TotalEnergies

Culzean Floating Wind

A semi-submersible pilot project

Construction Method Statement (CMS)
GB-CZT-00-TOTA-000005

Rev.	Date	Issued by	Checked by	Approved by
003	22/07/2025	Claire MacDonald	Scott Dillon	Charles Howorth

TABLE OF REVISIONS

Revision	Modification
00A	Draft for review
01	Revision addressing comments received from MD-LOT 20/02/2025.
02	Revision addressing comments received from the Consultation process, received from MD-LOT 17/04/2025
03	Revision to update the dates in regard to the project

DETAILED CHANGE LOG

Date	Rev. Status	References	Description of changes
21/03/2025	Resubmission to MD-LOT for review		Section 1.6 – has been updated to reflect that revisions will be subject to prior approval by the Scottish Ministers. Section 2.1 – further information about the material that the bend stiffener / buoyancy modules and the local outer sheath are made of, has been added. Section 5.1 – has been updated to reflect the current status of surveys. Section 5.4 – Construction related mitigations has been included and Table 1-1 has been updated to refer to this Section. Section 6 – Good Working Practices has been added. Appendix 1 – Contact Details for Key project roles – has been included
24/06/2025	Resubmission to MD-LOT for review addressing consultation comments	NatureScot comments on CMS Consultation	As per Comment 1 & 2 from NatureScot, Sections 3.2.1 and 3.2.3 have been updated to confirm that the installation of the mooring system will commence in July 2025.
			As per Comment 3 from NatureScot, Table 3-1 and Sections 3.2.2.4 and 3.2.2.3 have been updated to reference Wergeland in Norway. Section 3.2.2.4 has been updated to reference Aberdeen.
22/07/2025	Resubmission to MD-LOT		Update to Sections 3.1, 3.2.1, 3.2.3, 3.2.4 and 5.3 to update timescales for the project.

DISTRIBUTION

Stakeholder No.	Document Recipient	Date Issued

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ACRONYMS, ABBREVIATIONS and DEFINITIONS

AHV	Anchor Handling Vessel
AIS	Automatic Identification System
AtoN	Aid to Navigation
COLREGs	International Convention of the Prevention of Collisions at Sea
CAA	Civil Aviation Authority
CLV	Cable Laying Vessels
CMS	Company Management System
CMS	Construction Method Statement
CNS	Central North Sea
CPF	Central Processing Facility
CSV	Construction Support Vessel
DGC	Defence Geographic Centre
DoL	Depth of Lowering
DP	Dynamic Positioning
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ERCoP	Emergency Response Cooperation Plan
ERRV	Emergency Response Rescue Vessel
FLO	Fisheries Liaison Officer
FSO	Floating Storage and Offloading
HDPE	High Density PolyEthylene
HMCG	His Majesty's Coastguard
IAC	Inter Array Cable
IMO	International Maritime Organisation
KIS-ORCA	Kingfisher Information Service – Offshore Renewables & Cable Awareness
LAT	Lowest Astronomical Tide
LMP	Lighting and Marking Plan
LNtM	Local Notices to Mariners
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate Licensing Operations Team
MGN	Marine Guidance Note
MRCC	Maritime Rescue Coordination Centre
NLB	Northern Lighthouse Board
NMCC	National Maritime Coastguard Centre
NOTAM	Notice to Airmen
NSP	Navigational Safety Plan
NSVMP	Navigational Safety and Vessel Management Plan
NtM	Notice to Mariners
O&M	Operations and Maintenance
OfCom	Office of Communications
OIM	Offshore Installation Manager

OREI	Offshore Renewable Energy Installation
PEMP	Project Environmental Monitoring Plan
PU	Polyurethane
ROV	Remotely Operated Underwater Vehicle
RYA	Royal Yachting Association
SFF	Scottish Fishermen's Federation
SOV	Service Operations Vessel
TEPNSUK	TotalEnergies E&P North Sea UK Limited
UKCS	United Kingdom Continental Shelf
UKHO	United Kingdom Hydrographic Office
VMP	Vessel Management Plan
ULQ	Living Quarters and Utility Platform
WHP	Wellhead Platform
WTG	Wind Turbine Generator

1. INTRODUCTION

1.1 Purpose of the Document

This Construction Method Statement (CMS) document has been prepared to address the specific requirements of the relevant conditions attached to the Marine Licences (the 'offshore consent') issued to TotalEnergies E&P North Sea UK Limited (hereafter referred to as TEPNSUK) for the Culzean Floating Offshore Wind Turbine Pilot project. The overall objective of the CMS is to set out the intended construction programme, procedure and good working practices during construction (excluding decommissioning) for the Culzean Floating Wind project.

The CMS confirms that the construction programme and procedures to be employed align with those considered in the original Application, and that construction-related mitigation measures detailed in the Application will be applied during installation.

All TEPNSUK personnel and contractors involved in the Culzean Floating Wind project must comply with this CMS.

1.2 Scope and Objectives

This CMS has been produced for the purposes of satisfying the Marine License which require the drafting of a CMS.

In line with the requirements of the offshore consent conditions, along with industry standards and good practice, CMS covers the following:

- the proposed dates for commencement of construction;
- the proposed details of mobilisation of plant and delivery of materials (including details of onshore lay-down areas;);
- the proposed dates, durations and sequencing of construction work for all key elements of the project;
- contingency planning for poor weather or other unforeseen delays;
- the scheduled date for final commissioning of the project;
- construction procedures in relation to installation of the works;
- good working practices to be employed during construction; and
- the roles and responsibilities of key project personnel and contractors during construction.

The relevant conditions discharged under the CMS are detailed in Table 1-1.

1.2.1 Consent Compliance

The CMS fulfils the consent conditions for the preparation of a Construction Method Statement.

Table 1.1 includes reference to how and where the condition clauses have been addressed within the CMS.

Table 1.1 Consent conditions to be discharged by this CMS

Condition reference	Condition	Relevant section
Construction Method Statement 3.2.5	The Licensee must, no later than six months prior to the Commencement of the Licensed Activity submit a Construction Method Statement ("CMS"), in writing, to the Licensing Authority for its written approval.	This document sets out the CMS for approval by the Scottish Ministers.

