placing of lift rigging equipment duly secured for transport (e.g. First Level Sling, Spreader Bar, Second Level Sling etc.) a protection platform/grillage will be temporary erected over the weather deck installed equipment. Mainly a temporary structure shall protect the E&I Technical Rooms. It will be in charge of Contractor to consolidate the Design of above temporary Items, with the aim to be easily removed once deck will be installed (to minimise the Hook-up works).

At the end of the inspections and upon issue of MWS Certificate of Approval for Lift, the topside lifting operation can start.

For any lifting analysis, the calculations carried out shall combine and include the following loads and factors:

- For a weighed structure, the calculations shall consider the weighed weight plus a tolerance factor of 3 % due to weighing inaccuracy.

When the maximum expected lift weight is above 90 % of the maximum lift capacity, the maximum lift capacity shall be considered for the lifting analysis. In such a case a lifting dynamic motion analysis shall be performed to assess accurate DAF.

Whenever the results of a weighing (if any) would show a weighed weight greater than the maximum expected weight and/or an excessive COG shift, the lifting calculations shall be revised to consider the weighed weight plus 3 %, and the structure shall be reinforced accordingly if required.
The topside installation tolerances is:

- +/- 0.5 degree.

The topside location and orientation are frozen by the Jacket that will be previously installed and approved by Company. Contractor shall perform the jacket leg cut-off (if required) to bring the topside within the required tolerance.

Lifting analyses during detailed engineering phase shall consider:

- the variation of the calculated location of the center of gravity within an envelope for the topside;
- the variation of the minimum sling angle, in line with [Ref 21] requirements, to be confirmed by Contractor during detailed design phase.

The lifting rigging shall be designed according [Ref 21] taking into account:

- DAF;
- skew load factor;
- yaw effect factor;
- Tilt effect factor;
- consequence factor etc.

The rigging design report shall be issued/reviewed and approved by Company and MWS.
The lifting slings shall be attached to a spreader bar positioned above the topside center of gravity to avoid any damage during lifting operation. Other 2 (two) slings will connect the spreader ba to the crane hook.
Contractor shall supply the drawings showing the topside rigging points, CoG, installation scenario, and the capability of the crane used for operations listed above.

In the following figure a preliminary topside rigging connection layout is shown.

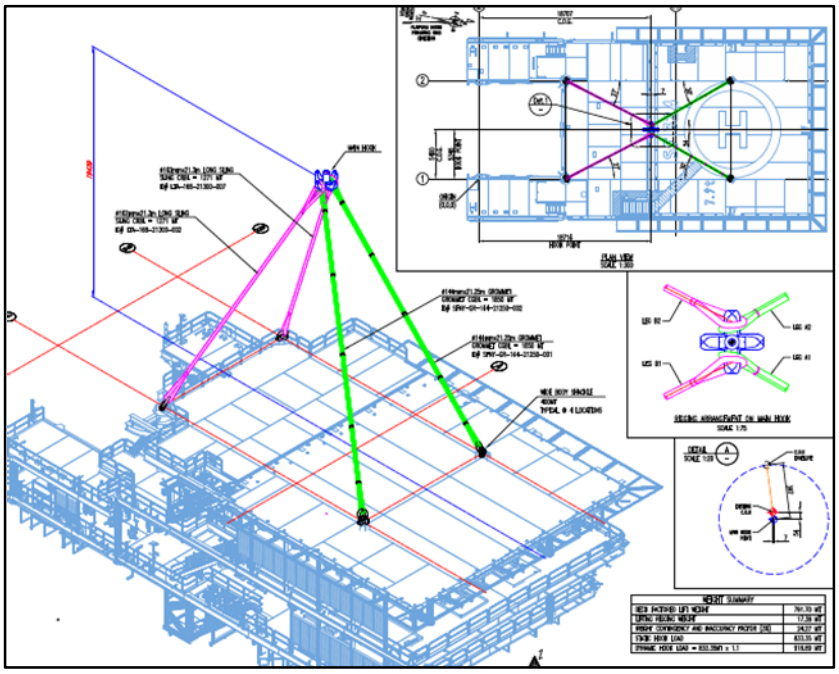


Figure 6-8 Indicative Topside Rigging Arrangement

The topside structure and the crane rigging shall be designed to withstand all the phases of the installation.

During installation of the topside, care shall be taken to avoid damaging it or any equipment already installed on the jacket. If damage does occur, the Contractor shall inform the Company's representative and carry out any repairs in agreement with the Company's representative.

The actual installation sequence shall be defined by installation Contractor and shall be submitted to Company for approval. The following installation operations shall consider but not limited to the following steps below reported:

- Start sea fastening cutting operations;
- Connect topside upper lifting slings (pre-installed and soft lashed to the topside structures) to the HLV main hook;
- Connect tugger lines respectively to the HLV tugger winches;
- Complete sea fastening cutting operations and fix all loose items on board;
- Tension the lift riggings;
- Slightly slack the barge mooring lines;
- Recover slack in tugger lines;
- Lift with crane main hook the topside off the barge to a position of approx. 3 m above the relevant barge transportation supports;
- Release the transportation barge mooring lines and move the transportation barge clear of the area by means of its tow tug;
- Adjust cranes radius in order to comply the requirements relevant to operational clearances during topside installation operation and Lift the topside with crane main hook in order to guarantee a sufficient clearance (at least 3 m) between its bottom stabbing guide and the top of Jacket;
- Move the HLV towards the jacket up to have the topside above its as installed target position
- Adjust topside position and orientation by means of HLV boom moving and tugger lines, if necessary, in order to align topside legs with the jacket legs;
- Lower slowly and insert the topside main stabbing guide into Jacket leg;
- Complete the topside setting down on the jacket,
- Complete welding and NDT of the topside to jacket joint;
- Disconnect lift rigging and tugger lines and retrieval on board of HLV deck.

The Installation Contractor shall include, in its installation manual, the procedures for the complete installation of the topside including, but not limited to, the topside connection to jacket structures, the topside plates completion\restate (removal of lifting points, if necessary), the required hook-up activities (stairs, lay-down areas and etc., if necessary) and the NDT inspections and touch-up paint repairs.

6.7 Offshore Construction Works Matrix

The following section clarifies the proposed completion work activities distribution (for details see 105600BJRV09240 [Ref 54]). The optional activities not completed by HLV will be included in the punch list and closed by the Hook-up team. Decision to proceed with this optional activities Shall be agreed between Company and Contractor during execution phase and in conjuction with [Ref 54] and based on overall installation schedule.

		Offshore Construction works - Action By	
		X - activity to be completed	
		O - Optional scope	
		N - No action	
No.	**Activity**	**HLV**	**Hookup team**
1.	Jacket Lift off the barge and installation on the seabed	X	N
2.	Piling Operations on the Jacket	X	N
3.	Topside legs welding	X	O
4.	Deck lifting padeyes removal	O	X
5.	All permanent structure painting	N	X
6.	Reinstatement of helideck netting	N	X
7.	Reinstatement of gratings, handrails and floor plating (if any)	N	X

Table 6-1 Proposed Offshore Construction Matrix for HLV and Hook-up

6.8 HLV Positioning/Mooring

Once in field and prior to Jacket/Topside transportation barge arrival at site, the HLV will be positioned according to approved positioning/mooring plan; the position of crane vessel whether on DP or on its anchors, if any, will be controlled by using a suitable positioning system. The exact position of the crane vessel will be determined by the crane vessel Superintendent after review of the prevailing conditions and weather forecast.

Installation layout Shall consider the actual crane vessel and transportation vessel characteristics and the site environmental conditions during all installation time, as well as the final Jacket/Topside weight and COG position.

An appropriate positioning/anchoring sequence and procedure Shall be chosen, taking into account the actual prevailing environmental conditions and the presence of underwater sealines. The characteristics of such mooring system will be defined by the Contractor; a pre-deployment underwater survey of the installation area, if necessary, will be carried out.

In order to ensure that the HLV is ready, the Contractor will make preparations to receive the transportation barge to HLV stern alongside. These preparations Shall include deployment of all equipment, tools and personnel involved in the installation operations.

Contractor will use a Wave Rider Buoy to monitor and forecast the actual sea state before and during any critical operation. Wave Rider Buoy will be deployed into the water at the discretion of Contractor Vessel Master as soon as possible when Vessel arrives at the field.

Contractor will also use a Boom Tip Motion Sensor at critical lifting stages to ensure the actual DAF is not exceeding the allowable value.

6.9 Transportation and Sea-fastening Manual

A transportation & sea-fastening manual Shall be developed and submitted to Company and MWS for review/approval. This Manual Shall include description of, but not limited to:

- Schedule of the preparatory Works before sail away;
    - Mobilisation plan detailing activities;
- Schedule of the voyage;
- Organisation and communication (incl. responsibility matrix);
- General arrangement during transportation;
- Object/s to be transported;
- Barge structure, including internal and external barge reinforcement if any;
- Grillage and sea-fastening;
- Detailed tow route;
- Environmental conditions for the voyage;
- Barge ballast condition;
- Barge stability (intact and damage);
- Extreme motions and accelerations expected during the voyage;
- Bollard pull calculation;
- Preparatory works before sail away;
- Check lists;
- Utility requirements, workforce, consumables, electrical power, cooling water for preparatory works before sail away;
- Risk analysis report;
- Associated calculation notes, as needed in sections above;
- Associated drawings.

Note: The transportation and sea-fastening manual Shall include the necessary calculation notes to document all above items. The Contractor is required to prepare the transportation and sea-fastening manual in connection with the load-out/load-in manual and to check compatibility between the loadout arrangement (skid ways, skid shoes, skid beams, etc.), the transportation arrangement (barge grillage, sea-fastening, etc.) and the Installation requirements.

For typical transportation layout and transportation analysis for New Douglas Jacket/Topside on an appropriate cargo barge see [Ref 48] [Ref 50] and [Ref 57].
Note: due to the sizes of the New Douglas Jacket footprint the barge Shall have a width of 40m as a minimum.
A typical grillage and sea-fastening for tralier loadout arrangement can be seen in the below Figure 6-9:

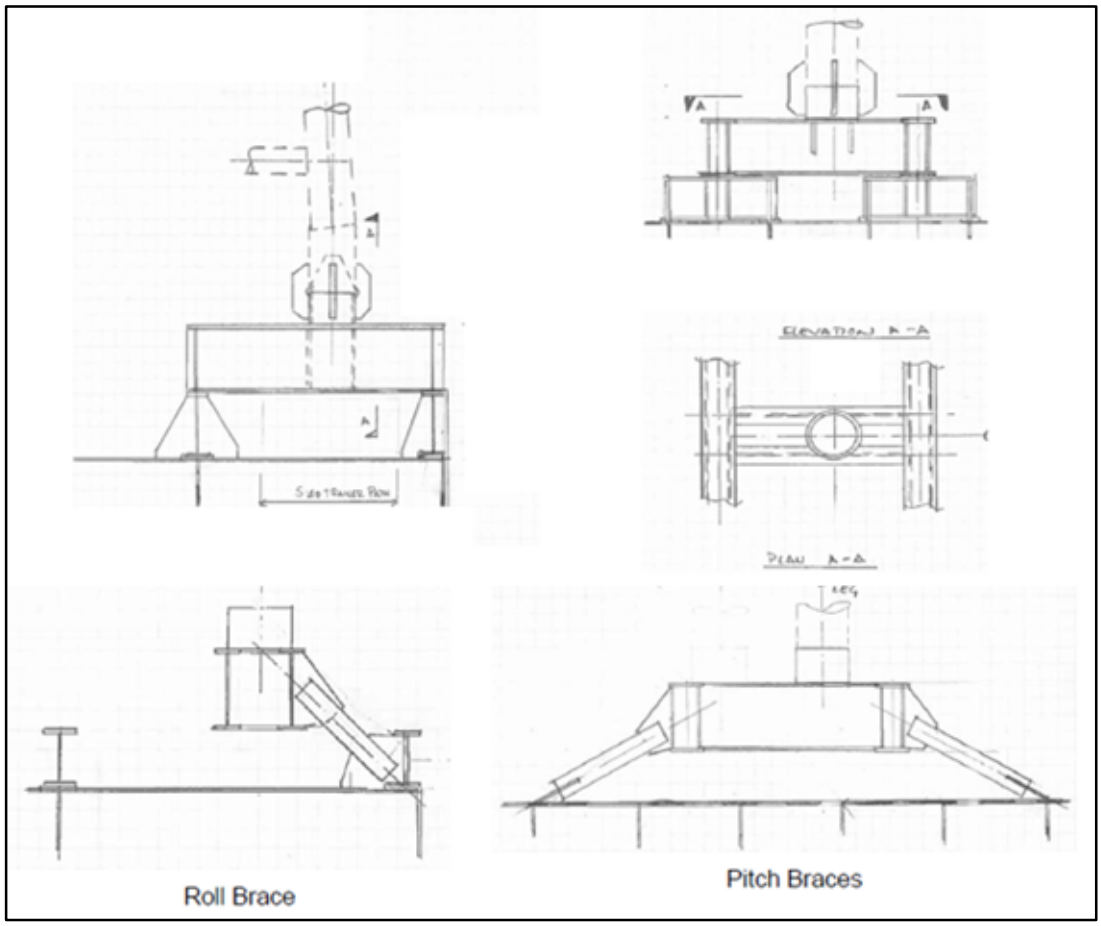


Figure 6-9 Typical Grillage and Sea-fastening

6.10 Towing Manual

A towing manual Shall be developed and submitted to Company and MWS for approval. This Manual Shall include description of, but not limited to:

- Organisation and communication (incl. responsibility matrix);
- Barge specification;
- Tow tugs/vessels;
- Towing equipment;
- Towing arrangement;
- Object/s to be transported;
- Transportation route;
- Schedule of the voyage;
- Ports / Place of refuge;
- Bunkering (if planned);
- Weather forecasting;
- Weather routing;
- Preparatory works and check lists;

- Reporting;
- Contingencies;
- Emergency procedure;
- Procedures for departure, for passages and arrival on site.

Note: The towing manual Shall include the necessary calculation notes to document the bollard pull calculation and towing engineering.

6.11 Load-out Manual

A loadout procedure Shall be developed and submitted to Company and MWS for approval. This Procedure Shall include description of, but not limited to:

- Loadout method with the associated method statement: skidding, trailers, lifting, etc.;
- Schedule of the loadout with detailed activities;
- Organisation and communication (incl. responsibility matrix);
- General arrangement of the yard, cargo barge and relative storyboards;
- Items to be loaded and lift plans;
- Site and quay information with associated drawings;
- Skid ways, skid beams, skid shoes, link beams;
- Barge, grillage, and sea-fastening;
- Loadout equipment and its spares, such as: trailers, winch systems, jacking systems, crane, lift rigging details, ballast pumps & arrangement;
- Mooring arrangements before, during and after the loadout;
- Fender details;
- Tide tables;
- Ballast procedure;
- Weather forecast;
- Loadout limitations such as environmental operation criteria, settlements /deflections /displacements, harbor traffic, etc.;
- Recording and monitoring procedure (barge draft, trim, heel, object advancement, etc.);
- Check lists;
- Videography of all basic stages to be documented.

Utility requirements, manpower, consumables, electrical power, cooling water, etc.

- Contingency plans;
- Emergency procedures;
- Associated calculation notes, as needed in sections above;
- Associated drawings.

Note: The loadout manual Shall include the necessary calculation notes to document all above items, their strength, the clearances, and the specific tolerances.

The comprehensive list of main installation activities Shall be provided by Contractor during execution phase. Preliminary list is as follow:

- Installation engineering;
- Preparatory Works in the fabrication yard;
- Preparatory Works at Offshore Installation site;
- Mooring of HLV on site and lifting preparation Works;
- Mooring of Cargo Barge on site along HLV;
- Connection of Rigging to the Hook of HLV;
- Lifting from Cargo Barge and cast-off Cargo Barge by the AHT's / towing tugs;
- Installation of positioning survey system (transponder) and set down in position;
- Lifting and appending in suitable position;
- Disconnecting Auxiliary Crane rigging with assistance from zodiac;
- Lowering and placing in specified locations;
- Closing the clamps;
- Welding and NDT of hang off clamps;
- Recovery of the installation aids;
- Completion Works.

6.12 Preparatory Works

Preparatory works are described in Section 6.4 Section and Section 6.5.

7.0 MARINE SPREAD

Contractor Shall provide HLV capable to safely perform the Works and provide feasibility study including concept drawings and preliminary lifting analysis.

7.1 Potential HLVs

The list of potential HLVs capable to carry out the SOW is shown in Table 7-1 – this list is not exhaustive. Crane vessel of minimum 5000 Te class has been selected based on requirments of New Douglas Jacket and Topside weight and water depth (27.2m LAT). Shear leg vessels can be utilised (example presented in the table) as they have significant Shallow water draft operability.

Vessel	Type	Draft (m)	Crane (Te)
Seaway Strashnov	DP III & 8-point Anchor system	8.5 – 13.5	5000
Les Alizés	DP II	Max 10.5	5000
Aegir	DP III	9 - 11	5000
Asian Hercules III	Moored	4.8	5000

Table 7-1 Potential HLVs

7.2 HTV and Cargo Barges

The naval spread involved in the operations together with the above-mentioned HLV Shall consists as a minimum in the following naval means:

- The Main tug will be used for towing the barge with New Douglas Jacket and Topside from Construction Yard to New Douglas Platform location; the tug will remain permanently connected to the barge bow;
- Auxiliary tug will be used only at the site as back-up tug for barge handling or the anchor handling operation where authorised.

The list of potential cargo barges able to carry out the SOW is shown below – this list is not exhaustive:

Vessel's / Barge Name	Vessel Owner	DP Class
Castro XI	Saipem	N/A
LB I	NPCC	N/A
H405, H406, H407	Heerema	N/A

Table 7-2 Potential Cargo Barges

8.0 INSTALLATION DURATIONS

Table 8-1 below considers the operations durations preliminary estimates for the HLV only to carry out the Jacket and Topside installation. All preparatory works reqiuired for “ready to lift” are adressed in document “105600BJRV09244 Constructability Report Offshore –New Douglas Platform”, and in Sections 6.4 and 6.5. There is no requirement for barges supply from different locations - to be assessed during project execution phase.

New Douglas Platform, Topside and Jacket Marine Spread	Duration
	DAYS
Commencement of New Douglas CCS Installation	
Transportation Barge	
Mobilisation & Transit to site of Transportation Barge (Jacket + Topside)	6
Set-up at New Douglas Location (Jacket + Topside)	4
De-Mobilisation (transit back to quay (Jacket + Topside))	3
Heavy Lift Vessel	
Mobiliasation of HLV + Set Up on site (DP Trials, Anchors)	3
Rigging connection, Cutting of sea-fastening. Lift off of the Jacket from the Barge. Land the Jacket on seabed. Disconnect Riggings, Time to settle down. Pilling Operation (4 piles x 2 days each) Levelling of the Jacket and as-installed survey	10
Jacket Preparation for Topside Installation Lift off of the Topside from the Barge Land the Topside on the Jacket - Welding ops Remove lift rigging, remove lifting padeyes, reinstate the deck	6
Demobilisation (HLV transit back to quayside & Demobolisation)	2
Assisting/Towing Tugs for Transportation Barge	
Mobilisation	1
Total	35

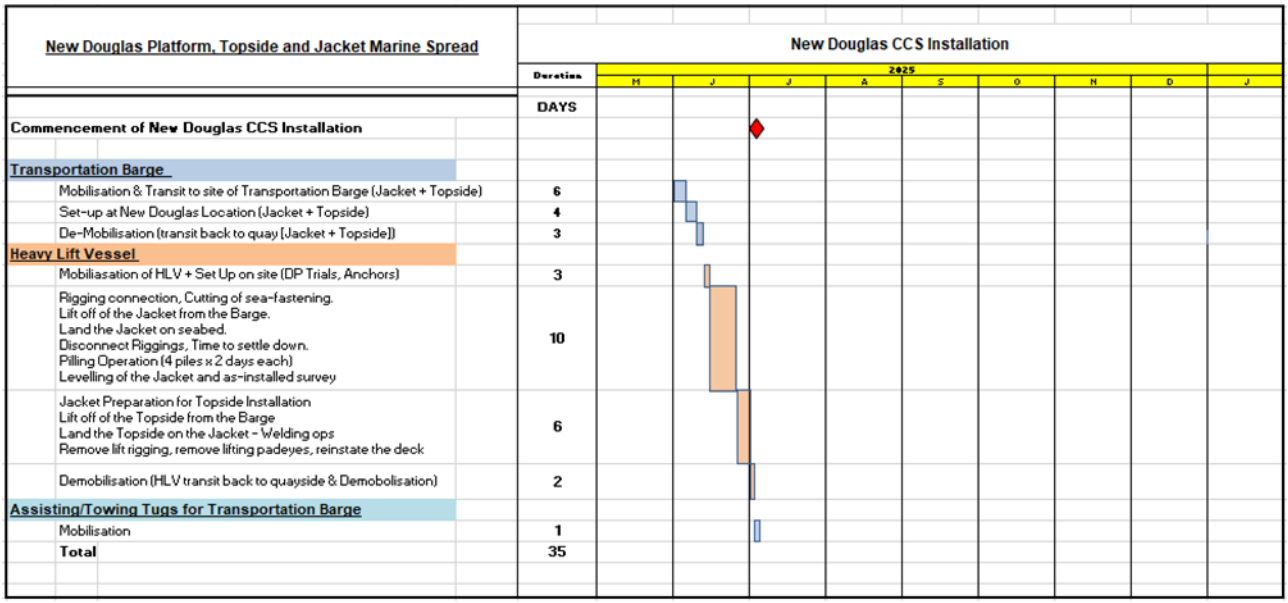


Table 8-1 Operation Duration

9.0 AREAS OF CONCERN

This section is intended to identify those areas of challenge, address the related concerns and to discuss in detail their impact on the success of the project.

The following areas of challenge have been identified that will be discussed in detail in the next sections.

9.1 Synergy with Installation of New Jacket and Topside

Contractor Shall organise and develop their installation strategy based on that New Douglas Platform (Jacket & Topside) to be installed on a new location see Table 5-9 which is in the vicinity of existing Douglas complex. Contractor Shall provide detailed installation methodology to demonstrate their capabity to install structrures without impacting future installation of any future new structure. Contractor must ensure that all risks are mitigated and proper actions are taken.

The pre-construction activities inlcuding detailed survey to be carried out before the installation of the new Jacket and Topside. Following a detailed survey of the new structures, structural analysis Shall be performed during detailed engineering with sufficient level of conservatism in the structural strength assumption.

Based on the above structural analysis, Contractor Shall elaborate an installation philosophy, develop the installation procedure accordingly and perform a detailed Risk Assessment subject to Company and MWS approval.

9.2 Lifting of the New Jacket

Contractor Shall ensure all the lifting operations of the new Jacket during the mobilisation at the construction yard and at new platform location have been thoroughly studied and engineered. Furthermore any required survey at the platform location Shall be carried out and actions are taken to remove any debris if necessary.

9.3 Lifting Topside Over the New Jacket

Contractor Shall perform detailed survey and lifting assesments in order to minimise any potentital clash between the Jacket and Topside, i.e. removal of any installation aids utilised during the Jacket installation etc. A Topside guiding system to be designed and applied during the lift in order to guarantee safe installation of the New Topside.

9.4 Operational Weather Window

Contractor must minimise downtime for platform installtion by chosing adequate weather window during the year where operation can be carried out in a safe and efficient manner. Contractor must provide a detailed offshore construction schedule, including any downtime (weather, equipment etc.) at tender and detailed engineering phase to demonstrate their capability to install the structures without impacting overall project schedule.

9.5 Requirements for Consultation

For decommissioning of oil and gas assets in UK, there is a statutory requirement for operators to consult with stakeholders who may be affected by decommissioning proposals under Section 29(3) of the UK Petroleum Act 1998 [Ref 30], this is to make sure information is made public and provides various stakeholders with the opportunity to deliberate in input and decision-making in the execution of the project. However for all New field development of oil and gas assets in the UK (in this case installation of a new structure in a new location), there are also requirements for operators to fulfil as per Section 3 (but not limited to) in the “Requirements for the Planning of and Consent to UKCS Field Developments [Ref 29]” to ensures all considerations to new developments have been taken into account.

