Inch Cape
OFFSHORE LIMITED

Inch Cape Offshore Wind Farm

Lighting and Marking Plan

November 2024

Originator	Reviewed by	Accepted by
Adam Foster	Derek Duckett	Gavin Kelly
[Redacted]	[Redacted]	[Redacted]
Head of Renewables (Anatec)	Offshore ECoW	Offshore Consents Manager

Revision History (previous five)

Date	Rev.	Purpose of Issue	Description of revision	Initials
21/11/2024	1	For approval	Second issue. Updated Consent Plan Overview, Section 1.5 and Table 6.3 to address East Lothian Council comments.	AF/DD
24/07/2024	0	For approval	First issue	DD

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Template Revision: 1

Consent Plan Overview

Purpose and Objectives of the Plan

This Lighting and Marking Plan (LMP) has been prepared to address the specific requirements of the relevant conditions attached to the following consent documents (collectively referred to as 'the consents'):

- Section 36 Consent (dated 14th June 2023);
- Generating Station Marine Licence (MS-00010140 dated 15th June 2023); and
- Offshore Transmission Infrastructure (OfTI) Marine Licence (MS-00010593 dated 9th November 2023).

The consents have been issued to Inch Cape Wind Offshore Limited (hereafter referred to as 'ICOL'), for the construction, operation and decommissioning of the Inch Cape Offshore Wind Farm (OWF) and OfTI, (hereafter referred to as 'the Development').

This LMP has been prepared to discharge consent conditions for both the Generating Station and OfTI simultaneously.

The overall aims and objectives of the LMP are to set out the proposed marine and aviation lighting and marking for the Development. All relevant Inch Cape Contractors involved in the Inch Cape Project are required to comply with this LMP through their conditions of contract.

This document is applicable to the construction and operations and maintenance phases of the Development.

The LMP is a live document that will be reviewed regularly. LMP to be updated as required and as a minimum updated every 5 years for approval by MD-LOT in consultation with East Lothian Council. Information within this document is accurate at the time of submission, but it is recognised that amendments or updates may be required to reflect changes following consultation, changes to best practice, lessons learned, etc, prior to the end of the construction phase or operations and maintenance phase of the Development. The process by which this LMP will be reviewed is presented in Section 1.5.

Scope of the Plan

This document has been produced in line with the requirements of the consent conditions, industry standards, and best practices. The LMP conveys information on the following:

- Marine and aviation lighting and marking during the construction phase; and
- Marine and aviation lighting and marking during the operational and maintenance phase.

Plan Structure

The LMP has been structured as follows:

- Section 1: an introduction including an outline of background, objectives, and related documentation.
- Section 2: an overview of the Development including its location, parameters and timelines.
- Section 3: A list of consent conditions.
- Section 4: The guidance documentation relating to lighting and marking (marine and aviation).
- Section 5: Details of the lighting and marking to be implemented during the construction phase.
- Section 6: Details of the lighting and marking to be implemented during the operation and maintenance phase.
- Section 7: A list of references used/cited in this document.

Plan Audience

This LMP will be submitted for approval to the Scottish Ministers/Licensing Authority in consultation with other stakeholders. Once approved and the condition discharged, the LMP is intended to be referred to by personnel involved in the construction and operation of the Development. This includes ICOL personnel, contractors and subcontractors. All documentation and method statements produced in relation to the Development must incorporate the requirements and comply with this LMP.

Compliance with the LMP will be monitored by ICOL's Environmental Clerk of Works (ECoW), ICOL's Consent Team, Inch Cape appointed contractors, and Marine Directorate Licensing Operations Team (MD-LOT).

Plan Locations

Copies of this LMP will be available from the following locations:

- ICOL's Project Office, 5th Floor, 40 Princes Street, Edinburgh, EH2 2BY;

- ICOL's Marine Coordination Centre (MCC);
- The premises of any main contractors and subcontractors undertaking work on behalf of ICOL;
- ICOL's ECoW; and
- Aboard any vessels carrying out construction or operational activities for the Development.

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Acronyms & Abbreviations

Acronym	Term
AIS	Automatic Identification System
ANO	Air Navigation Order
AtoN	Aid to Navigation
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
Cd	Candela
CMS	Construction Method Statement
CoP	Construction Programme
DSLP	Design Specification and Layout Plan
EIAR	Environmental Impact Assessment Report
ERCoP	Emergency Response and Cooperation Plan
ES	Environmental Statement
Fl	Flashing
HAT	Highest Astronomical Tide
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
ICOL	Inch Cape Offshore Limited
K	Kelvin
kV	kilovolts

Acronyms & Abbreviations

Acronym	Term
km^2	Square Kilometre
LAT	Lowest Astronomical Tide
LATON	Local Aid to Navigation
LMP	Lighting and Marking Plan
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MOD	Ministry of Defence
MD-LOT	Marine Directorate Licensing Operations
NLB	Northern Lighthouse Board
Nm	Nautical Mile
NOTAM	Notice to Airmen
NSP	Navigation Safety Plan
NVIS	Night Vision Imaging System
OFCOM	Office of Communications
OfTI	Offshore Transmission Infrastructure
OfTW	Offshore Transmission Works
OMP	Operation and Maintenance Plan
OREI	Offshore Renewable Energy Installations

Acronyms & Abbreviations

Acronym	Term
OSP	Offshore Substation Platform
Radar	Radio Detection and Ranging
S	Second
SAR	Search and Rescue
SFF	Scottish Fishermen's Federation
SNH	Scottish Natural Heritage
SPS	Significant Peripheral Structure
UK	United Kingdom
UPS	Uninterruptible Power Supply
VMP	Vessel Management Plan
W	White
WTG	Wind Turbine Generator
Y	Yellow

Glossary

Defined Term	Meaning
2013 Environmental Statement (ES)	Refers to the document in which the Environmental Impact Assessment (EIA) was carried out for the Inch Cape 2014 Consent.