	Such approval may only be granted following consultation by the Licensing Authority with NatureScot, MCA, NLB, and any such other advisors or organisations as may be required at the discretion of the Licensing Authority.	Consultation to be undertaken by the Scottish Ministers.
	The CMS must include, but not be limited to: a) Details of the proposed date for the Commencement of the Licensed Activity, duration and phasing for the key elements of construction, the working areas, the construction procedures and good working practices for installing the Works;	Section 3
	b) The proposed timings for mobilisation of plant and delivery of materials, including details of onshore lay-down areas;	Section 5
	c) Details of the roles and responsibilities, chain of command and contact details of company personnel, any contractors or sub-contractors involved during the construction of the Works;	Section 4
	d) Details of how the construction related mitigation steps proposed in the Application are to be delivered;	Section 5.4
	e) Contingency planning for poor weather or other unforeseen delays; and	Section 3 Weather delays are built into the construction timings provided.
	f) The scheduled date for Final Commissioning of the Works.	Section 3
	The CMS must adhere to the construction methods assessed in the Application. The CMS also must, so far as is reasonably practicable, be consistent with the Environmental Management Plan ("EMP"), Vessel Management Plan ("VMP"), Navigational Safety Plan ("NSP"), Cable Plan ("CaP") and the Lighting and Marking Plan ("LMP").	The CMS has been written to, as far as is reasonably practicable, be consistent with the DS, EMP, NSVMP, CaP and LMP.

1.3 Linkages with other Consent Plans

This CMS details the proposed construction programme, forming part of a set of approved documents (including other mitigation plans required under the Marine Licence). Table 1.2 lists the Consent Plans with linkages to this CMS.

Table 1.2 Consent Plans with linkages to this CMS

Other Consent Plans and Documents	Linkage with CMS
Development Specification and Layout Plan (DSLP)	The DSLP provides information about the Culzean Floating Wind site including WTG layout, seabed information, details on WTG dimensions, generating output of the WTG, as well as details on the cable.
Cable Plan (CaP)	The Culzean Floating Wind CaP details on the specification, location and installation techniques of the export cable. This includes the results of surveys to inform cable routing, a burial risk assessment, methodologies for survey and monitoring of the cables during the operational phase and reporting requirements to Marine Directorate Licensing Operations Team (MD-LOT).
Environmental Management Plan (EMP)	The EMP sets out the environmental framework for the construction and operation of the Culzean Floating Wind infrastructure. It also contains the Marine Pollution Contingency Plan (MPCP) which sets out the procedure should an oil spill occur during construction. The installation and construction described within this CoP and CMS will be undertaken in line with the environmental management measures as described in the EMP.
Emergency Response Cooperation Plan (ERCoP)	The ERCoP describes the agreed measures for emergency response with the MCA.
Lighting and Marking Plan (LMP)	The LMP provides details of the aviation and navigational lighting and marking arrangements during construction and operation phases.
Vessel Management and Navigational Safety Plan (VMNSP)	Provides the management and coordination of vessels to mitigate the impact of vessels.

1.4 Structure of the Plan

Sections 1 and 2 Background to consent requirements and overview of the CMS scope and structure.

Sections 3 Construction Programme.

Section 4 Construction Roles and Responsibilities.

Section 5 Construction Methods and Procedures.

Section 6 Good Working Practices.

1.5 Plan Audience

All TEPNSUK personnel, contractors and subcontractors involved in the construction of the Culzean Floating Wind project must comply, as a minimum, with this CMS.

The CMS is intended to be referred to by personnel involved in the construction of the Culzean Floating Wind project. Compliance with the CMS will be monitored by the TEPNSUK Floater Package Lead. A TEPNSUK Company Representative will be present on a construction vessel to act as the offshore shore focal point during construction operations.

The latest version of this CMS can be obtained from TEPNSUK document management system (Prodom) and from the Marine Directorate website[1]. Copies are also to be held in the following locations:

- TotalEnergies Aberdeen office; and
- TEPNSUK Floating Package Lead.

1.6 Updates and Amendments

It is acknowledged that there may be a requirement for the CMS to be revised and updated on occasion as the project progresses to ensure the information is kept up to date.

This CMS is a 'live document' and will be revised as relevant to ensure the information is kept up to date with any revisions being notified to the Scottish Ministers as soon as practicable and any proposed material revisions being subject to prior approval by the Scottish Ministers.

Linkages exist between a number of offshore consent plans as highlighted in Section 1.3 (Table 1-2). As plans are updated, there will be a review of inter-linkages with other consent plans to ensure these are also updated as relevant.

[1] https://marine.gov.scot/ml/culzean-floating-offshore-wind-turbine-pilot-project

2. INTRODUCTION

2.1 Project Description

The Culzean Floating Offshore Wind Turbine Pilot project is located in the central North Sea (CNS), approximately 222 kilometres (km) east of Aberdeen in the UK Continental Shelf (UKCS) Block 22/25a. The Culzean Floating Wind project will deploy one floating wind turbine generator (WTG) with a capacity of 3 MW with test floater and mooring system technologies for offshore floating wind. This is a pilot project which aims to; i) test and qualify the floater technology designed by Ocergy, and ii) perform a hybridisation showcase for TotalEnergies to demonstrate the feasibility of platform electrification in an offshore environment.

The Culzean Floating Wind project will be installed approximately 2.5 km west of the Culzean oil and gas platform, linked via an export cable to the Culzean Central Processing Facility (CPF) (Figure 2-1). The wind turbine will be connected to the plant power management system to allow the export of the produced electricity to the site. The Culzean facility is a stand-alone development involving three bridge linked platforms including a Wellhead Platform (WHP), Central Processing Facility (CPF) with flare tower, and separate Living Quarters and Utility Platform (ULQ).

The Project does not require a grid connection to shore and will be entirely within the offshore region between 12 nautical miles (nm) and the Exclusive Economic Zone (EEZ) boundary.

The Culzean Floating Wind will be connected to the Culzean facilities via an existing J-tube on the platform. The key components include:

- One WTG;
- One floating substructure;
- Up to six mooring lines;
- Up to six drag anchors;
- One 2.5 km long one dynamic inter array cable (IAC) (with bend stiffener / buoyancy modules and local outer sheath protection); and
- Associated scour and cable protection (if required).

The design life for the WTG is 10 years.

The bend stiffener is made of Polyurethane (PU), the buoyancy module and outer sheath protection are both made of High Density PolyEthylene (HDPE).