9.6 Consultation Process

When UKCS statutory consultation starts that is when the draft Commissioning Programme is submitted to DESNZ/OGA and within short period thereafter, a public notice is made for the Commissioning proposals. The outcome of the consultation process is reported in the Commissioning Programme prior to final submission. As Commissioning program of existing structrures is directly corelated with installation of new structure, Contractor Shall take into consideration the Consultation Process in their overall execution programe.

10.0 ATTACHMENTS

10.1 Attachment 1 – Typical HLV Crane Capacity Curve

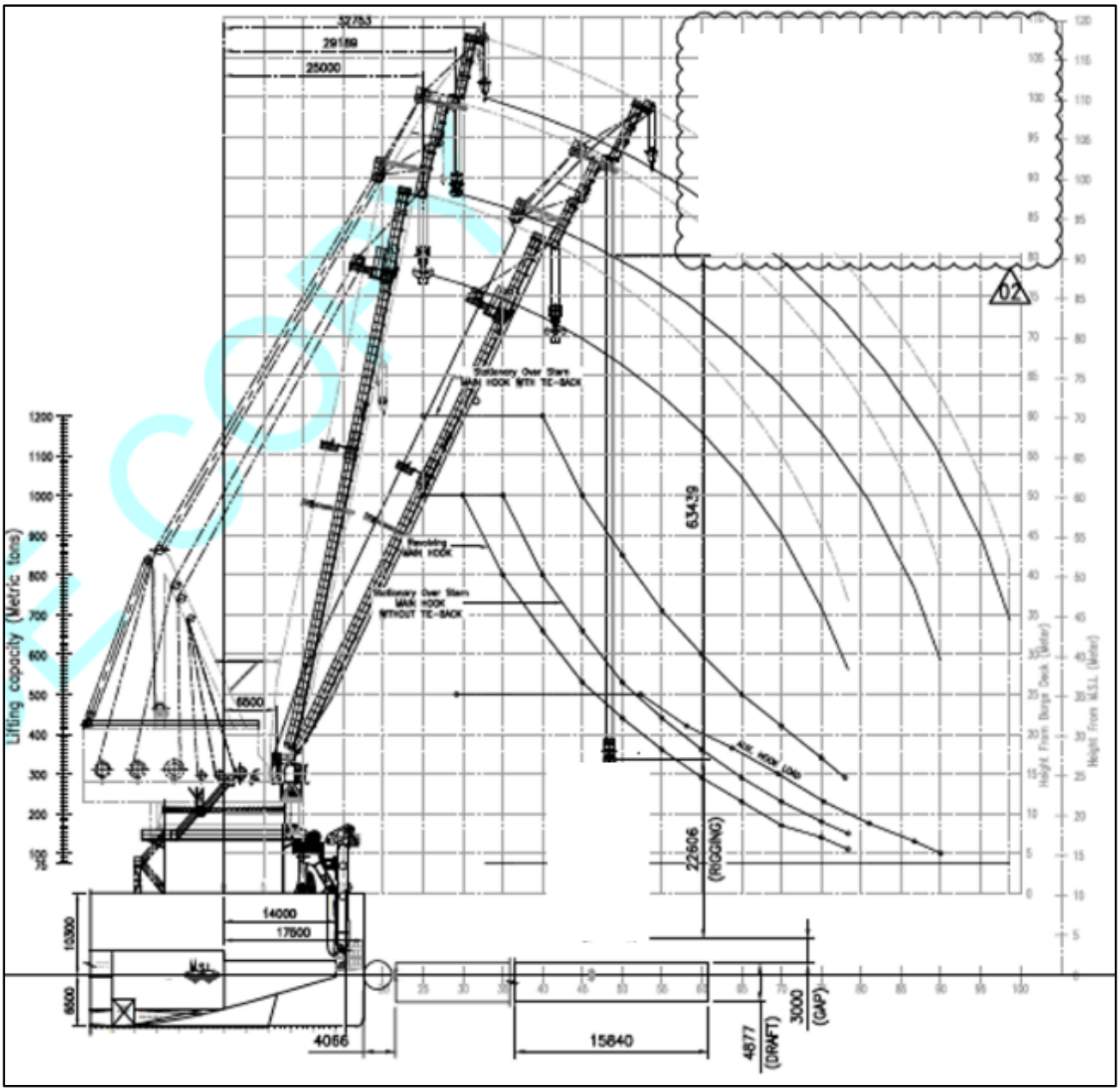
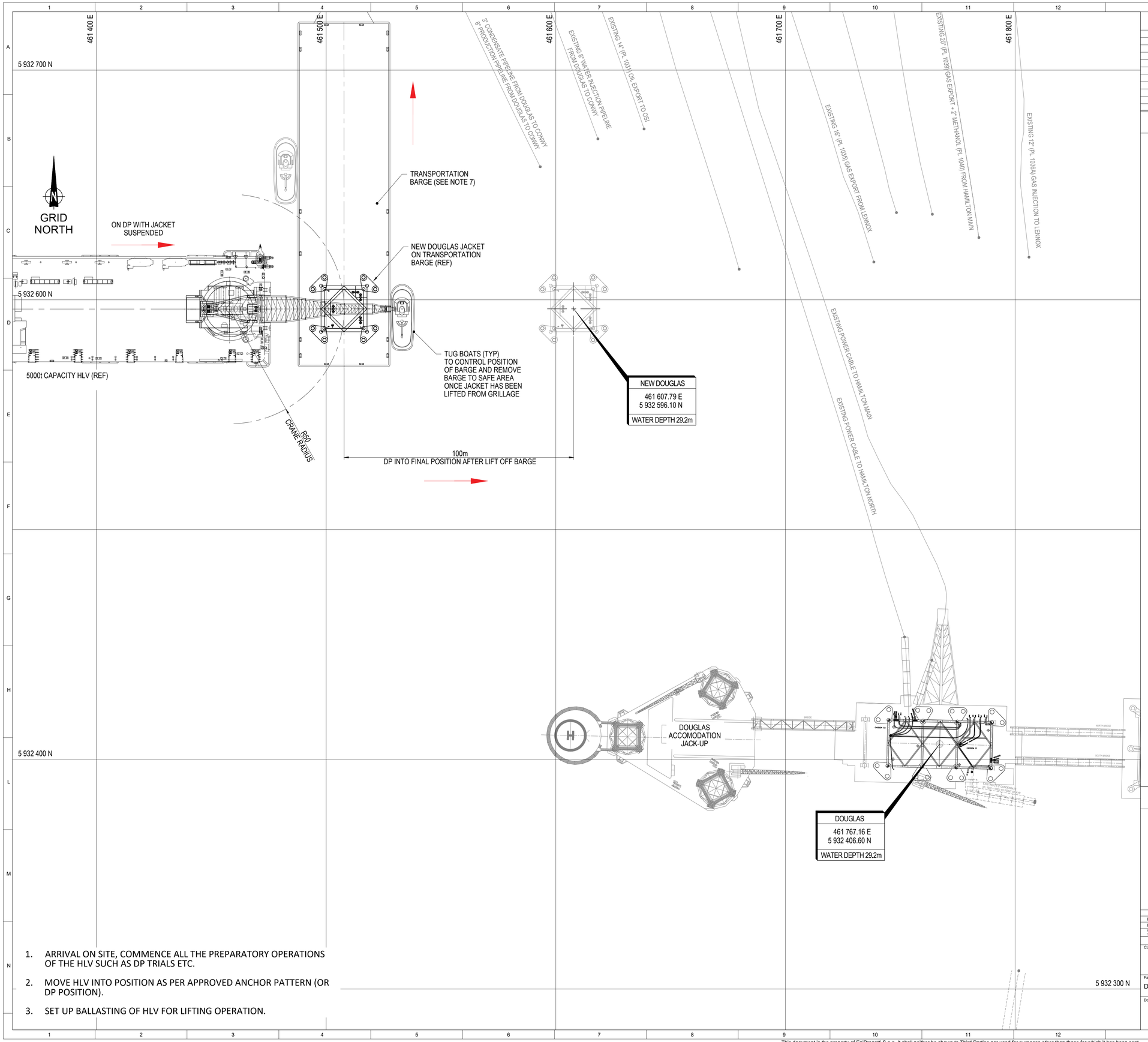


Figure 10-1 Typical Crane Chart

10.2 Attachment 3 – New Douglas Jacket Installation Sequence

[Ref 57] Sheet 1- 5



REFERENCE DOCUMENTS

NUMBER	TITLE
105600BNMI85023	DOUGLAS PLATFORMS - INSTALLATION METHOD STATEMENT
105600BNRZ85024	DOUGLAS PLATFORMS - LIFTING ANALYSIS
105600BNRZ85025	DOUGLAS PLATFORMS - TRANSPORTATION ANALYSIS
105600BORV90115	DOUGLAS PLATFORMS - JACKET WEIGHT CONTROL REPORT
105600BORV90215	DOUGLAS PLATFORMS - TOPSIDES WEIGHT CONTROL REPORT

GENERAL NOTES

1. ALL DIMENSIONS AND COORDINATES ARE IN METRES UNLESS NOTED OTHERWISE.
2. GLOBAL COORDINATE REFERENCE SYSTEM: European Datum 1950 UTM Zone 30N (EPSG: 23030)

PROJECTED COORDINATE SYSTEM	European Datum 1950 UTM Zone 30N
PROJECTION	TRANSVERSE MERCATOR
LINEAR UNIT	METERS (1.0)
FALSE EASTING	500000.0
FALSE NORTHING	0.0
CENTRAL MERIDIAN	-3.0
SCALE FACTOR	0.9996
LATITUDE OF ORIGIN	0.0
GEOGRAPHIC COORDINATE SYSTEM	European Datum 1950
ANGULAR UNIT	DEGREE (0.0174532925199433)
PRIME MERIDIAN	GREENWICH (0.0)
DATUM	European 1950
SPHEROID	International 1924
SEMIMAJOR AXIS	6378388.0
SEMIMINOR AXIS	6356911.946127946
INVERSE FLATTENING	297

3. 5000t CAPABLE HEAVY LIFT VESSEL HAS BEEN USED AS THE HLV AS PRESENTED IN THIS STORYBOARD. OTHER VESSELS MAY BE MORE SUITABLE. FINAL DECISION SHALL BE DETERMINED DURING DETAILED DESIGN PHASE.
4. TOPSIDE WEIGHT REPORTED IN WEIGHT CONTROL REPORT DOC No. 105600BORV90215
5. JACKET WEIGHT REPORTED IN WEIGHT CONTROL REPORT DOC No. 105600BORV90115
6. THE HEAVY LIFT VESSEL UTILIZED IS 5000t CLASS.
7. TRANSPORTATION BARGE SHOWN ON THIS DRAWING IS 150m x 40m x 9m CARGO BARGE.
8. THE DESIGN OF THE GRILLAGE AND SEAFASTENING WILL BE DEVELOPED DURING DETAILED ENGINEERING PHASE BY THE EPIC CONTRACTOR.
9. FOR LIFTING INFORMATION REFER TO NEW DOUGLAS INSTALLATION METHOD STATEMENT- CONTRACTOR DOC No 105600BNMI85023.
10. LIFT RIGGING CONFIGURATION SHALL BE REVIEWED AND AGREED BY EPIC CONTRACTOR DURING DETAILED ENGINEERING PHASE.

HOLDS

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2. FINAL LOCATION OF NEW PLATFORM AND JACKET TO BE CONFIRMED
3. DESIGN OF JACKET AND TOPSIDES TO BE FINALISED AND CONFIRMED.
4. COG HAS BEEN ASSUMED AND ASSUMPTIONS MADE WITH A CONSERVATIVE EXPECTED SHIFT. TO BE CONFIRMED.
5. PILE OD, LENGTH AND QUANTITY TO BE CONFIRMED.