Glossary

2018 Environmental Impact Assessment (EIA) Report (EIAR)	Refers to the document produced in 2018 to accompany the application for Consent of the Development (granted in 2019) following a material change in design.
Development	The Inch Cape Offshore Wind Farm (the Wind Farm) and Offshore Transmission Infrastructure (OfTI) being developed by ICOL.
Development Area	The area for the Wind Farm, within which all WTGs, IACs, interconnector cables, OSP and the initial part of the Offshore Export Cable and any other associated works must be sited. As stipulated in the Crown Estate agreement for lease.
Inch Cape Offshore Transmission Infrastructure (OfTI)	Components of the Development comprising the offshore export cable and OSP which are permitted by the OfTI Marine Licence (MS-00010593).
Inch Cape Offshore Transmission Works (OfTW)	Offshore Transmission Works (i.e., construction methods) associated with Inch Cape Offshore Wind Farm.
Inch Cape Offshore Wind Farm (OWF)/the Wind Farm	A component of the Development, comprising wind turbines and their foundations and substructures, and IACs.
Inch Cape Onshore Transmission Works (OnTW)	Onshore transmission works associated with the Inch Cape Offshore Wind Farm comprising the construction, operation and decommissioning of an onshore substation, electricity cables and associated infrastructure required to export electricity from the Inch Cape Offshore Wind Farm to the National Electricity Transmission System.
Offshore Export Cables	The subsea, buried or protected electricity cables running from the offshore wind farm substation to the landfall and transmitting the electricity generated to the onshore cables for transmission onwards to the onshore substation and the electrical grid connection.

Glossary

Offshore Export Cable Corridor	The area within which the Offshore Export Cables will be laid from the OSP and up to Mean High Water Springs.
(The) Consents	Collective term used to describe the Section 36 consents and Marine Licences issued to ICOL.

1 Introduction

1.1 Background

The Inch Cape Offshore Wind Farm (the Wind Farm) and Offshore Transmission Infrastructure (OfTI), hereafter referred to as the Development, is being developed by Inch Cape Offshore Limited (ICOL).

ICOL originally applied for consent for the Development in 2013, and this was updated, and a revised application submitted in 2018. In 2013 an Environmental Statement (ES) was produced to accompany the initial application based on the original design of the Wind Farm. This was also subsequently updated in 2018 with the production of an Environmental Impact Assessment Report (EIAR) to enable the use of progressions in technology following the original consent, through a reduction in turbine numbers (fewer turbines with larger generating capacity), and reduction in associated cabling (inter-array and export cables) in order to maximise efficiencies whilst minimising environmental impacts. The EIAR updated the 2013 ES and where impacts were predicted to be less than those already assessed, a new assessment was not undertaken as the conclusions drawn in the original 2013 ES remained valid.

Section 36 and Marine Licence consents for the revised design, were granted by Scottish Ministers in 2019. Since then, ICOL has successfully sought two variations to the Section 36 and Generation Station Marine Licence to optimise wind farm efficiency and both were granted consent in June 2023 (Section 36 Variation dated 14 June 2023 and Generation Marine Licence Variation MS-00010140 dated 15 June 2023).

In 2019 a revised Marine Licence was granted for the OfTI connecting the landfall location, near Cockenzie, East Lothian, and the Inch Cape Offshore Wind Farm. A varied Marine Licence (MS-00010593), to capture changes to deposit quantities and revision to the Offshore Export Cable Corridor coordinates, was granted 9th November 2023.

A separate Marine Licence (MS-00010672 dated 15th January 2024) has also been granted for Additional Landfall Works to facilitate the construction of the export cables through the seawall.

1.2 Plan Objectives

This Lighting and Marking Plan (LMP) has been prepared to address the specific requirements of the relevant conditions in the Section 36 Consent (condition 20), Generating Station Marine Licence (MS-00010140) (condition 3.2.2.17) and OfTI Marine Licence (MS-00010593) (condition 3.2.2.16). The conditions must be discharged through approval of the Scottish Ministers prior to the commencement of offshore construction, which includes the approval of this LMP.

The objective of this document is to provide details of the lighting and marking of The Development, in accordance with relevant guidance, during construction and operation and maintenance. It is intended that in doing so, this document satisfies the relevant requirements of the Section 36 Consent,

Generating Station Marine Licence and OfTI Marine Licence.

The relevant conditions setting out the requirement for the LMP approval, and which are to be discharged by the LMP are presented in full in Table 1.1, below.

1.3 Linkages with other Consent Plans and Consent Conditions

The consent conditions require that the development of the LMP will be consistent with a number of other consent plans and consent conditions. Details of the linkages and relevant cross references are set out in Table 1.1.

It should be noted that information is not repeated across consent plans, rather, where pertinent information is available in linked consent plans, the relevant consent plans are referred to. The plans detailed below are not required for approval of this LMP but are provided for ease of reference.

Table 1.1: Lighting and Marking Plan Links with Other Consent Plans and Documents

Reference	Description and relevance to the Lighting and Marking Plan	Crossed Referenced in this Offshore Lighting and Marking Plan
Construction Method Statement (CMS)	Details the methods that will be implemented during the construction phase. The CMS is, so far as is reasonably practicable, consistent with the LMP as required under condition 10 of the Section 36 consent, condition 3.2.2.7 of the Generating Station Marine Licence and condition 3.2.2.6 of the OfTI Marine Licence.	The lighting and marking shown for the construction phase in Section 5 is consistent with the CMS.
Design Specification and Layout Plan (DSLP)	Details the final layout and associated parameters (including lighting and marking). It is noted that the relevant conditions do not explicitly state a required linkage between the DSLP and the LMP; however there is overlap between these consent plans and as such they will be consistent as far as is reasonably practicable. The DSLP is required under condition 12 of the Section 36 consent, condition 3.2.2.9 of the Generating Station Marine Licence and condition 3.2.2.8 of the OfTI Marine Licence.	The layout shown in Section 6 is consistent with that shown in the DSLP.