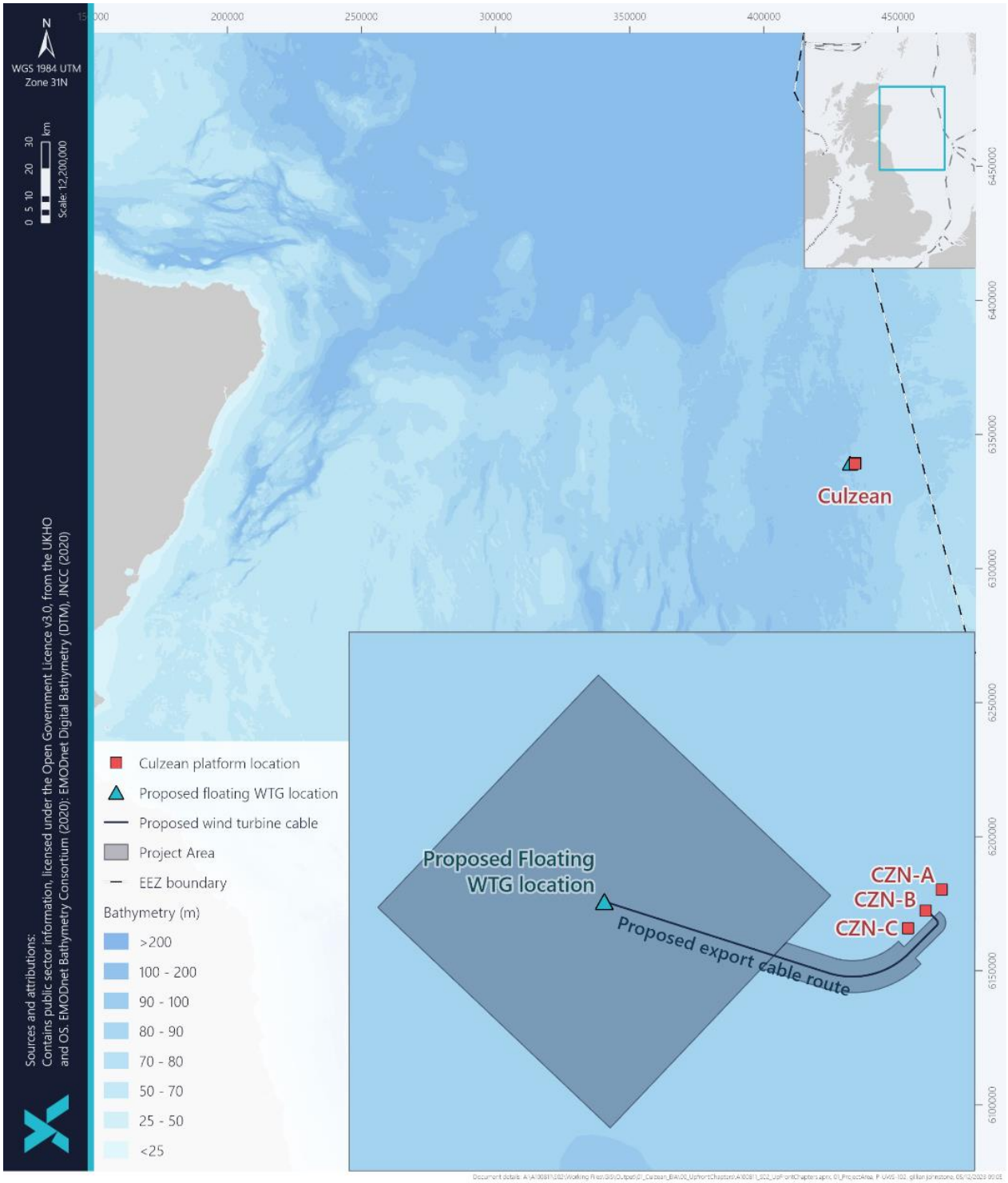


Figure 2-1 Culzean Floating Wind Project Area

3. CONSTRUCTION PROGRAMME

This section sets out the proposed programme for construction of the Culzean Floating Wind project and presents the key milestone dates for the commencement of the project construction works, the main construction activities and the commissioning of the project.

3.1 Key Milestone Dates

The key milestone dates associated with the construction activities are presented in Table 3-1 and Figure 3-1. Dates presented in this section may be subject to some changes to take account of delivery of components, vessel availability, and minor operational refinements, including weather restrictions. Any changes to the dates presented in this CMS will be notified to MD-LOT and incorporated into future revisions as required.

Culzean Floating Wind construction works will be carried out on a 24-hour, 7-day per week basis unless otherwise stated.

Table 3-1 Key Milestone Dates

Milestone	Anticipated Programme
Commencement of offshore construction	Earliest Mid August 2025 or April 2026 (following end of winter conditions)
Timing and sequencing of construction works	<u>Quayside construction activities (Wergeland, Norway)</u> Floater assembly • August 2025 Floater & WTG Integration & Onshore Commissioning • September to October 2025 <u>Offshore installation activities</u> Mooring System (Station Keeping System) Installation • Mid August to September 2025 or April to May 2026 Cable Installation • Mid August to September 2025 or April to May 2026 Cable Pull-in, Connection & Commissioning • October 2025 or April to May 2026 Floating WTG tow and hook-up • October 2025 or April to May 2026 Culzean platform modifications for installation/commissioning) • August 2025

3.2 Culzean Floating Wind Site Construction Programme

The Culzean Floating Wind project construction programme is presented in Figure 3-1 above. In line with the requirements of the Marine Licence conditions, the sections below provide details on the following:

- date of the commencement of construction;
- timing and sequencing of construction works;
- timing for the mobilisation of plant and delivery of materials, including details of onshore laydown areas (where required);
- contingency planning for poor weather or other unforeseen delays; and
- schedule date for the final commissioning of the project.

3.2.1 Commencement of Construction

The date of commencement of construction is defined in the Marine Licence as:

> *"Commencement of the Licensed Activity" means the date on which the first vehicle or vessel arrives on the site to begin carrying on any activities in connection with the Licensed Activity."*

The Culzean Floating Wind project site construction commences with the mooring pre-lay, which is due to commence Mid August to September 2025 or April to May 2026. Therefore, as defined by the Marine Licence condition, the commencement of the construction works of the project is Mid August to September 2025 or April to May 2026.

3.2.2 Mobilisation of Plant and Delivery of Materials

The key components of the Culzean Floating Wind project are:

- One WTG;
- One floating substructure;
- Mooring System (mooring lines and anchors);
- One IAC (with bend stiffener / buoyancy modules and local outer sheath protection); and
- Associated scour and cable protection (if required).

Delivery of the components will be from the manufacturing facilities to the selected marshalling or assembly yard for storage in onshore laydown areas and pre-assembly.

3.2.2.1 WTG

The WTG components will be delivered to the marshalling yard (at Wergeland, Norway) where they will be stored at an onshore laydown area for pre-assembly prior to load-out for installation.

WTG components are anticipated to be transported from the manufacturing facilities to the marshalling yard for preassembly between March and May 2025.

3.2.2.2 Floating Substructure

The floating substructure components will be delivered to the assembly yard where they will be stored at an onshore laydown area for pre-assembly prior to load-out for installation.

Floating substructure components are anticipated to be transported from the manufacturing facilities to the marshalling yard for preassembly during June 2025.

3.2.2.3 Mooring System

The mooring system components will be delivered to the marshalling yard (at Wergeland, Norway) where they will be stored at an onshore laydown area for pre-assembly prior to load-out for installation.

Mooring system components are anticipated to be transported from the manufacturing facilities to the marshalling yard in June 2025.

A second mooring system may potentially be installed at a later date as part of the Culzean Floating Wind scientific programme. This would test a new low impact moorings design. If this goes ahead, an update to this CMS will be made at the appropriate time.