1. ARRIVAL ON SITE, COMMENCE ALL THE PREPARATORY OPERATIONS OF THE HLV SUCH AS DP TRIALS ETC.
2. MOVE HLV INTO POSITION AS PER APPROVED ANCHOR PATTERN (OR DP POSITION).
3. SET UP BALLASTING OF HLV FOR LIFTING OPERATION.

Validity Status	Rev. Number	Date	Description	Prepared	Checked	Approved	Approved Eni UK
CDFE	01	31.05.2023	ISSUED FOR FINAL	ADM	DM	BC	
CDFE	00	05.04.2023	ISSUED FOR COMMENT	ADM	DM	BC	

Revision index

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Job. N. JA0614

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Project Name: LBA CCS

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Sheet of Sheets: 1 / 10

Document Title: DOUGLAS PLATFORMS - LIFTING AND TRANSPORTATION DRAWINGS

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Plant Unit: N/A

A1 (841 x 594)

Software:AutoCad

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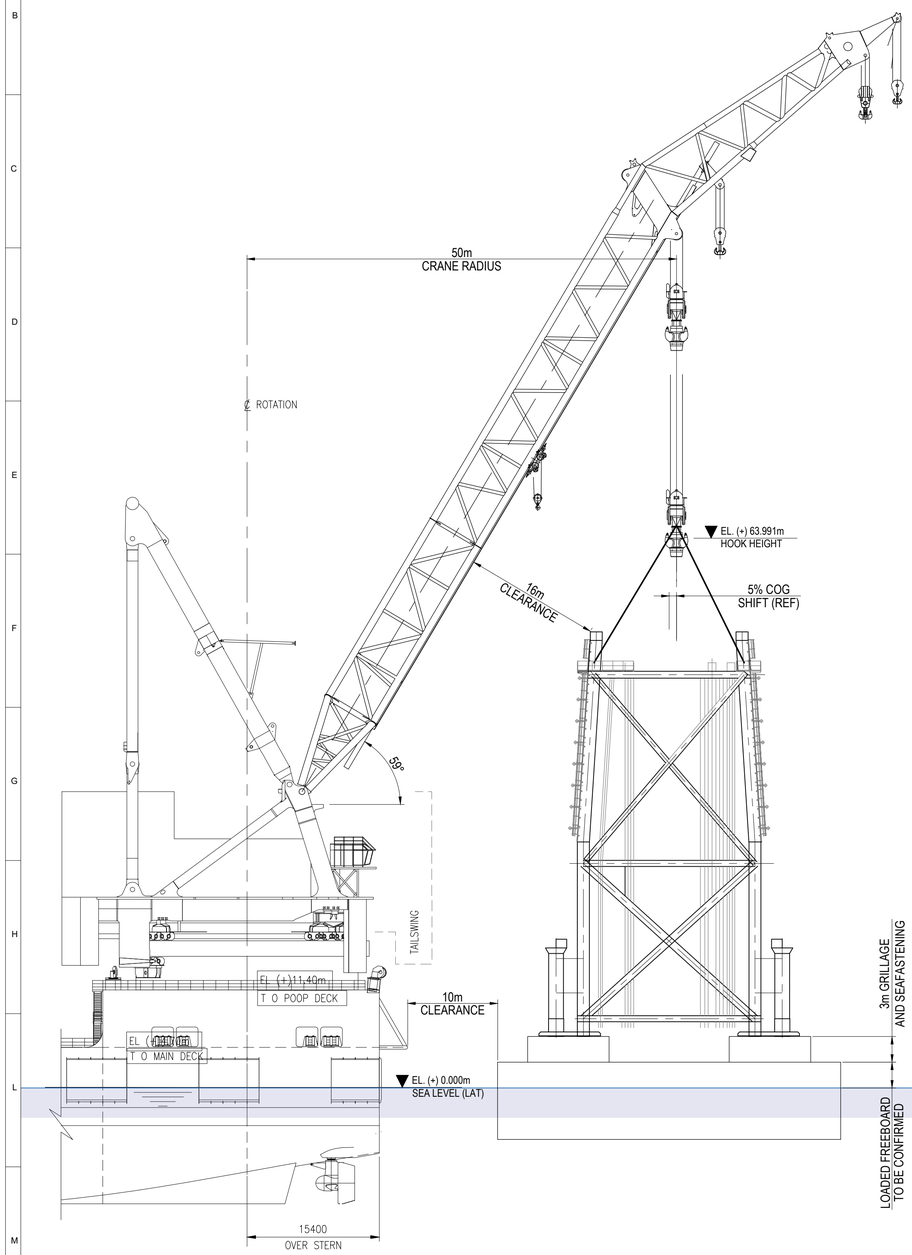
4. BALLAST HLV TO THE REQUIRED LIFTING CAPACITY, ENSURE THE TILT/TRIM OF HLV WILL NOT EXCEED ALLOWED PARAMETERS AFTER LIFTING THE JACKET

5. HLV WILL NOT EXCEED ALLOWED PARAMETERS AFTER LIFTING THE JACKET

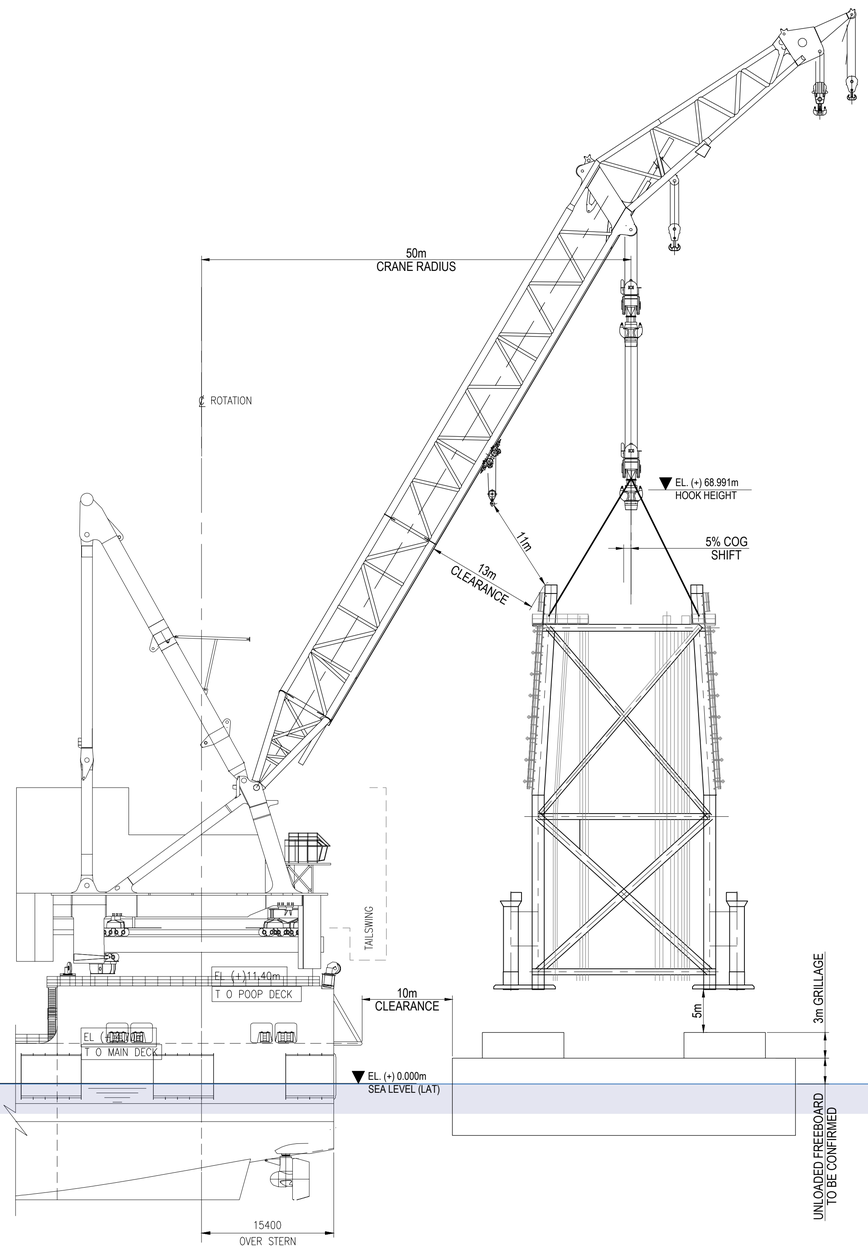
6. LOWER DOWN THE MAIN HOOK AND CONNECT LIFT RIGGING TO MAIN HOOK AND RAISE THE HOOK TO RECOVER THE SLACK OF LIFTING SLINGS.

7. WITH FAVORABLE WEATHER FORECAST AND ACCEPTANCE OF LIFT PREPARATION, SEND CREW AND CUTTING TOOLS TO CARGO BARGE TO CUT SEAFASTENING



8. START INCREASING THE LOAD GRADUALLY UP TO WHEN THE JACKET DETACHES FROM THE BARGE GRILLAGE. RAISE THE MAIN HOOK UNTIL APPROX 5m CLEARANCE BETWEEN DECK AND HIGHEST OBSTRUCTION ON THE CARGO BARGE IS ACHIEVED.

9. CAST-OFF CARGO BARGE FROM UNDERNEATH THE JACKET STRUCTURE BY PULLING AND ASSISTANCE WITH TUGS



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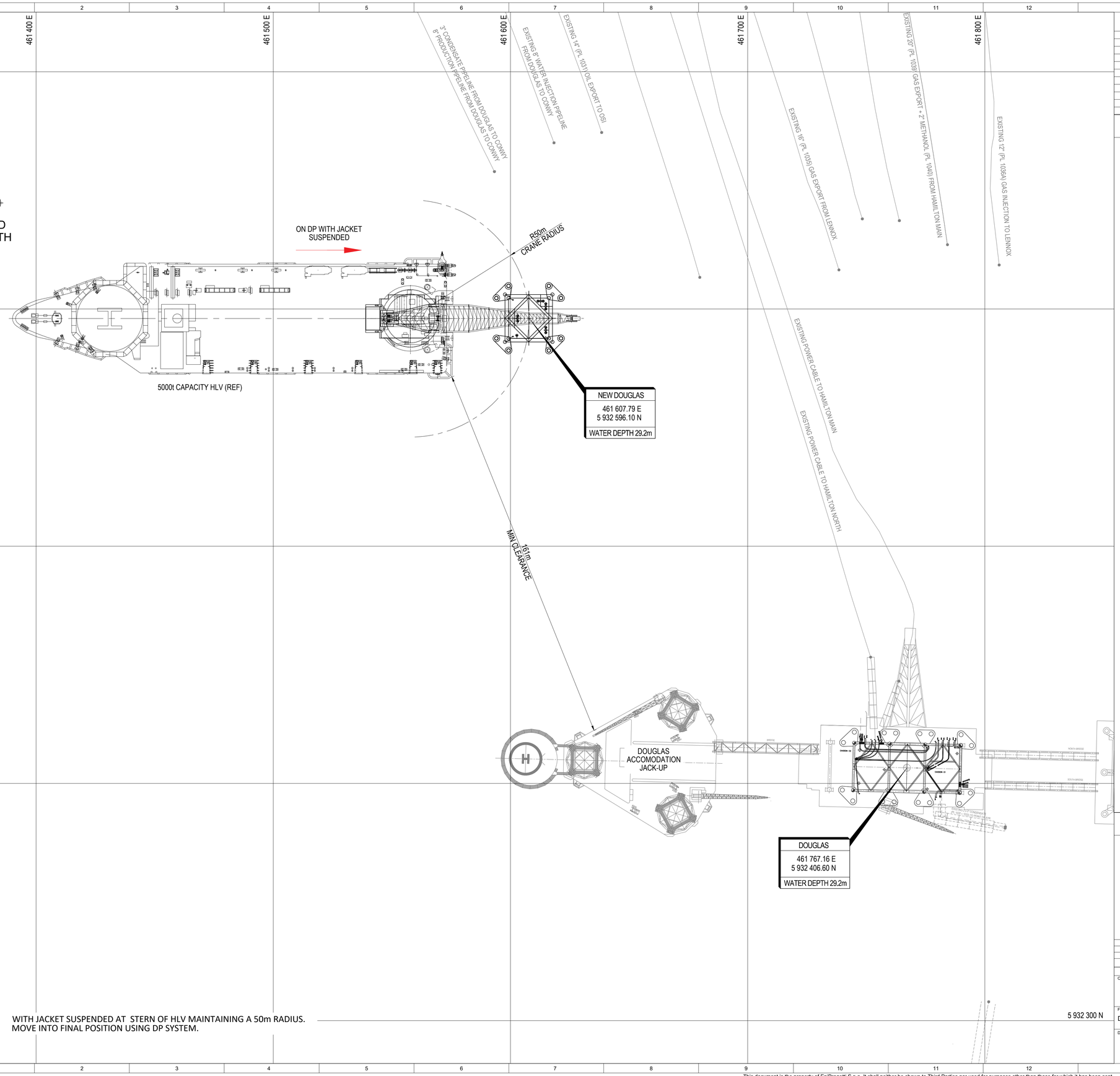