Reference	Description and relevance to the Lighting and Marking Plan	Crossed Referenced in this Offshore Lighting and Marking Plan
Emergency Response and Cooperation Plan (ERCoP)	Details how emergency response procedures will be implemented in cooperation with the relevant bodies. It is noted that the relevant conditions do not explicitly state a required linkage between the ERCoP and the LMP; however there is overlap between these consent plans and as such they will be consistent as far as is reasonably practicable. The ERCoP is required under condition 18 of the Section 36 consent, condition 3.2.2.15 of the Generating Station Marine Licence and condition 3.2.2.14 of the OfTI Marine Licence.	The lighting and marking shown in this LMP is consistent with that shown in the ERCoP.
Navigation Safety Plan (NSP)	Presents the measures that will be put in place to manage navigational safety. It is noted that the relevant conditions do not explicitly state a required linkage between the NSP and the LMP; however there is overlap between these consent plans and as such they will be consistent as far as is reasonably practicable. The NSP is required under condition 17 of the Section 36 consent, condition 3.2.2.14 of the Generating Station Marine Licence and condition 3.2.2.13 of the OfTI Marine Licence.	The lighting and marking shown in this LMP is consistent with that described in the NSP.
Operation and Maintenance Plan (OMP)	Sets out the procedures and good working practices for the operation and maintenance phase of the Development. The OMP is, so far as is reasonably practicable, consistent with the LMP as required under condition 16 of the Section 36 consent, condition 3.2.2.13 of the Generating Station Marine Licence and condition 3.2.2.12 of the OfTI Marine Licence.	The lighting and marking shown for the operational phase in Section 6 is consistent with the OMP.
Vessel Management Plan (VMP)	Considers the management and coordination of vessels. The VMP is, so far as is reasonably practicable, consistent with the LMP as required under condition 15 of the Section 36 consent, condition 3.2.2.12 of the Generating Station Marine Licence and condition 3.2.2.11 of the OfTI Marine Licence.	The contents of this LMP are consistent with the VMP.

1.4 Document Structure

The structure of this LMP is provided in Table 1.2, below.

Table 1.2: Lighting and Marking Plan Document Structure

Section No	Section Title	Summary of Content
1	Introduction	An introduction including an outline of background, objectives, and related documentation.
2	Wind Farm and Offshore Transmission Infrastructure (OfTI) Overview	An overview of the Development including its location, parameters and timelines.
3	Consent Conditions & Environmental Impact Assessment Report Compliance	A list of consent conditions.
4	Guidance	The guidance documentation relating to lighting and marking, marine and aviation.
5	Construction Phase	Details of the lighting and marking to be implemented during the construction phase.
6	Operations and Maintenance Phase	Details of the lighting and marking to be implemented during the operations and maintenance phase.
7	Reference Documents	A list of references used/cited in this document.

1.5 Document Control and Management of Change

This LMP is a 'live document' and will be regularly revised at intervals agreed with Scottish Ministers, to ensure that the information is kept up to date. LMP to be updated as required and as a minimum

updated every 5 years for approval by MD-LOT in consultation with East Lothian Council. Linkages exist between a number of offshore consent plans and programmes as highlighted in Table 1.1. As plans and programmes are updated, there will be a review of inter-linkages with other documents to ensure these are also updated as relevant.

It is expected that following a review, there may be a requirement to undertake a non-material or material update of the document. It is anticipated that a material change would be defined as one that fundamentally affects key information being communicated in the LMP; a change in proposed mitigation or monitoring commitments; or a change that may increase environmental risk. A non-material change would be expected to be one that is communicated for information only; does not fundamentally affect assumptions made based on previous information provided; does not result in deviation from agreed commitments; or does not increase the level of environmental risk.

Where an update is required, the Marine Directorate Licensing Operations Team (MD-LOT) will be consulted to determine whether the level of changes signifies a material change to an approved plan that requires formal consultation, or a non-material update to be approval by MD-LOT.

It is anticipated that the review and update process will be as follows:

1. Document review undertaken by ICOL (triggered by influencing factor listed above).
2. Need for an update of document communicated to MD-LOT and ICOL to inform MD-LOT whether it is deemed it as material or non-material.
3. MD-LOT to notify ICOL whether they agree with the materiality of the change (and therefore whether or not formal consultation will be required).
4. If change is considered non-material, ICOL will provide an updated LMP for MD-LOT to review, approve and make available.

Or:

a) If change is considered material, ICOL updates the LMP, and a formal consultation on the updated LMP is undertaken.

2 Wind Farm and OfTI Overview

2.1 Project Description

The Inch Cape Offshore Wind Farm will be located approximately 15 to 22 kilometres (km) (eight to 12 nautical miles (nm)) off the Angus coastline, to the east of the Firth of Tay. The Development Area is approximately 150 square kilometres (km^2) and will contain 72 Wind Turbine Generators (WTGs), one Offshore Substation Platform (OSP), 66 kilovolts (kV) inter-array cabling and the initial section of the Export Cables between the Development Area boundary and OSP.

The Offshore Export Cable Corridor will contain the Offshore Export Cables. The Offshore Export Cable Corridor will consist of two 220 kV export cables approximately 85 km long, between the landfall point at Cockenzie in East Lothian and the boundary of the Development Area, and 1.4 km across at the widest point, reducing to approximately 250 m at the landfall.