3.2.2.4 Inter Array Cable

Delivery of the IAC will be phased to match installation requirements. The cable is expected to be loaded onto the cable lay vessel (CLV) at the assembly yard (or any other appropriate storage area) in Aberdeen and transported directly to the Culzean Floating Wind site, but may be held in interim storage at a quayside.

3.2.2.5 Associated Scour and Cable Protection

Where required, cable protection material will likely be mobilised onto the CLV at the point of cable load out and transported directly to the Culzean Floating Wind project site.

3.2.3 Timing and Sequencing of Construction Works

The construction works are split into three campaigns:

- Mooring installation;
- IAC installation; and
- Floating WTG installation and hookup'

This section details the proposed timings and sequencing of construction for the Culzean Floating Wind project site construction programme (as per Section 3.1).

Mooring system installation is planned to commence in Mid August to September 2025 or April to May 2026.

The installation of floating WTG (the WTG and the floating substructure – onshore scope) is anticipated to commence in August 2025. Floating WTG installation and hookup will follow, this is expected to commence also in October 2025 or April to May 2026.

IAC installation is anticipated to take place over several days in Mid August to September 2025 or April to May 2026. During this time, IAC will be laid, buried and stored at WTG and Culzean platform locations.

The installation of the mooring (station keeping) system first phase is planned for Mid August to September 2025 or April to May 2026. The second phase will occur where a second additional mooring system will be installed. This second mooring system is to trial low-impact mooring techniques with the aim to assess their feasibility for future electrification projects at TotalEnergies. This is expected about a year into the project (2026 at the earliest). This CMS will be updated and submitted as a revision for approval to Scottish Ministers.

3.2.4 Final Commissioning

The date of final commissioning is defined in the Marine Licence as:

"Final Commissioning of the Works" means the date on which the WTG constructed forming the Works has supplied electricity on a commercial basis to the Culzean platform, or such earlier date as the Licensing Authority deem the Works to be complete."

As the Culzean Floating Wind will be providing supplementary power to the Culzean platform there is no commercial agreement. The anticipated date of first power to the Culzean platform is Q4 2025 or Q2 2026 depending on the installation dates. However, there is the potential for snagging works to continue beyond this date. Any changes to the dates presented in this CMS will be notified to MD-LOT and incorporated into future revisions of this CMS as required.

3.3 Contingency Planning

Given the nature and scale of the offshore construction activities the potential exists for unforeseen delays, including from periods of unsuitable weather and equipment failure which are out of TEPNSUK's control.

TEPNSUK has planned construction activities around a suitable weather window based on the location and offshore construction experience. The Culzean Floating Wind project key construction dates set out in this CMS have been designed with reasonable contingency included.

4. CONSTRUCTION ROLES AND RESPONSIBILITIES

This section sets out the roles and responsibilities of all relevant personnel involved in the construction and installation process of the Culzean Floating Wind project, in relation to the delivery of this CMS. All TEPNSUK personnel have a responsibility to comply with the requirements of the CMS. Table 4-1 details the roles and responsibilities with respect to delivering this CMS. Figure 4-1 shows the key roles and linkages between the different roles and teams with respect to delivery of the project.

The chain of command on site comes from TEPNSUK personnel and down through the contractors to any sub-contractors onboard. Vessel Masters remain in command of their own vessels but will be directed by TEPNSUK where appropriate. The hierarchy of compliance cascades from TEPNSUK down through the contracting/sub-contracting organisations. Each is responsible for verifying the level of compliance of the one below in the hierarchy.

Table 4-1 Key responsibilities of personnel relevant to this CMS

Role *	Responsibilities
Culzean Floating Wind Project Manager	• Overall Responsibility for the Project Delivery
Floater Package Lead	• Overall responsibility for the offshore installation activities; • Responsible for managing contractors; • Responsible for managing offshore construction and quayside assembling and integration.
IAC and WTG Package Lead	• Oversee the delivery of discreet construction work packages and to establish contractual obligations for contractors (and their sub-contractors) in relation to the CMS, and to requiring compliance with these contracts.
TEPNSUK Company Representative	• Responsible for onsite project support
TENSPUK Fisheries Liaison Officer (FLO)	• Responsible for providing information to fishermen and other users of the sea during the construction phase.

(*Roles may be covered by the same person in some circumstances).

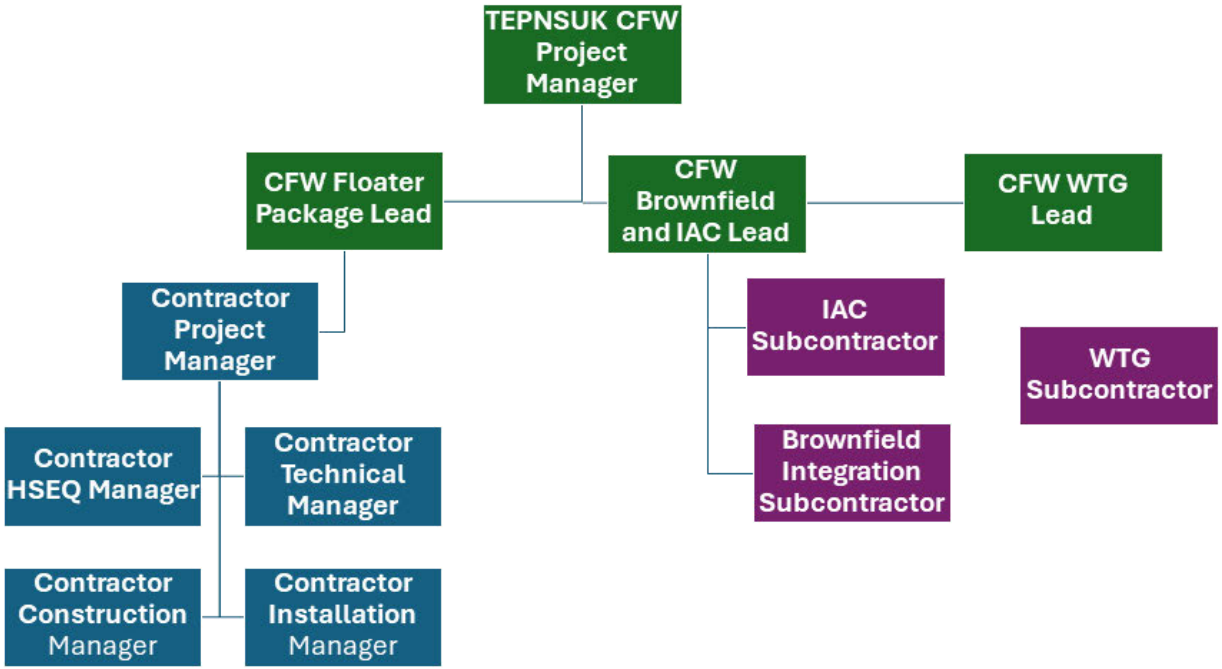


Figure 4-1: Culzean Floating Wind Organisation chart

4.1 Key Contractors

The key responsibilities and scope of work of each key Contractor are set out below in Table 4-1.