10. WITH JACKET SUSPENDED AT STERN OF HLV MAINTAINING A 50m RADIUS. MOVE INTO FINAL POSITION USING DP SYSTEM.

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105600BORV90215	DOUGLAS PLATFORMS - TOPSIDES WEIGHT CONTROL REPORT

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1. ALL DIMENSIONS AND COORDINATES ARE IN METRES UNLESS NOTED OTHERWISE.
2. GLOBAL COORDINATE REFERENCE SYSTEM: European Datum 1950 UTM Zone 30N (EPSG: 23030)

PROJECTED COORDINATE SYSTEM	European Datum 1950 UTM Zone 30N
PROJECTION	TRANSVERSE MERCATOR
LINEAR UNIT	METERS (1.0)
FALSE EASTING	500000.0
FALSE NORTHING	0.0
CENTRAL MERIDIAN	-3.0
SCALE FACTOR	0.9996
LATITUDE OF ORIGIN	0.0
GEOGRAPHIC COORDINATE SYSTEM	European Datum 1950
ANGULAR UNIT	DEGREE (0.0174532925199433)
PRIME MERIDIAN	GREENWICH (0.0)
DATUM	European 1950
SPHEROID	International 1924
SEMIMAJOR AXIS	6378388.0
SEMIMINOR AXIS	6356911.946127946
INVERSE FLATTENING	297

3. 5000t CAPABLE HEAVY LIFT VESSEL HAS BEEN USED AS THE HLV AS PRESENTED IN THIS STORYBOARD. OTHER VESSELS MAY BE MORE SUITABLE. FINAL DECISION SHALL BE DETERMINED DURING DETAILED DESIGN PHASE.
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5. JACKET WEIGHT REPORTED IN WEIGHT CONTROL REPORT DOC No. 105600BORV90115
6. THE HEAVY LIFT VESSEL UTILIZED IS 5000t CLASS.
7. TRANSPORTATION BARGE SHOWN ON THIS DRAWING IS 150m x 40m x 9m CARGO BARGE.
8. THE DESIGN OF THE GRILLAGE AND SEAFASTENING WILL BE DEVELOPED DURING DETAILED ENGINEERING PHASE BY THE EPIC CONTRACTOR.
9. FOR LIFTING INFORMATION REFER TO NEW DOUGLAS INSTALLATION METHOD STATEMENT- CONTRACTOR DOC No 105600BNMI85023.
10. LIFT RIGGING CONFIGURATION SHALL BE REVIEWED AND AGREED BY EPIC CONTRACTOR DURING DETAILED ENGINEERING PHASE.

HOLDS

1. DOCUMENT NUMBERS TO BE CONFIRMED
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5. PILE OD, LENGTH AND QUANTITY TO BE CONFIRMED.

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Company logo and business name: eni uk / eni progetti

Company Document ID: 105600BNDD85026

Job. N. JA0614

Facility and Sub Facility Name: DOUGLAS DD

Project Name: LBA CCS

Scale: 1:250

Sheet of Sheets: 3 / 10

Document Title: DOUGLAS PLATFORMS - LIFTING AND TRANSPORTATION DRAWINGS

Superseded N.

Superseded by N.

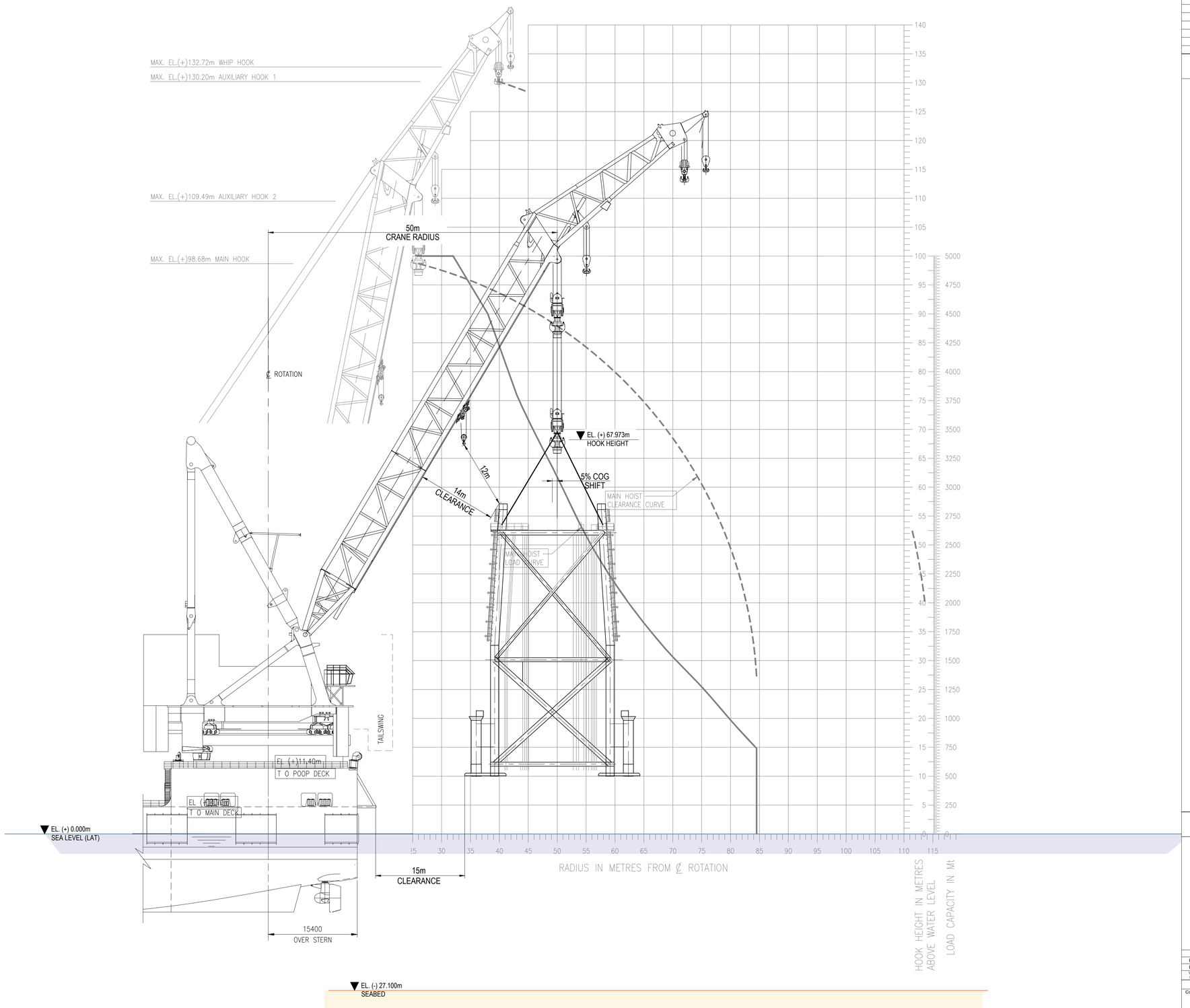
Plant Area: N/A

Plant Unit: N/A

A1 (841 x 594)

Software:AutoCad

Filename.105600BNDD85026_CDFE01_10.DWG



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Sheet of Sheets: 4 / 10

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Superseded by N.

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Plant Unit: N/A

Software AutoCad

Filename.105600BNDD85026_CDFE01_10.DWG

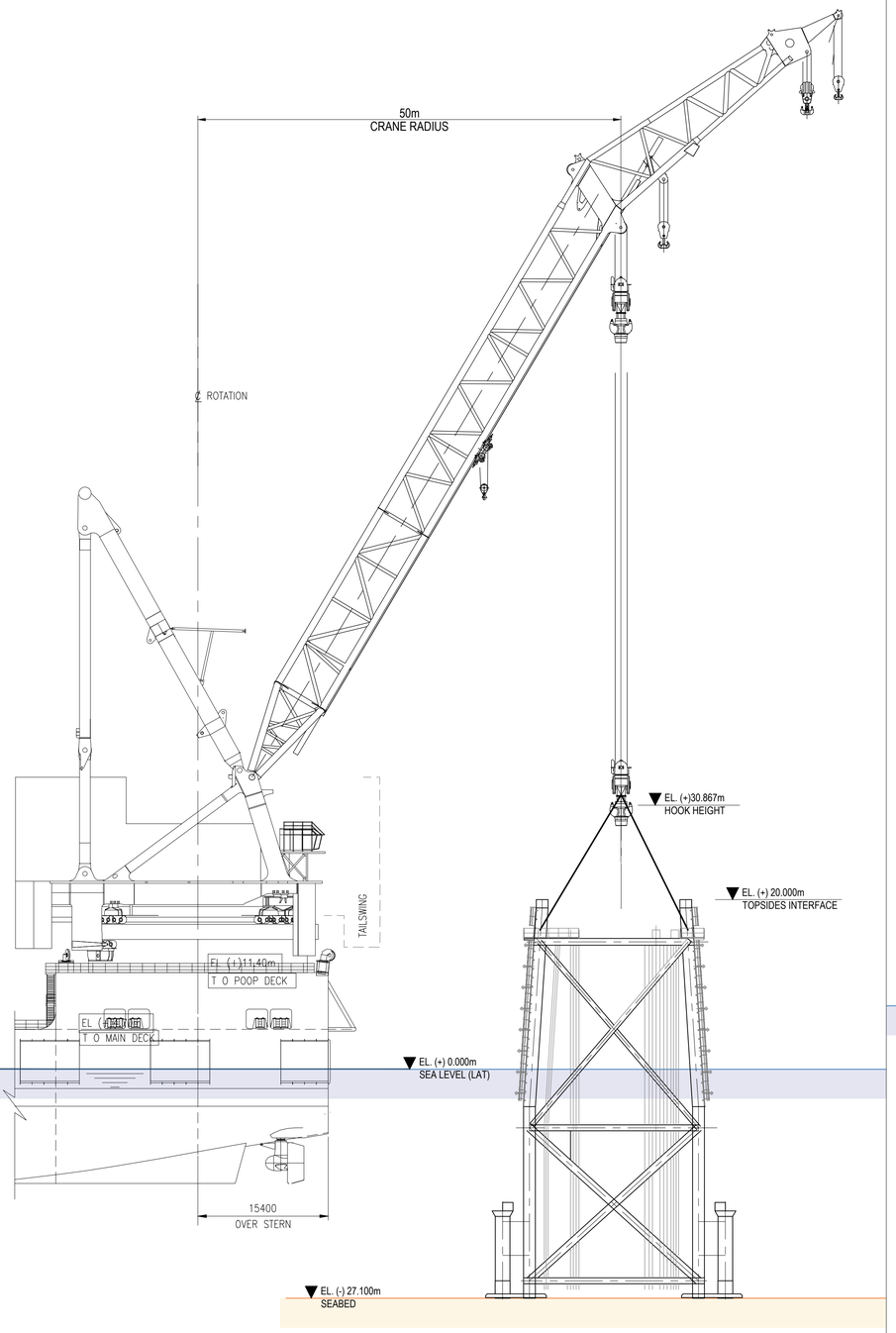
A1 (841 x 594)