The location and extent of the Development Area and Offshore Cable Corridor is shown in Figure 2.1.

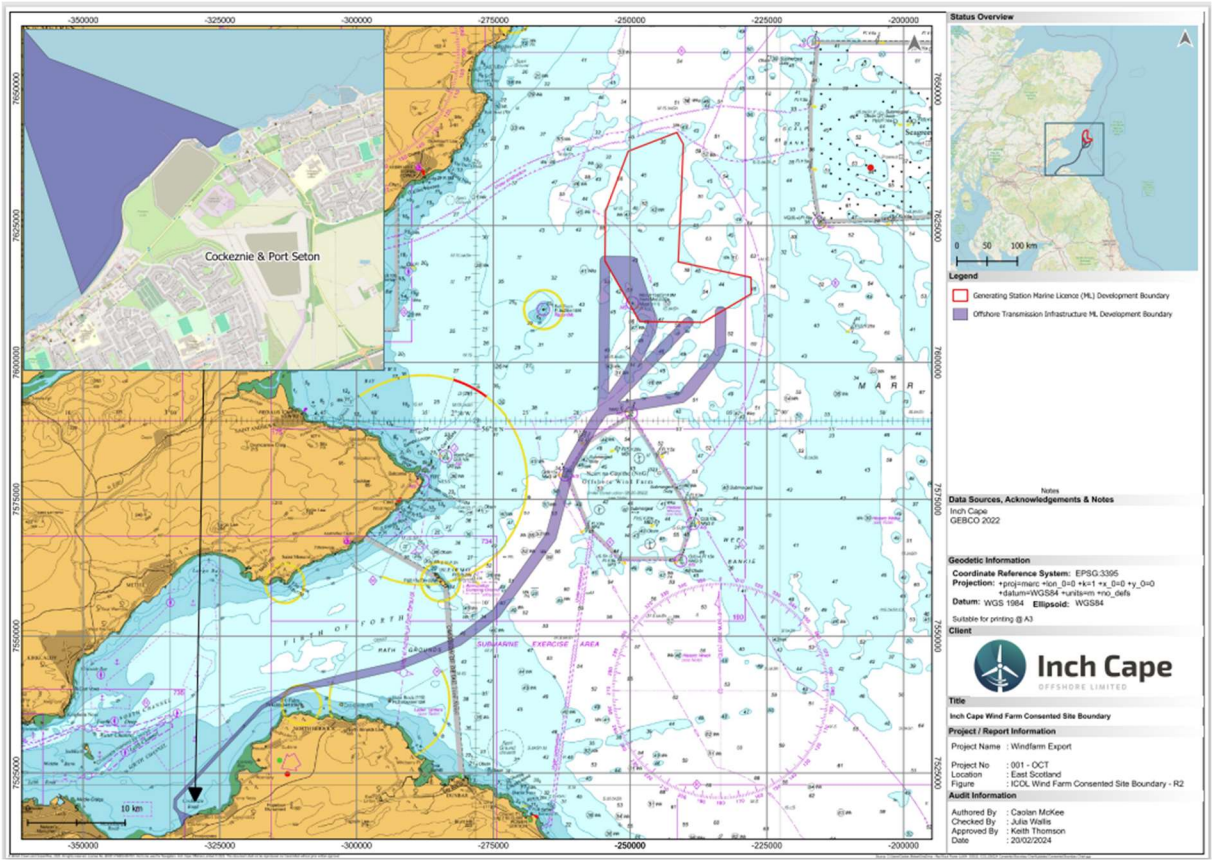

Figure 2.1: Project Location

2.2 Timing of Construction Works

Offshore construction is expected to commence in 2025 and is anticipated to take approximately 2.5 years. Details of the full programme for the construction works are provided in the Construction Programme (CoP).

3 Consent Conditions & Environmental Impact Assessment Report Compliance

At the time of submission of this LMP, the Inch Cape project benefits from the following consents:

- The S36 Consent;
- The Generation Marine Licence; and
- The OfTI.

This LMP has been prepared to satisfy the criteria of the S36 condition 20, OfTI Marine Licence conditions 3.2.2.16, 3.2.3.3 and 3.2.4.5, Generation Marine Licence condition 3.2.2.17, 3.2.3.3 and 3.2.4.5 as set out in Table 3.1.

Table 3.1 provides the relevant consent conditions, along with details of where information to address each part of the condition has been provided. In addition to the specific licence requirements for the Development, this LMP also includes information to discharge a number of other licence conditions related to the LMP and these are also included within Table 3.1.

The requirement to construct and operate the Development in accordance with the measures identified in the Application arise from specific requirements in the consents. The consents require the works be constructed in accordance with the licence, the Application and supporting Environmental Impact Assessment Report (EIAR) and related documents.

This LMP and the remaining consent plans have been put together considering the commitments made on the EIAR and corresponding consent conditions.

Table 3.1: Consent Conditions to be Discharged by this Offshore Lighting and Marking Plan

Condition Document	Condition Reference	Condition Text	Relevant Section of this Lighting and Marking Plan
Section 36	Condition 20	The company must, no later than six months prior to the Commencement of the Development, submit an LMP, in writing, to the Scottish Ministers for their written approval.	This document sets out the LMP for approval by the Scottish Ministers