The Key Contractors will be responsible for identifying and contracting subcontractors such as may be required to provide services for the completion of the construction works.

TENPUSK will be responsible for the transport of the WTG and IAC to assembly yards (or any other port as required).

Table 4-1 Key Contractor roles and responsibilities / scope of work

Scope of Work	Key Contractor(s)
Supply of WTG	Vestas
Supply of floating substructure	Archer Wind
Transport of WTG to marshalling yard	Archer Wind
Installation of WTG	Archer Wind
Transport and Installation of floating substructure	Archer Wind
Supply of offshore export cable	Prysmian
Transport, and installation of offshore export cables	Archer Wind
IAC pull-in on Culzean platform	PBS
All Culzean platform topside modifications	PBS

5. CONSTRUCTION METHODS AND PROCEDURES

5.1 Introduction

This section presents the construction methods and procedures for each pre-construction (seabed preparation) and construction component of the Development. The main pre-construction and construction components are as follows:

- Seabed preparation
- Floating WTG tow and installation
- Mooring system installation
- IAC installation
- Cable protection installation
- Commissioning

No Unexploded Ordnance (UXO) were detected during site-specific surveys with a magnetometer or during any other surveys undertaken within the Culzean Field over the last 15 years. The 2023 surveys also confirmed that that boulder movement will not be required prior to anchor installation. Pre-installation surveys took place in 2024 and will continue in 2025. These will consist of visual inspections (using Remotely Operated Vehicle (ROVs)) of the mooring locations and cable routes to confirm the exact routing and determine the need for any seabed preparation. These surveys are likely to take up to a day. All survey equipment will utilise ultrashort baseline positioning equipment to ensure precise subsea locations. More details on the surveys are included in the Cable Plan.

5.2 Components to be installed

5.2.1 OCG Wind floater description

The OCG-Wind is a 4 column semi-submersible floating steel platform for large wind turbines. The columns are arranged in the shape of an equilateral triangle, with one column in the centre of the triangle which carries the tower and wind turbine generator.

The OCG-Wind is made of steel with a compressed air-based trimming system and has three unique selling points which allows the structure to be much lighter and robust than its competitors (e.g., concrete based or water ballasting) and eases the final assembly.

The turbine is placed on a cylindrical centre column (CC) with a diameter matching the turbine tower base. Three outside columns (OC) are used to provide hydrostatic stiffness, connected to CC with truss bay composed of a horizontal top and bottom beam with two V-braces. Pre-tensioned tendons interconnect each pair of outer columns (OC) near their top and bottom ends.

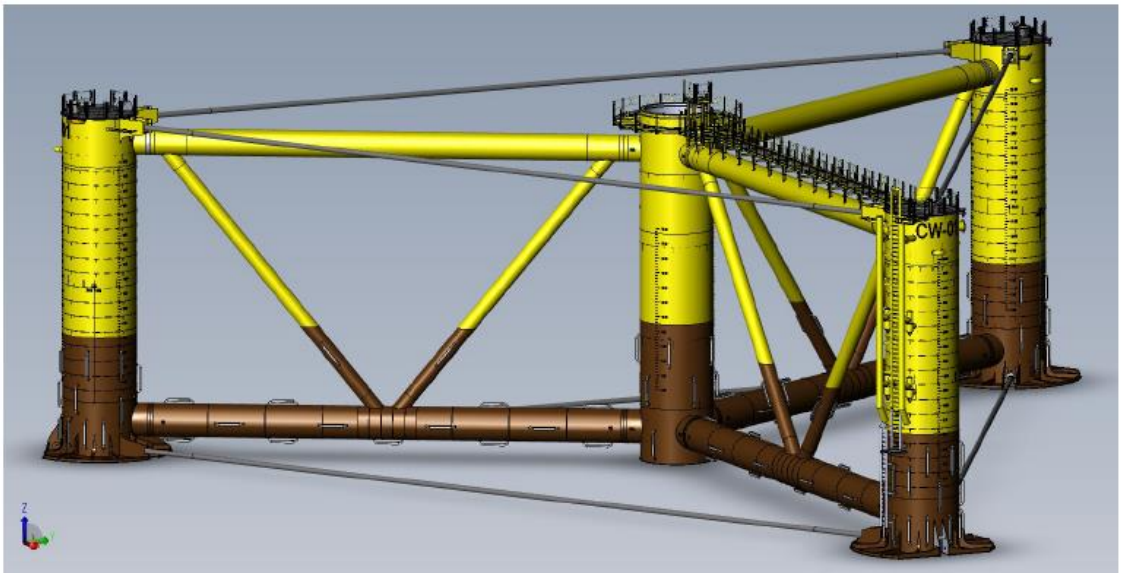


Figure 5.2.1 OCG-Wind Floater 3D view

Description	Value
Width Over All (keep plate – keel plate)	77.11 m
Length Over All (keep plate – keel plate)	67.0 m
Outer Column c/c	67.55 m
Outer Column height	23.0 m
Center Column height	23.8 m
Draft during tow	13.43 m
Quayside draft	10.50 m
Initial In-Place draft	14.02 m
Displacement (at 13.43 m draft)	1624.5 Te

Table 5.2.1 OCG-Wind Floater Main Characteristics

5.2.2 Mooring Line description

The OCG-Wind floater is light enough to be kept on station with a 3-line spread mooring system – one line connected to the base of each OC – and a relative azimuth of 120° between each line. The general arrangement for the project uses a 3-line catenary mooring configuration. The anchor radius is 600m.