11. ONCE JACKET MUDMATS HAVE BOTTOMED OUT ON SEABED, RELEASE THE LOAD COMPLETELY FROM THE CRANE HOOK.

12. CONTINUE LOWERING THE MAIN BLOCK UNTIL RIGGING BECOMES SLACK.

13. PERFORM ELEVATION AND HORIZONTAL LEVEL SURVEY CHECKS

14. OBTAIN COMPANY APPROVAL FOR THE JACKET INSTALLATION.



15. BEGIN PILING OPERATIONS BY PRE-DRILLING TO SPECIFIED DEPTH USING INDUSTRY STANDARD BORING MACHINE.

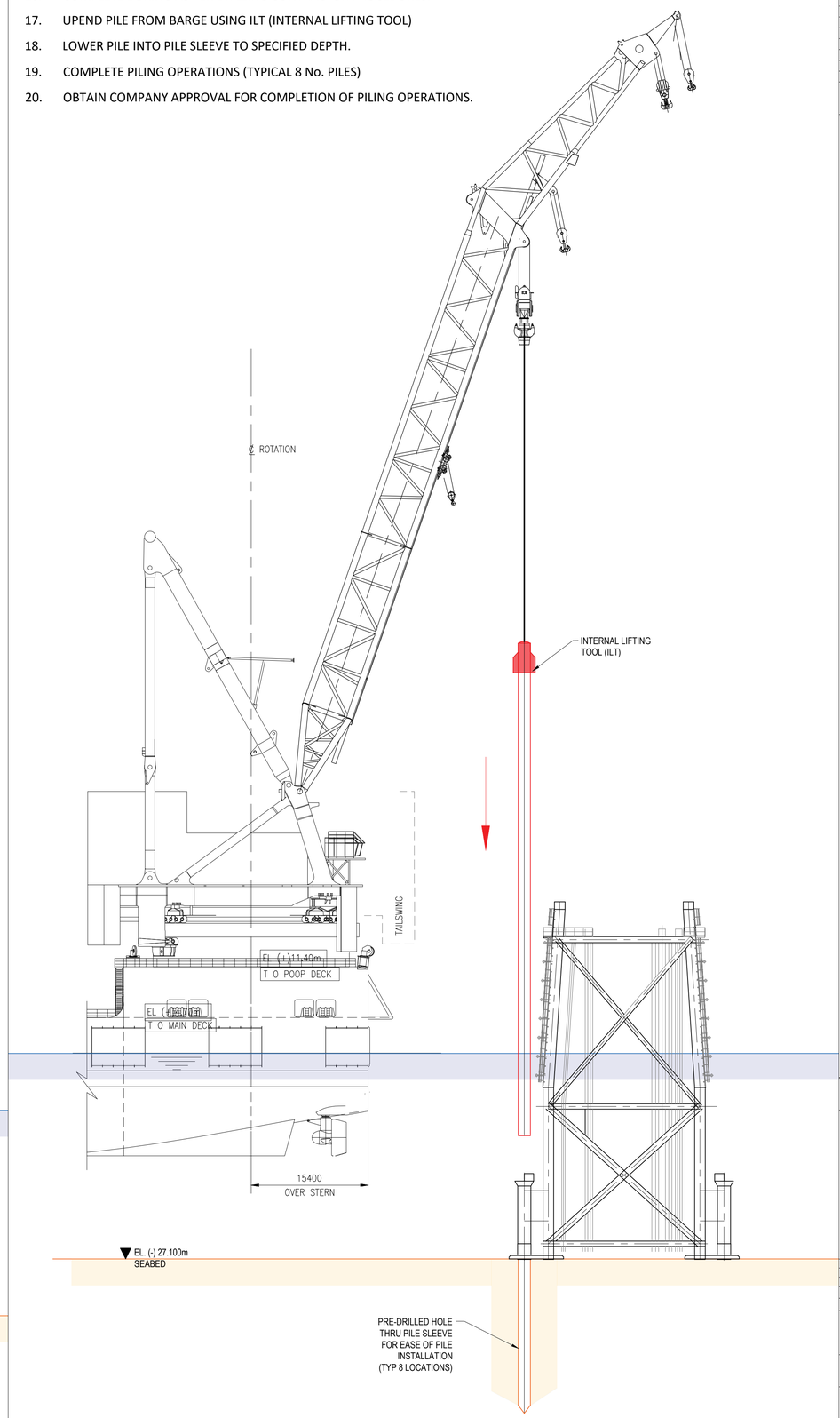
16. COMPLETE BORING AS PER DRILLING CONTRACTOR PROCEDURES.

17. UPEND PILE FROM BARGE USING ILT (INTERNAL LIFTING TOOL)

18. LOWER PILE INTO PILE SLEEVE TO SPECIFIED DEPTH.

19. COMPLETE PILING OPERATIONS (TYPICAL 8 No. PILES)

20. OBTAIN COMPANY APPROVAL FOR COMPLETION OF PILING OPERATIONS.



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Revision index

Company logo and business name

Company Document ID: 105600BNDD85026

Job. N. JA0614

Facility and Sub Facility Name	Project Name	Scale	Sheet of Sheets
DOUGLAS DD	LBA CCS	1:250	5 / 10

Document Title

DOUGLAS PLATFORMS - LIFTING AND TRANSPORTATION DRAWINGS

Superseded N.

Superseded by N.

Plant Area	Plant Unit
N/A	N/A

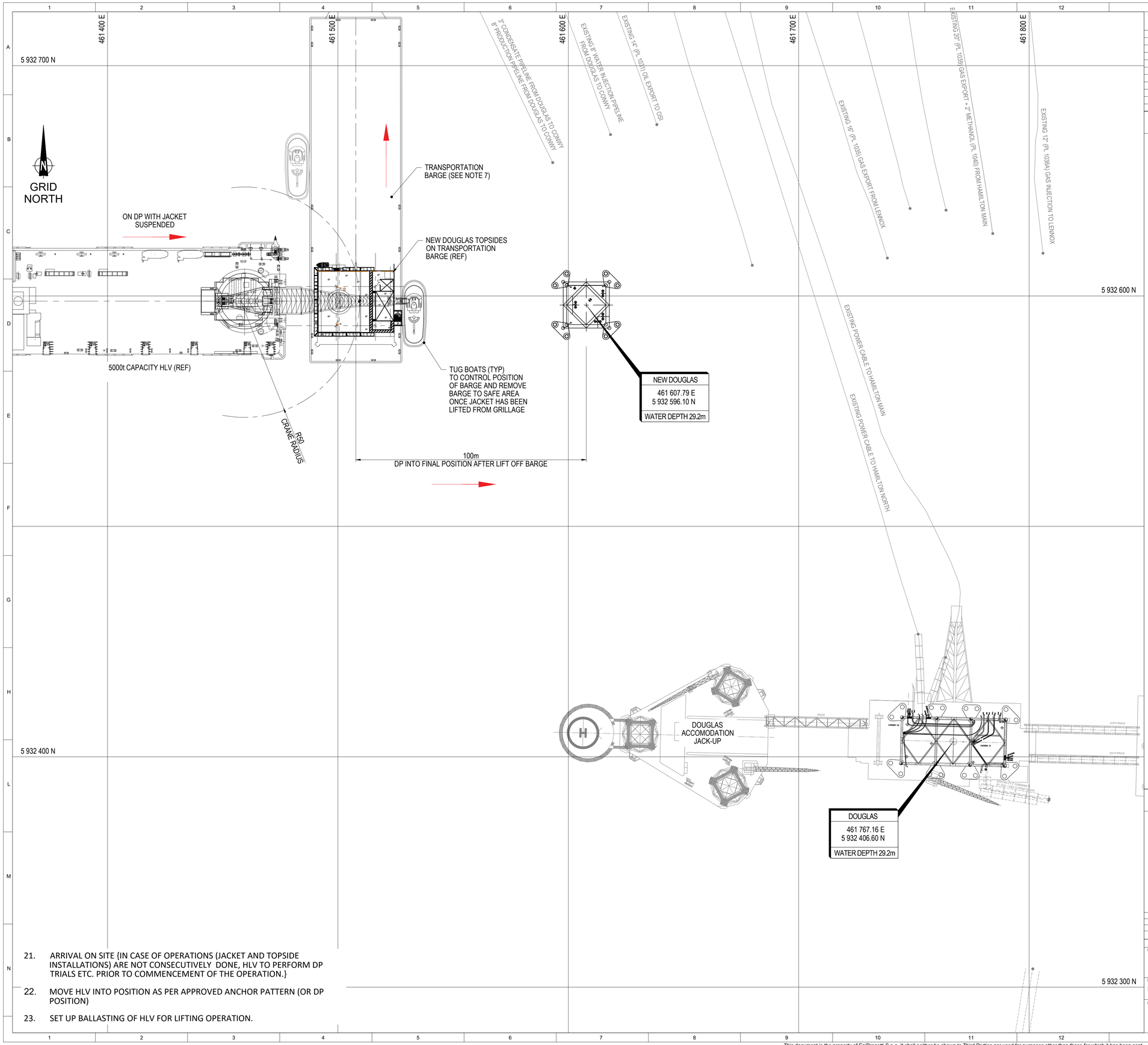
Software:AutoCad

Filename.105600BNDD85026_CDFE01_10.DWG

A1 (841 x 594)

10.3 Attachment 4 – New Douglas Topside Installation Sequence

[Ref 57] Sheet 6- 10



21. ARRIVAL ON SITE {IN CASE OF OPERATIONS (JACKET AND TOPSIDE INSTALLATIONS) ARE NOT CONSECUTIVELY DONE, HLV TO PERFORM DP TRIALS ETC. PRIOR TO COMMENCEMENT OF THE OPERATION.}
22. MOVE HLV INTO POSITION AS PER APPROVED ANCHOR PATTERN (OR DP POSITION)
23. SET UP BALLASTING OF HLV FOR LIFTING OPERATION.

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LINEAR UNIT	METERS (1.0)
FALSE EASTING	500000.0
FALSE NORTHING	0.0
CENTRAL MERIDIAN	-3.0
SCALE FACTOR	0.9996
LATITUDE OF ORIGIN	0.0
GEOGRAPHIC COORDINATE SYSTEM	European Datum 1950
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Job. N. JA0614

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Scale: 1:250

Sheet of Sheets: 6 / 10

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Plant Area: N/A

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Software:AutoCad

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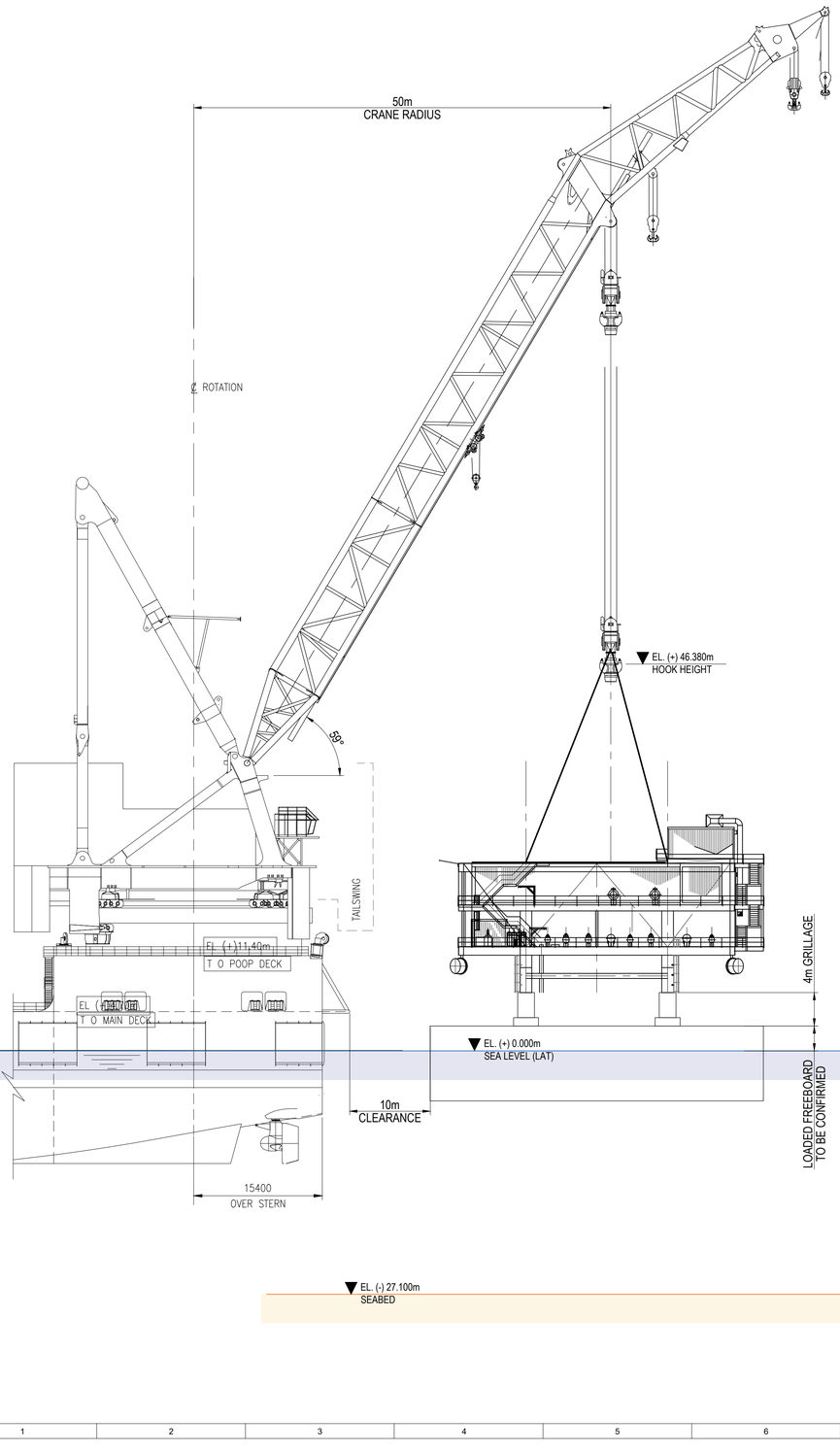
A1 (841 x 594)