Condition Document	Condition Reference	Condition Text	Relevant Section of this Lighting and Marking Plan
		Such approval may only be granted following consultation by the Scottish Ministers with Scottish Natural Heritage (SNH), Maritime and Coastguard Agency (MCA), Northern Lighthouse Board (NLB), Civil Aviation Authority (CAA), Ministry of Defence (MOD), East Lothian Council and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers.	Consultation to be undertaken by the Scottish Ministers
		The LMP must provide that the Development be lit and marked in accordance with the current CAA and MOD aviation lighting policy and guidance that is in place as at the date of the Scottish Ministers approval of the LMP, or any such other documents that may supersede this guidance prior to the approval of the LMP.	See Section 4.1 (marine) and Section 4.2 (aviation).
		The LMP must also detail the navigational lighting requirements detailed in the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Recommendation O-139 or any other documents that may supersede this guidance prior to approval of the LMP.	See Section 4.1 (marine). The latest relevant IALA guidance (G1162, IALA, 2021) has been applied.
		The final LMP must be sent to Aberdeenshire Council, Angus Council, Dundee City Council and Fife Council for information only.	A copy of the approved LMP will be provided to these bodies
Marine Licence OfTI	Condition 3.2.2.16	The Licensee must, no later than six months prior to the Commencement of the Works, submit a LMP, in writing, to the Licensing Authority for its written	This document sets out the LMP for approval by the

Condition Document	Condition Reference	Condition Text	Relevant Section of this Lighting and Marking Plan
		approval. Commencement of the Works cannot take place until such approval is granted.	Scottish Ministers
		Such approval may only be granted following consultation by the Licensing Authority with SNH, MCA, NLB, CAA, MOD, East Lothian Council 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 LMP must provide that the Works be lit and marked in accordance with the current CAA and MOD aviation lighting policy and guidance that is in place as at the date of the Licensing Authority's approval of the LMP, or any such other documents that may supersede this guidance prior to the approval of the LMP.	See Section 4.1 (marine) and Section 4.2 (aviation).
		The LMP must also detail the navigational lighting requirements detailed in the IALA Recommendation O-139 or any other documents that may supersede this guidance prior to approval of the LMP.	See Section 4.1 (marine). The latest relevant IALA guidance (G1162, IALA, 2021) has been applied.
		The final LMP must be sent to Aberdeenshire Council, Angus Council, Dundee City Council, and Fife Council for information only.	A copy of the approved LMP will be provided to these bodies.
	Condition	The Licensee must ensure that the Works are marked and lit in accordance with an approved LMP	This document sets out the LMP

Condition Document	Condition Reference	Condition Text	Relevant Section of this Lighting and Marking Plan
	3.2.3.3	at all times. The LMP and any subsequent amendments must be approved by the Licensing Authority following consultation with the SNH, NLB, MCA, CAA, Scottish Fishermen's Federation (SFF), East Lothian Council and the MOD.	for approval by the Scottish Ministers. Consultation to be undertaken by the Scottish Ministers
		The display of unauthorised marks or lights is prohibited.	Only Aids to Navigation (AtoNs) agreed through this LMP will be implemented.
		The Licensee must ensure that the Works are marked and lit in accordance with IALA Recommendation O-139.	See Section 4.1 (marine). The latest relevant IALA guidance (G1162, IALA, 2021) has been applied.
	Condition 3.2.4.5	The Licensee must ensure that the Works are marked and lit in accordance with an approved LMP at all times. The LMP and any subsequent amendments must be approved by the Licensing Authority following consultation with the SNH, NLB, MCA, CAA, SFF, East Lothian Council and the MOD.	This document sets out the LMP for approval by the Scottish Ministers. Consultation to be undertaken by the Scottish Ministers

Condition Document	Condition Reference	Condition Text	Relevant Section of this Lighting and Marking Plan
		The display of unauthorised marks or lights is prohibited.	Only AtoNs agreed through this LMP will be implemented.
		The Licensee must ensure that the Works are marked and lit in accordance with International IALA Recommendation O-139.	See Section 4.1 (marine). The latest relevant IALA guidance (G1162, IALA, 2021) has been applied.
Generating Marine Licence	Condition 3.2.2.17	The Licensee must, no later than six months prior to the Commencement of the Works, submit a LMP, in writing, to the Licensing Authority for its written approval. Commencement of the Works cannot take place until such approval is granted.	This document sets out the LMP for approval by the Scottish Ministers
		Such approval may only be granted following consultation by the Licensing Authority with SNH, MCA, NLB, CAA, MOD, East Lothian Council 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

Condition Document	Condition Reference	Condition Text	Relevant Section of this Lighting and Marking Plan
		The LMP must provide that the Works be lit and marked in accordance with the current CAA and MOD aviation lighting policy and guidance that is in place as at the date of the Licensing Authority's approval of the LMP, or any such other documents that may supersede this guidance prior to the approval of the LMP.	See Section 4.1 (marine) and Section 4.2 (aviation).
		The LMP must also detail the navigational lighting requirements detailed in the IALA Recommendation O-139 or any other documents that may supersede this guidance prior to approval of the LMP.	See Section 4.1 (marine) and marking. The latest relevant IALA guidance (G1162, IALA, 2021) has been applied.
		The final LMP must be sent to Aberdeenshire Council, Angus Council, Dundee City Council, and Fife Council for information only.	A copy of the approved LMP will be provided to these bodies.
	Condition 3.2.3.3	The Licensee must ensure that the Works are marked and lit in accordance with an approved LMP at all times. The LMP and any subsequent amendments must be approved by the Licensing Authority following consultation with the SNH, NLB, MCA, CAA, East Lothian Council and the MOD.	This document sets out the LMP for approval by the Scottish Ministers. Consultation to be undertaken by the Scottish Ministers

Condition Document	Condition Reference	Condition Text	Relevant Section of this Lighting and Marking Plan
		The display of unauthorised marks or lights is prohibited.	Only AtoNs agreed through this LMP will be implemented.
		The Licensee must ensure that the Works are marked and lit in accordance with IALA Recommendation O-139.	See Section 4.1 (marine). The latest relevant IALA guidance (G1162, IALA, 2021) has been applied.
		Unless otherwise approved by the Licensing Authority, the LMP must include but not be limited to: a. the lighting requirements of the MCA, NLB, CAA and MOD; b. that the boundary WTG, where they are more than 900 metre (m) apart, must be lit with a single 2000 candela (cd), red aviation light, flashing Morse 'W' in unison with all other boundary WTG; c. that all other WTG must be fitted with a fixed single red 200cd aviation light for Search and Rescue (SAR) purposes; and d. that all WTG aviation lights should be compatible with Night Vision Imaging Systems (NVISs).	a. See Section 4. b. See Section 6.2. c. See Section 6.2. d. See Section 6.2.