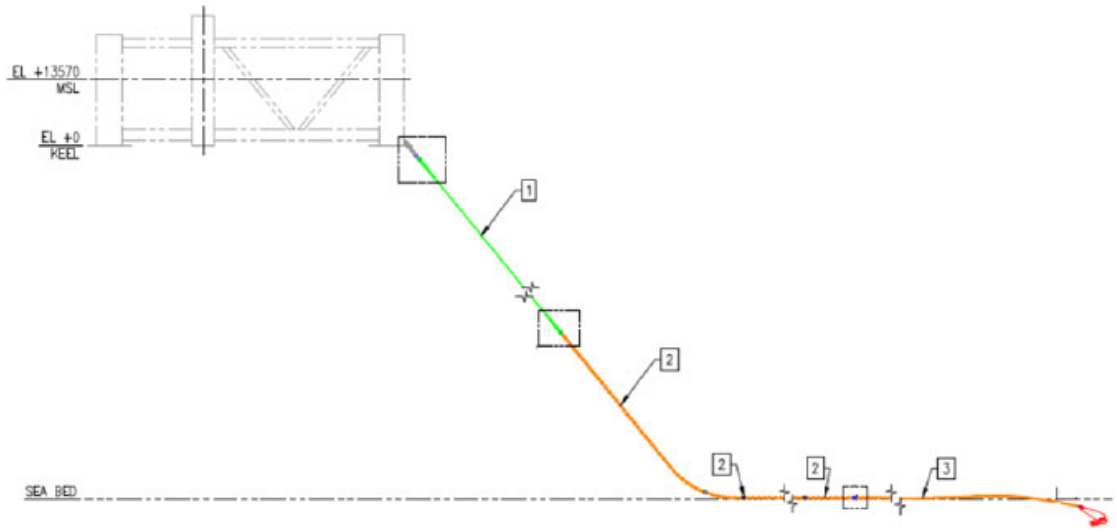


Figure 5.2.2 Mooring Line Profile

The catenary derives its weight from a section of heavy (oversized) chain featuring distributed clump weights installed near the touchdown point. Studless bottom chain connects the heavy chain section to the anchor. Polyester rope segments are used to connect the heavy chain section to the floater. The mooring lines are connected to the three outer columns keels via mooring line connectors. The mooring line component characteristics are as follows in the table below.

Item	Line Type	Size	Length [m]	Mass in air [kg/m]
1	Polyester Rope Section (PRS)	152 mm	75	~17.1
2	Heavy Chain Section (HCS), studless	177.8 mm	80.0	629
2	Clump Weights	-	8 off per line	6958 kg
3	Bottom Chain Section (BCS), studless	101.6 mm	440 .0	206

Table 5.2.2 A Mooring Lines Elements Main Characteristics

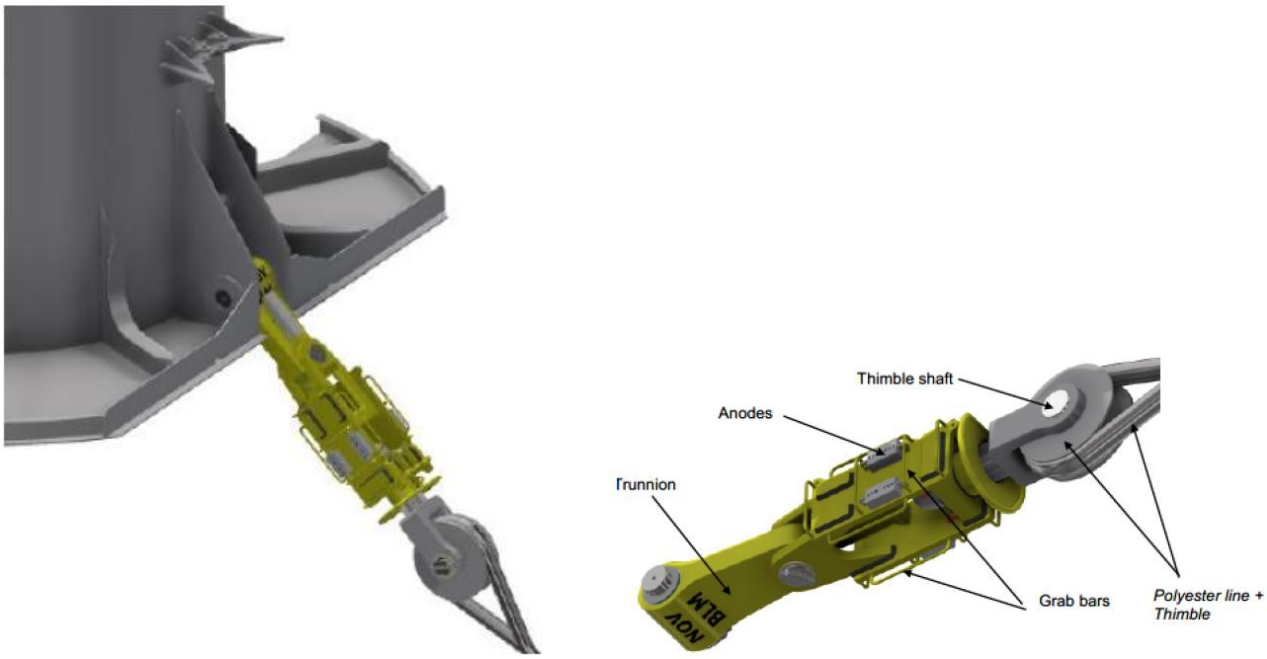


Figure 5.2.2 B Platform Mooring Connector

5.2.3 Anchors

Drag embedded anchors are selected as the anchor type for the project. The floater will be moored with drag embedded anchors of type 12 Te Stevshark Rex shown in Figure 4-7 below.

Figure 5.2.3 Anchor (typical)

5.2.4 Wind Turbine description

The WTG selected for the project is a Vestas V112 3.0 MW. Key details are provided in Table 5.4.2 below. The WTG consists of a refurbished turbine (nacelle, hub and blades) and a new-built tower designed for the pilot metocean conditions.

Description	Value
Rotor diameter	112 m
RNA mass	195.5 Te
Tower mass	151.2 Te
Blade length	54.65 m
Tower base diameter	4.98 m
Tower height (above SWL)	76.3 m

Table 5.2.4 V112 Main Characteristics

5.2.5 IAC Description

Inter array cable will be a 11kV cable with optical fibres as part of the cable cross section.

Description	Value
Outer diameter	ø97.1mm (-5.0 / + 6.0mm)
Outer sheath material	Semiconductive PE
Weight in air and interstices dry	200.5 N/m (20.4 kg/m)
Weight in water and interstices flooded	135.5 N/m (13.8 kg/m)
Nominal mass (weight in air, flooded)	212.7 N/m (21.7kg/m)
Bending stiffness @ 20°C ($kN.m^2$)	2.48
Minimum Bending Radius, storage	0.90 m
Minimum Bending Radius, installation	1.13m
Minimum Bending Radius, normal operation	1.42m
Maximum Crushing Load, for 4 tensioners	25 tf/m/pad
Maximum tensile load, normal operation	571 kN
Maximum tensile load, installation	705 kN

Table 5.2.5 IAC Main Characteristics

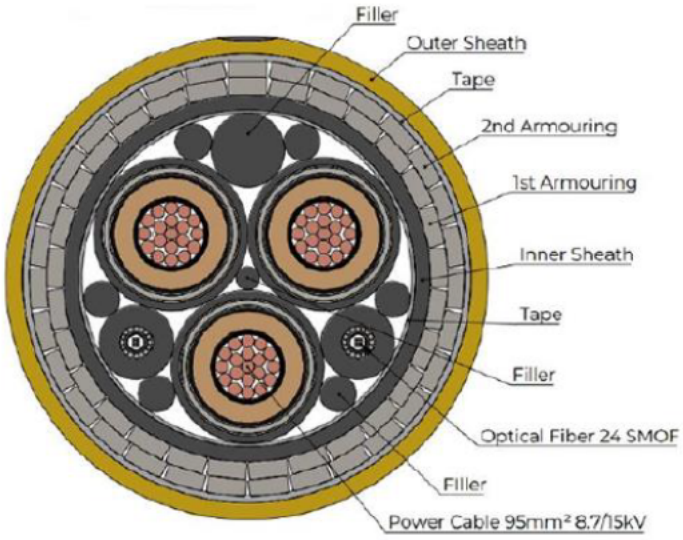


Figure 5.2.5 IAC Cross-Section

The cable configuration will be a dynamic lazy-wave configuration on the FOWT side and a static configuration on the Culzean CPF side. Connection to the platform will be via a spare J-tube on the south-east side. On the FOWT side a bend stiffener and bend stiffener connector will be mounted to the I-tube. On the platform J-tube side, bend restrictors will be mounted. Split flange hang-off will be used topside on both sides.