24. BALLAST HLV TO THE REQUIRED LIFTING CAPACITY, ENSURE THE TILT/TRIM OF HLV WILL NOT EXCEED
ALLOWED PARAMETERS AFTER LIFTING THE TOPSIDES.

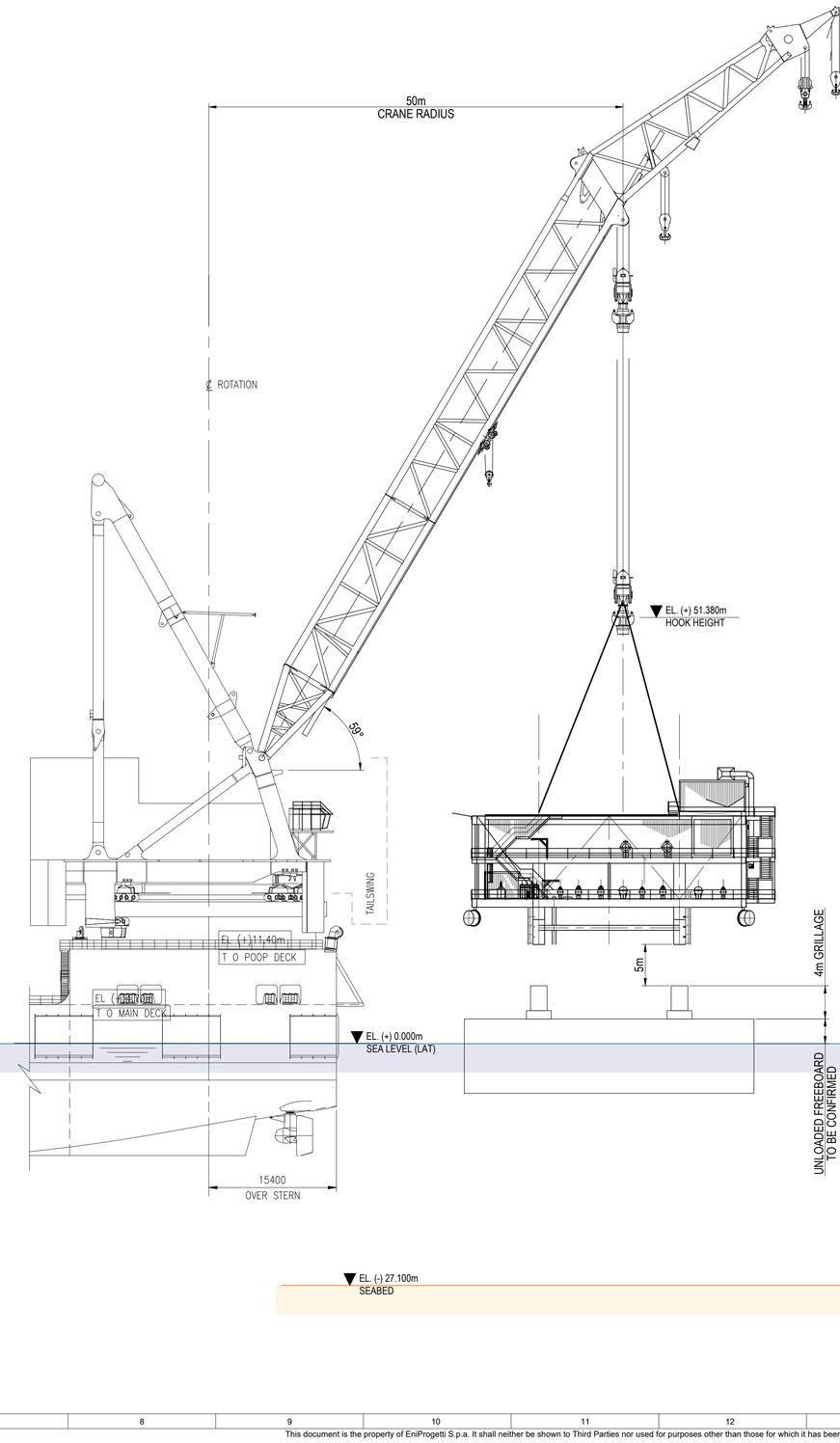
25. LOWER DOWN THE MAIN HOOK AND CONNECT LIFT RIGGING TO MAIN HOOK AND RAISE THE HOOK TO RECOVER THE SLACK OF LIFTING SLINGS.

26. WITH FAVORABLE WEATHER FORECAST AND ACCEPTANCE OF LIFT PREPARATION, SEND CREW AND CUTTING TOOLS TO CARGO BARGE TO CUT SEAFASTENING.



27. START INCREASING THE LOAD GRADUALLY UP TO WHEN THE DECK/TOPSIDE DETACHES FROM THE BARGE GRILLAGE. RAISE THE MAIN HOOK UNTIL APPROX 5m CLEARANCE BETWEEN DECK AND HIGHEST OBSTRUCTION ON THE CARGO BARGE IS ACHIEVED.

28. CAST-OFF CARGO BARGE FROM UNDERNEATH THE DECK/TOPSIDE STRUCTURE BY PULLING AND ASSISTANCE WITH TUGS.



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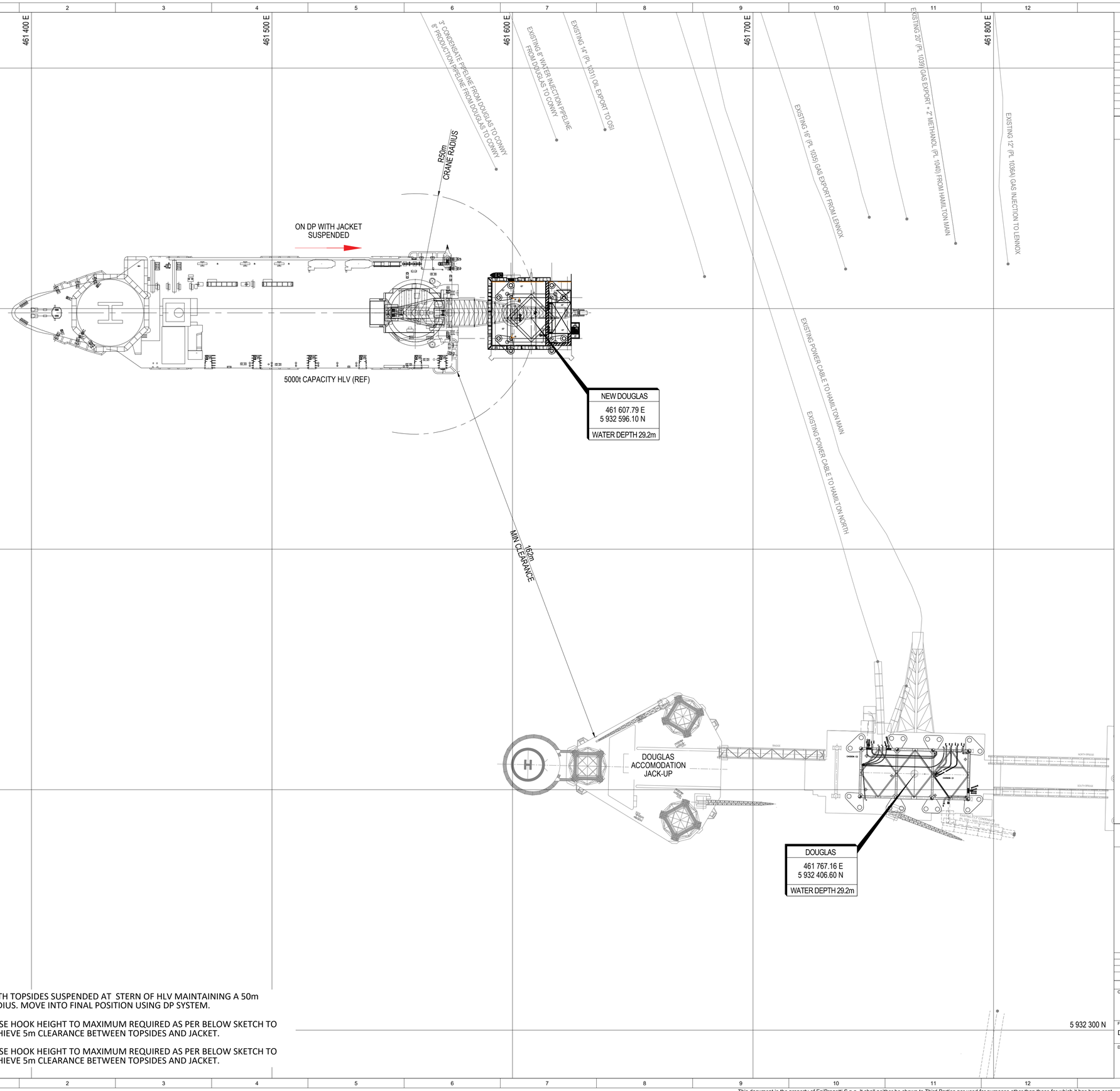

29. WITH TOPSIDES SUSPENDED AT STERN OF HLV MAINTAINING A 50m RADIUS. MOVE INTO FINAL POSITION USING DP SYSTEM.

30. RAISE HOOK HEIGHT TO MAXIMUM REQUIRED AS PER BELOW SKETCH TO ACHIEVE 5m CLEARANCE BETWEEN TOPSIDES AND JACKET.

31. RAISE HOOK HEIGHT TO MAXIMUM REQUIRED AS PER BELOW SKETCH TO ACHIEVE 5m CLEARANCE BETWEEN TOPSIDES AND JACKET.

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CDFE	00	05.04.2023	ISSUED FOR COMMENT	ADM	DM	BC	

Company logo and business name: eni uk / eni progetti

Company Document ID: 105600BNDD85026

Job. N. JA0614

Facility and Sub Facility Name: DOUGLAS DD

Project Name: LBA CCS

Scale: 1:250

Sheet of Sheets: 8 / 10

Document Title: DOUGLAS PLATFORMS - LIFTING AND TRANSPORTATION DRAWINGS

Supersedes N.

Superseded by N.