Condition Document	Condition Reference	Condition Text	Relevant Section of this Lighting and Marking Plan
		The Licensee must ensure that during the construction phase the Site boundary is marked by a mixture of lit Cardinal Mark and lit Special Mark buoys, to be agreed with NLB. These buoys must be a minimum of 3m in diameter at the waterline, have a focal plane of at least 3m above the waterline and be fitted with a topmark and Radio Detection and Ranging (Radar) reflector. The light range on these buoys must be 5nm. Automatic Identification System (AIS) AtoN must be fitted to Cardinal Marks.	See Section 5. Buoyage requirements including types, locations, specifications and use of AIS will be as directed by NLB.
	Condition 3.2.4.5	The Licensee must ensure that the Works are marked and lit in accordance with an approved LMP at all times. The LMP and any subsequent amendments must be approved by the Licensing Authority following consultation with the SNH, NLB, MCA, CAA, East Lothian Council and the MOD.	This document sets out the LMP for approval by the Scottish Ministers. Consultation to be undertaken by the Scottish Ministers
		The display of unauthorised marks or lights is prohibited.	Only AtoNs agreed through this LMP will be implemented.

Condition Document	Condition Reference	Condition Text	Relevant Section of this Lighting and Marking Plan
		The Licensee must ensure that the Works are marked and lit in accordance with IALA Recommendation O-139	See Section 4.1 (marine). The latest relevant IALA guidance (G1162, IALA, 2021) has been applied.

4 Guidance

4.1 Marine

The marine navigation lighting and marking detailed in Section 5 and 6 abides by the requirements in the following guidance documents:

- IALA O-139 Recommendations on the Marking of Man-made Offshore Structures (IALA, 2021 (a)) and G1162 Guidance on the Marking of Man-made Offshore Structures (IALA, 2021 (b)).
- IALA R1001 – The IALA Maritime Buoyage System. (IALA, 2020).
- MCA Marine Guidance Note (MGN) 654 and Annexes – Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021).
- Guidelines for the Management of Local Lighthouse Authority Aids to Navigation (NLB, 2018).

4.2 Aviation

The aviation lighting and marking detailed in Section 4.2 abides by the requirements set out on the following guidance documents:

- CAA – The Air Navigation Order (ANO) (CAA, 2016 (a)) and Civil Aviation Publication (CAP) 393 (CAA, 2021 (b))
- CAA CAP 764 – Policy and Guidelines on Wind Turbines (CAA, 2016 (b)).
- CAA CAP 437 – Standards for Offshore Helicopter Landing Areas (CAA, 2021 (a)).
- MCA MGN 654 and Annexes – Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021).
- Ministry of Defence (MOD) Obstruction Lighting Guidance (MOD, 2020).

5 Construction Phase

Lighting and marking to be implemented during the construction phase is summarised in Table 5.1. It is noted that there will be no specific aviation lighting and marking implemented during the construction phase, however relevant information of the development will be promulgated to aviation stakeholders as required under the relevant CAA guidance.

Table 5.1 includes a guidance column, which lists the relevant guidance / stakeholder to each lighting and marking aspect where appropriate and where the full technical specifications required by the

relevant stakeholders can be located.

Figure 5.1 sets out the positions of the construction buoyage, with the associated coordinates and specifications then presented in Table 5.2.

All buoyage for the construction phase will meet the following IALA specifications:

- Radar Reflectors;
- Focal Plane 3-5 m above the waterline;
- Range 5 nm; and
- Minimum 3m in diameter at the waterline.

As required, ICOL will seek statutory sanction from NLB prior to deployment of any Aids to Navigation (AtoNs). The construction buoyage will be deployed at least four weeks prior to the commencement of construction. See Section 6.1.1 for procedures in cases of AtoN failure.

Table 5.1 Construction Phase Lighting and Marking Summary

Lighting and Marking Aspect	Relevant Structures	Specifications	Figure Illustration	Relevant Guidance or Stakeholder Requirement
Temporary Construction Lighting WTG foundations and OSP	All structures	• Flashing (Fl) Yellow (Y) 2.5 seconds (s). • 360° visibility (multiple lights may be required). • At least 2nm range.	N/A	Industry Standard[1]
Construction Buoyage – Numbers and Types	N/A	• 1 x north cardinal broadcasting via AIS • 1 x east cardinal broadcasting via AIS • 2 x south cardinals, one broadcasting via AIS • 1 x west cardinal broadcasting via AIS • 6 x special marks • Construction buoyage will be established at least four weeks prior to the start of construction. • Construction buoyage may need to be relocated, in consultation with NLB, when vessel types (i.e., anchor spreads) are confirmed.	Figure 5.1	Standard NLB Requirement IALA R1001

[1] Temporary lighting is not a stakeholder or guidance requirement however represents an industry standard mitigation during the construction phase.