5.3 Methods and Process of Installation

Campaign	Date	Campaign Activity	Vessel type	Vessel Trips
#1	Mid August / September 2025 or April to May 2026	Mooring pre-installation - As-found survey - Anchor embedment and proof test - Bottom chain cut to length - Heavy chain segment pre-lay - Polyester rope segment pre-lay - As-left survey	AHCV	1
#2a	October 2025	Tow - Harbor manoeuvring - Inshore and offshore tow - Station keeping during hook-up - Disconnect towing vessels	2 x AHT	1

#2b		Harbor manoeuvre - Manoeuvre FOWT from quay - Inshore tow - Disconnection and return to port	HT	
#2c		Mooring hook-up - Recover pre-installed mooring line - Retrieve messenger line from FOWT - Join lines and pull-in mooring line to FOWT (1st line) - Pull-in 2nd mooring line - Offset FOWT from design position towards 3rd mooring line - Pull-in 3rd mooring line - Release towing vessels - As-built survey of mooring lines - -	AHTS	
#3a	Mid August to September 2025 or April to May 2026	Inter array cable installation - Pre-lay survey of cable route - Install cable 1st end up to platform J-tube - Topside pull-in with installation vessel paying out cable - Cable installation along static route - Install buoyancy modules for dynamic section - Deploy 2nd end and handshake to FOWT pull-in wire - Trenching, - Protection works (as required) - As-built survey Note: The IAC can be pre-installed and picked up when the CFW is fully moored	LCV	1
#3b	October 2025 or April to May 2025	W2W support for IAC pull-in and commissioning - Deploy technicians for IAC pull-in	SOV	1

5.4 Construction related mitigations

Mitigations relating to the construction of the Culzean Floating Wind Turbine include:

- Keeping the number of vessels down to a minimum to prevent disruption to the nearby flora and fauna as well as other marine users.
- Noise – anchors will not be pile-driven therefore meaning underwater noise disturbance to mammals and other mega-fauna is low.
- Given the scale of the Project and the distance to the coastline, this greatly reduces the potential for impacts on seabirds compared to larger scale offshore wind developments closer to the coast. The results of the modelling show no potential for the Project to materially contribute to a wider regional cumulative impact on any ornithology receptors.
- Impacts on Commercial Fisheries, shipping and navigation, associated with the construction will be mitigated by following the correct notifications to various stakeholders as identified in the PLANC register.
- Any potential impact to military low flying and UK Search and Rescue (SAR) helicopter operations will be alleviated through embedded mitigation measures including engagement with the Helideck Certification Agency (HCA), Ministry of Defence (MoD) and Maritime and Coastguard Agency on the development of the specific WTG and export cable.

6. GOOD WORKING PRACTICES

Good working practices for the construction of the Culzean Floating Offshore Wind Turbine will include adhering to the relevant Health and Safety Regulations as identified in the Project's Health, Safety and Environmental Management Plan. Below is a summary of some of the key aspects of this Management Plan.

6.1 HSE Management framework

TotalEnergies (the Company) is the project owner, developer and Client and its role with respect to HSE, is primarily to lead and direct the Project and establish and maintain an effective HSE management framework to ensure the Project is designed and delivered safely and in a sustainable manner. The majority of the development and all construction work will be undertaken by Contractors, monitored and supervised by the Company. Furthermore, the Company is responsible for ensuring compliance with and discharge of conditions of consents, licenses and permits.

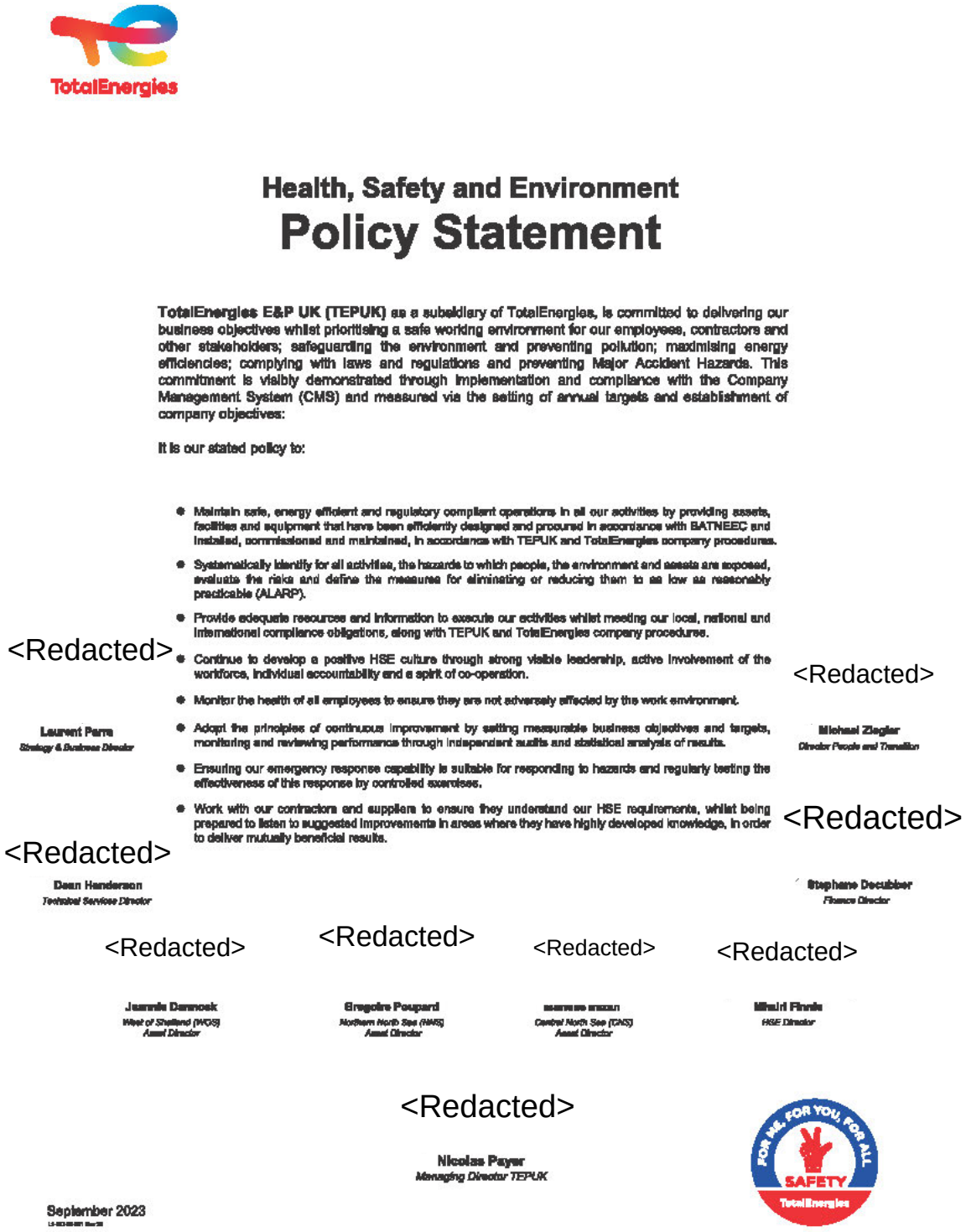
As part of project design and execution, the project team should ensure that:

- The facilities are designed in accordance with inherent safety principles;
- Risks to personnel working on the project and arising from the facilities delivered by the project are as low as reasonably practicable (ALARP);
- The design takes cognisance of environmental legislation and requirements and uses Best Available Techniques (BAT);
- Health, safety, and environmental risks are identified and reduced during design, construction, and commissioning.

TEPUK's key principles of risk management are described in the TotalEnergies E&P Company Rules and Specifications, HSE manuals and TEPUK's procedures.

Throughout the project, personnel are committed to minimising the risk to the safety and health at work for all employees and contractors. Protection of people, the environment and Company assets is a key management responsibility.

The Project Management team is fully committed to the application of TotalEnergies E&P UK Health, Safety and Environment Policy (L1-MD-02-001), Figure 6-1, and shall proactively encourage the implementation of the TotalEnergies Group Golden Rules, Figure 6-2, throughout all the Project sites and activities. Personnel shall be encouraged to participate fully and provide feedback to the Project Manager on areas for improvement or change.



TotalEnergies

Health, Safety and Environment
Policy Statement

TotalEnergies E&P UK (TEPUK) as a subsidiary of TotalEnergies, is committed to delivering our business objectives whilst prioritising a safe working environment for our employees, contractors and other stakeholders; safeguarding the environment and preventing pollution; maximising energy efficiencies; complying with laws and regulations and preventing Major Accident Hazards. This commitment is visibly demonstrated through implementation and compliance with the Company Management System (CMS) and measured via the setting of annual targets and establishment of company objectives:

It is our stated policy to:

- Maintain safe, energy efficient and regulatory compliant operations in all our activities by providing assets, facilities and equipment that have been efficiently designed and procured in accordance with BATNEEC and installed, commissioned and maintained, in accordance with TEPUK and TotalEnergies company procedures.
- Systematically identify for all activities, the hazards to which people, the environment and assets are exposed, evaluate the risks and define the measures for eliminating or reducing them to as low as reasonably practicable (ALARP).
- Provide adequate resources and information to execute our activities whilst meeting our local, national and international compliance obligations, along with TEPUK and TotalEnergies company procedures.
- Continue to develop a positive HSE culture through strong visible leadership, active involvement of the workforce, individual accountability and a spirit of co-operation.
- Monitor the health of all employees to ensure they are not adversely affected by the work environment.
- Adopt the principles of continuous improvement by setting measurable business objectives and targets, monitoring and reviewing performance through independent audits and statistical analysis of results.
- Ensuring our emergency response capability is suitable for responding to hazards and regularly testing the effectiveness of this response by controlled exercises.
- Work with our contractors and suppliers to ensure they understand our HSE requirements, whilst being prepared to listen to suggested improvements in areas where they have highly developed knowledge, in order to deliver mutually beneficial results.

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Managing Director TEPUK

FOR ME, FOR YOU, FOR ALL
SAFETY
TotalEnergies

September 2023

Figure 6-1: TotalEnergies E&P UK Health, Safety and Environment Policy (L1-MD-02-001).

Figure 6-2: TotalEnergies Group Golden Rules

6.2 Identification of Health and Safety Hazards and Environmental Aspects and Impacts

The Project must comply with applicable legal requirements and any other requirements that the Project shall or chooses to comply with. Other requirements may refer to industry standards or codes, or insurer requirements and commitments made to local communities / stakeholders or the Marine Directorate.

In case of different, but non-conflicting requirements, the most stringent requirements shall apply. Legal and other requirements relevant to the project are captured with the Permits, Licences, Authorisations, Notifications and Consents (PLANC) register. The PLANC register is used to systematically identify and manage the various permits, licences, authorisations, notifications, and consents required for the project, ensuring all the necessary regulatory approvals are obtained in a timely manner.

Managers and other Project team members in charge of staff are to ensure that the risks to HSE present in the workplace are adequately identified, assessed and appropriate precautions identified.

Risk assessments must identify the potential hazards and likely consequences, assess them and identify and implement appropriate control measures.

Contractors shall undertake risk assessments in accordance with their internal processes and using their own document templates. Copies of risk assessments shall be provided to the Company before work is expected to commence. The Package Leads, in conjunction with the HSE Leads shall review risk assessments to ensure they are sufficient and align with expectations. Risk assessment shall identify, assess and mitigate environmental risks as well as health and safety risks.

Where personal protective equipment (PPE) is identified as a last resort, details are shown on the risk assessment and method statement for the task involved.

Where PPE is being utilised arrangements will be made to ensure:

- PPE is readily available when required or needs replaced;

- Project team members know how to wear, maintain, report defects in and obtain replacements for personal protective equipment;
- Checks are carried out to ensure personal protective equipment is being worn correctly and that it is in good condition;
- Provisions of appropriate facilities to keep personal protective equipment in good condition when not in use;
- Recognition of the need for personal issue where health and hygiene are a factor.

The Project Team shall ensure the Contractors working on the project have HSE systems in place that comply with TEPUK's HSE Management System, specifically in respect to the incident reporting requirements as set out in the TEPUK procedures.

6.3 Reporting and Investigation

The Project team will report and investigate incidents in accordance with TEPUK Incident Reporting and Investigation Procedure. For environmental incidents, the TEPUK 'Reporting and Recording of Environmental Incidents shall apply. The Contractors will be audited to ensure that they have similar systems in place for events that do not directly involve TEPUK. Incident investigations finding will be shared as appropriate to ensure lessons are learnt and to minimise repetition of similar incidents.