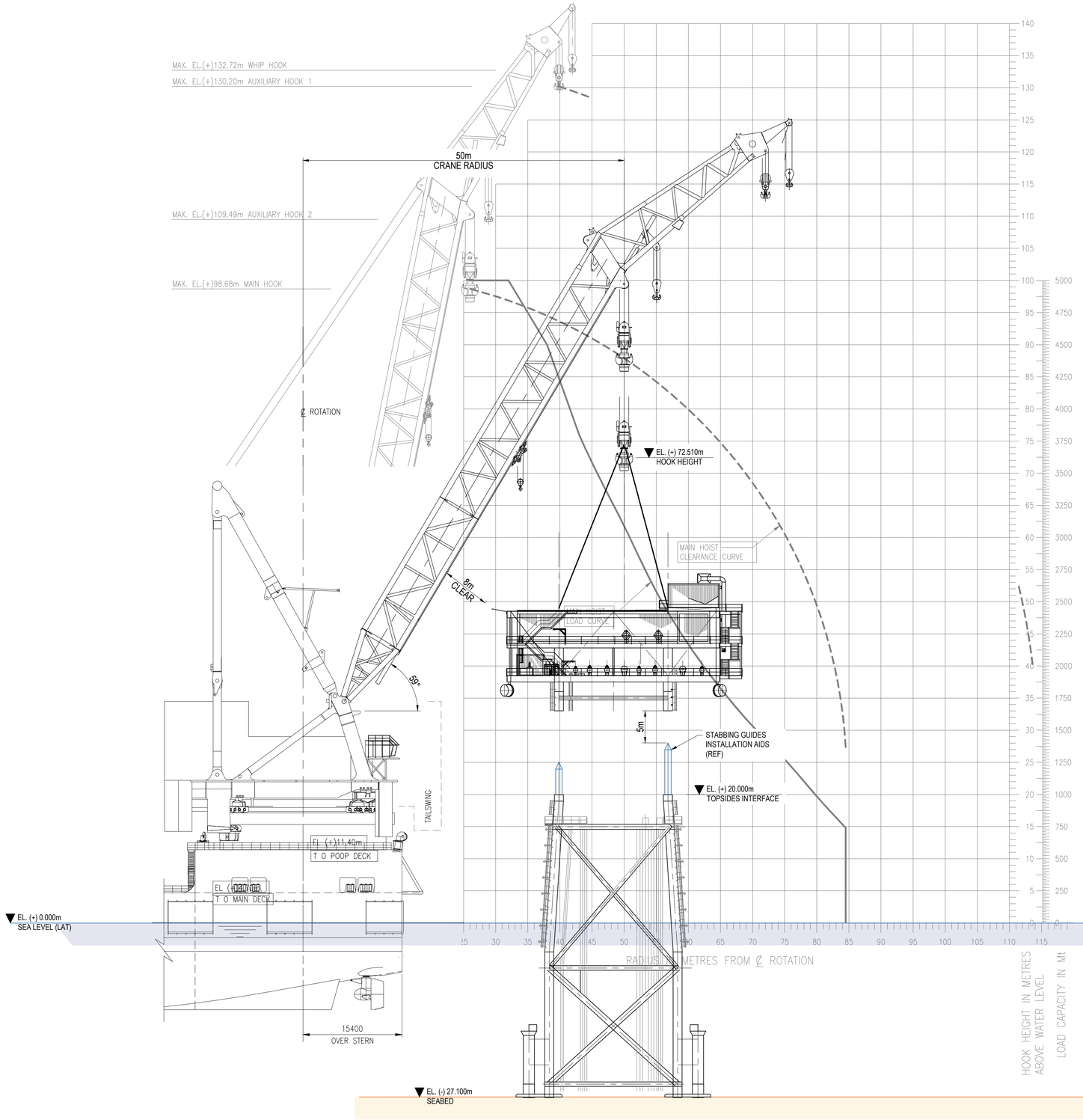
Plant Area: N/A

Plant Unit: N/A

Software:AutoCad

Filename.105600BNDD85026_CDFE01_10.DWG

A1 (841 x 594)



REFERENCE DOCUMENTS

NUMBER	TITLE
105600BNMI85023	DOUGLAS PLATFORMS - INSTALLATION METHOD STATEMENT
105600BNRZ85024	DOUGLAS PLATFORMS - LIFTING ANALYSIS
105600BNRZ85025	DOUGLAS PLATFORMS - TRANSPORTATION ANALYSIS
105600BORV90115	DOUGLAS PLATFORMS - JACKET WEIGHT CONTROL REPORT
105600BORV90215	DOUGLAS PLATFORMS - TOPSIDES WEIGHT CONTROL REPORT

GENERAL NOTES

1. ALL DIMENSIONS AND COORDINATES ARE IN METRES UNLESS NOTED OTHERWISE.
2. GLOBAL COORDINATE REFERENCE SYSTEM: European Datum 1950 UTM Zone 30N (EPSG: 23030)

PROJECTED COORDINATE SYSTEM	European Datum 1950 UTM Zone 30N
PROJECTION	TRANSVERSE MERCATOR
LINEAR UNIT	METERS (1.0)
FALSE EASTING	500000.0
FALSE NORTHING	0.0
CENTRAL MERIDIAN	-3.0
SCALE FACTOR	0.9996
LATITUDE OF ORIGIN	0.0
GEOGRAPHIC COORDINATE SYSTEM	European Datum 1950
ANGULAR UNIT	DEGREE (0.0174532925199433)
PRIME MERIDIAN	GREENWICH (0.0)
DATUM	European 1950
SPHEROID	International 1924
SEMIMAJOR AXIS	6378388.0
SEMIMINOR AXIS	6356911.946127946
INVERSE FLATTENING	297

3. 5000t CAPABLE HEAVY LIFT VESSEL HAS BEEN USED AS THE HLV AS PRESENTED IN THIS STORYBOARD. OTHER VESSELS MAY BE MORE SUITABLE. FINAL DECISION SHALL BE DETERMINED DURING DETAILED DESIGN PHASE.
4. TOPSIDE WEIGHT REPORTED IN WEIGHT CONTROL REPORT DOC No. 105600BORV90215
5. JACKET WEIGHT REPORTED IN WEIGHT CONTROL REPORT DOC No. 105600BORV90115
6. THE HEAVY LIFT VESSEL UTILIZED IS 5000t CLASS.
7. TRANSPORTATION BARGE SHOWN ON THIS DRAWING IS 150m x 40m x 9m CARGO BARGE.
8. THE DESIGN OF THE GRILLAGE AND SEAFASTENING WILL BE DEVELOPED DURING DETAILED ENGINEERING PHASE BY THE EPIC CONTRACTOR.
9. FOR LIFTING INFORMATION REFER TO NEW DOUGLAS INSTALLATION METHOD STATEMENT- CONTRACTOR DOC No 105600BNMI85023.
10. LIFT RIGGING CONFIGURATION SHALL BE REVIEWED AND AGREED BY EPIC CONTRACTOR DURING DETAILED ENGINEERING PHASE.

HOLDS

1. DOCUMENT NUMBERS TO BE CONFIRMED
2. FINAL LOCATION OF NEW PLATFORM AND JACKET TO BE CONFIRMED
3. DESIGN OF JACKET AND TOPSIDES TO BE FINALISED AND CONFIRMED.
4. COG HAS BEEN ASSUMED AND ASSUMPTIONS MADE WITH A CONSERVATIVE EXPECTED SHIFT. TO BE CONFIRMED.
5. PILE OD, LENGTH AND QUANTITY TO BE CONFIRMED.

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32. ONCE DECK/TOPSIDE LEGS ARE LANDED IN THEIR TRANSITION PIECES RELEASE COMPLETELY THE LOAD FROM THE CRANE HOOK.

33. PERFORM ELEVATION AND HORIZONTAL LEVEL SURVEY CHECK.

34. OBTAIN COMPANY APPROVAL FOR THE DECK/TOPSIDE INSTALLATION.

35. START WELDING THE LEGS TO THE TRANSITION PIECES AND NDT THE WELDS WHEN REQUIRED AS PER INSTALLATION PROCEDURE.

36. APPLY TOUCH-UP PAINT ON WELDING AREA.

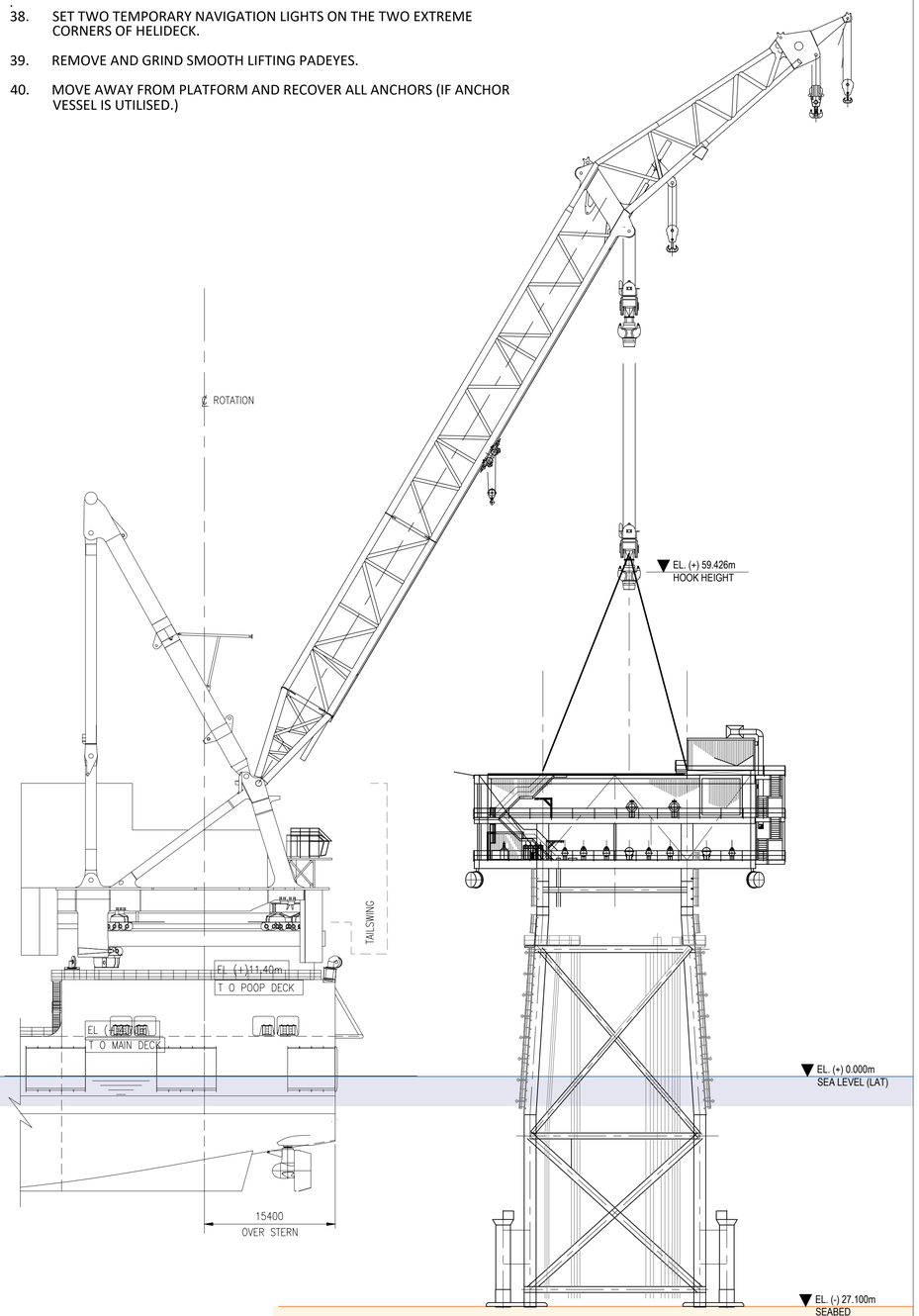
37. SET TWO TEMPORARY NAVIGATION LIGHTS ON THE TWO EXTREME CORNERS OF HELIDECK.

.

38. SET TWO TEMPORARY NAVIGATION LIGHTS ON THE TWO EXTREME CORNERS OF HELIDECK.

39. REMOVE AND GRIND SMOOTH LIFTING PADEYES.

40. MOVE AWAY FROM PLATFORM AND RECOVER ALL ANCHORS (IF ANCHOR VESSEL IS UTILISED.)



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