Lighting and Marking Aspect	Relevant Structures	Specifications	Figure Illustration	Relevant Guidance or Stakeholder Requirement
		• Each buoy will be clearly identifiable via a physical name marking on the buoy that will include a clear reference to the Inch Cape project. Any buoys transmitting via AIS will also include this name in the transmission.		
Construction Buoyage removal	N/A	• The approval of the operational lighting and marking on the structures by NLB will mark the removal of the construction buoyage. This will be written approval.	N/A	IALA R1001

Lighting and Marking of OSP	OSP	• In the event that the OSP is left isolated over winter, it will display the following AtoNs:
		  ○ White light, Mo (U) 15s, minimum nominal range of 10nm.
		  ○ Fog signal with character Mo (U) 30s, range of 2nm.
		  ○ AIS AtoN.
		• Once construction timelines are fully defined, the need for and duration of above will be agreed with the NLB.
				IALA G1162
				Agreed with MCA and NLB

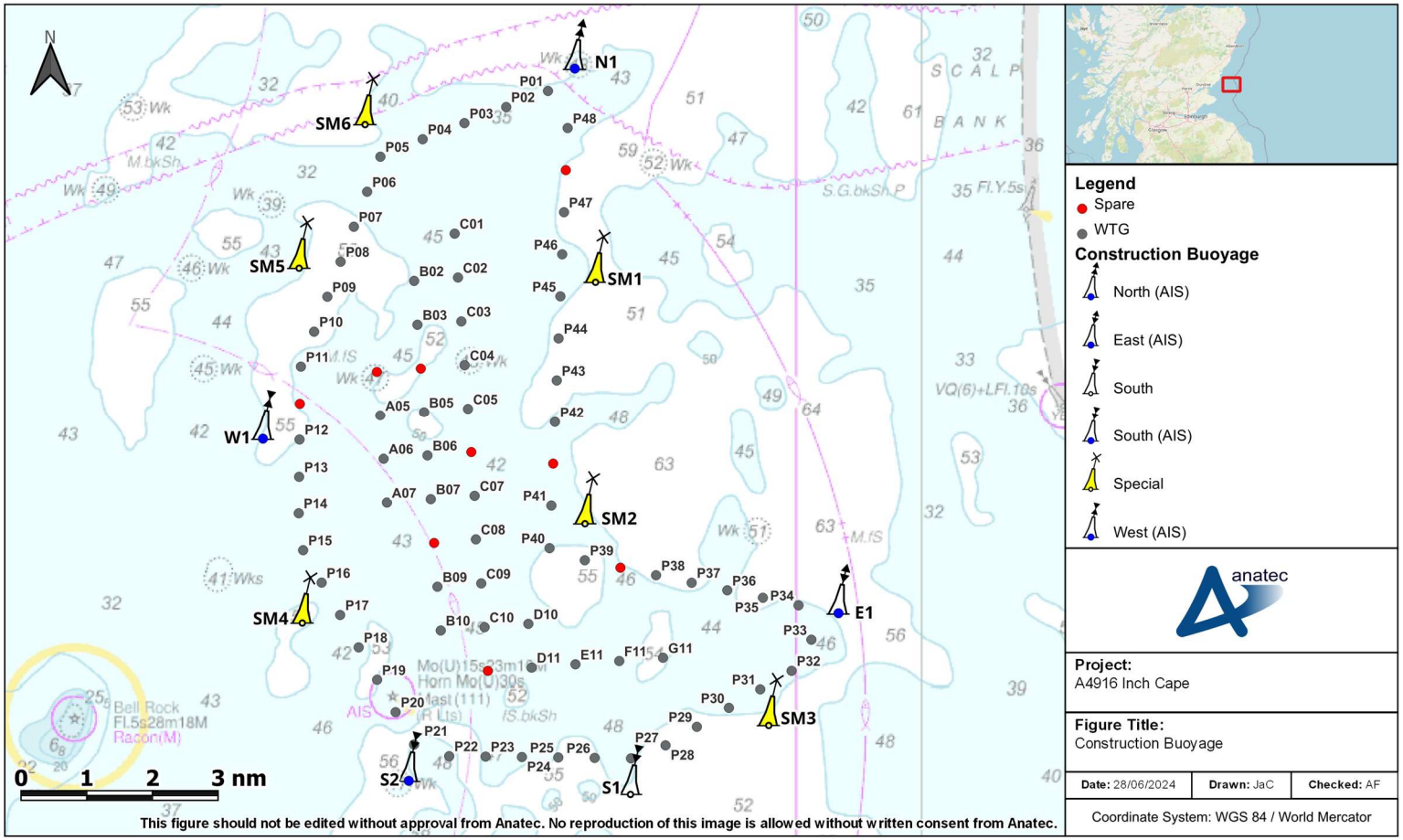

Figure 5.1: Construction Buoyage

Table 5.2: Construction Buoyage Locations

Buoy	ID	Location		Light and Top Mark Specification
		Latitude (Degrees Minutes Seconds (DDMMSS))	Longitude (DDMMSS)	
North Cardinal	N1	56° 35’ 53.88” N	002° 09’ 27.25” W	• Pillar shaped with a north cardinal shaped topmark • Exhibiting a Quick (Q) White (W) light character; • Category 1 Availability - 99.8% (IALA 2011). • AIS AtoN (Category 3 Availability - 97.0%).
Special Mark	SM1	56° 32’ 40.58” N	002° 08’ 52.75” W	• Pillar shaped with a yellow ‘x’ shaped topmark • Exhibiting a Fl Y 5s light character • Category 1 Availability - 99.8%
Special Mark	SM2	56° 29’ 0.35” N	002° 09’ 10.07” W	• Pillar shaped with a yellow ‘x’ shaped topmark • Exhibiting a Fl Y 5s light character • Category 1 Availability - 99.8%

Buoy	ID	Location		Light and Top Mark Specification
		Latitude (Degrees Minutes Seconds (DDMMSS))	Longitude (DDMMSS)	
East Cardinal	E1	56° 27’ 38.35” N	002° 02’ 13.45” W	• Pillar shaped with an east cardinal shaped topmark • Exhibiting a Very (V) Q (3) 5 s W light character; • Category 1 Availability - 99.8% (IALA 2011). • AIS AtoN (Category 3 Availability - 97.0%).
Special Mark	SM3	56° 25’ 56.68” N	002° 04’ 07.89” W	• Pillar shaped with a yellow ‘x’ shaped topmark • Exhibiting a Fl Y 5s light character • Category 1 Availability - 99.8%
South Cardinal	S1	56° 24’ 53.83” N	002° 07’ 55.28” W	• Pillar shaped with a south cardinal shaped topmark • Exhibiting a Quick (Q) (6) + L Fl 15s W light character. • Category 1 Availability - 99.8%
South Cardinal	S2	56° 25’ 5.69” N	002° 14’ 00.28” W	• Pillar shaped with a south cardinal shaped topmark

Buoy	ID	Location		Light and Top Mark Specification
		Latitude (Degrees Minutes Seconds (DDMMSS))	Longitude (DDMMSS)	
				• Exhibiting a Very Quick (VQ) (6) + L Fl 10s W light character. • Category 1 Availability - 99.8% • AIS AtoN (Category 3 Availability - 97.0%).
Special Mark	SM4	56° 27’ 29.99” N	002° 16’ 55.12” W	• Pillar shaped with a yellow ‘x’ shaped topmark • Exhibiting a Fl Y 5s light character • Category 1 Availability - 99.8%
West Cardinal	W1	56° 30’ 17.19” N	002° 18’ 00.16” W	• Pillar shaped with a west cardinal shaped topmark • Q (9) 15s or V Quick (9) 10s W light • Category 1 Availability - 99.8% • AIS AtoN (Category 3 Availability - 97.0%).
Special Mark	SM5	56° 32’ 53.32” N	002° 17’ 00.37” W	• Pillar shaped with a yellow ‘x’ shaped topmark • Exhibiting a Fl Y 5s light character

Buoy	ID	Location		Light and Top Mark Specification
		Latitude (Degrees Minutes Seconds (DDMMSS))	Longitude (DDMMSS)	
				• Category 1 Availability - 99.8%
Special Mark	SM6	56° 35’ 3.66” N	002° 15’ 11.88” W	• Pillar shaped with a yellow ‘x’ shaped topmark • Exhibiting a Fl Y 5s light character • Category 1 Availability - 99.8%

6 Operations and Maintenance Phase

6.1 Marine

The marine lighting and marking to be implemented during the operational phase is detailed in Table 6.1 (WTGs) and Table 6.2 (OSP). These includes a guidance column, which lists the guidance relevant to each lighting and marking aspect where appropriate (see also Section 4.1).

The overarching marine lighting and marking scheme is then presented in Figure 6.1 relative to the approved layout.

In the event that there is an unviable position on the periphery of the proposed layout and the use of a back up is required (i.e., a peripheral WTG is not installed), consultation would be undertaken with the NLB to determine if any aspects of the marine LMP scheme require amendments.

As required, ICOL will seek statutory sanction from NLB prior to deployment of any AtoNs.

6.1.1 Failure of Lighting and Marking

A requirement of the management of AtoN within Scottish waters is to report navigation failures to NLB (noting this does not include temporary lighting), as set out within Guidelines for the Management of Local Lighthouse Authority Aids to Navigation (NLB, 2018). This is done through a Local Aid to Navigation (LATON) Availability Reporting database. The system is administered and managed by the NLB in order to facilitate wind farm operators to fulfil their responsibility to maintain records of AtoN availability and to provide summaries of these to the NLB. This should be undertaken in the event of any failure or loss of availability and should be carried out during both the construction and operational phases as per the required availability standards (availability standards are detailed in Table 6.1 and Table 6.2).

In the event of a significant loss of an AtoN such that a significant risk to navigation is considered likely to occur, consultation would be undertaken with the NLB and MCA to determine the need for any additional mitigation.

Table 6.1: Operational WTGs' Marine Lighting and Marking Summary

Lighting and Marking Aspect	Relevant Structures	Specifications	Figure Illustration	Relevant Guidance
Significant Peripheral Structure (SPS) Lighting	Selected periphery structures: P01, P05, P11, P15, P21, P27, P30, P33, P37, P40, P43, P47	• WTGs located on a corner or other significant point of the layout periphery. • Each SPS will have 360° visibility, with flashing IALA special mark characteristics (Fl.Y.5 s) and with a range of not less than 5 nm. • IALA Category 1 (> 99.8% availability). • All SPS lights shall be synchronised. • As required under IALA G1162, lights on WTGs shall be located at least 6 m above Highest Astronomical Tide (HAT) and below the arc of the rotor	Figure 6.1	IALA O-139 / G1162 and standard requirement

Lighting and Marking Aspect	Relevant Structures	Specifications	Figure Illustration	Relevant Guidance
		blades[2]. • Uninterruptible Power Supply (UPS) of 96 hours[3].		
Sound signals	Selected periphery structures: P01, P05, P11, P15, P21, P27, P30, P33, P37,	• Foghorns must face outward into open sea and sound signals must be unimpeded by the tower. • IALA Category 3 (at least 97.0% availability) over a rolling three-	Figure 6.1	IALA O-139 / G1162 and standard requirement

[2] Light to be placed on handrails, anticipated to be between 18 and 22.5m from Lowest Astronomical Tide (LAT).
[3] Within these 96 hours either the Aid to Navigation will be made operational again, or, if this is not possible, a longer-term solution/plan shall be executed to allow mariners to be made aware of the site. UPS may be a battery supply or independent power supply to the normal power supply.

Lighting and Marking Aspect	Relevant Structures	Specifications	Figure Illustration	Relevant Guidance
	P40, P43, P47	year period. • Each WTG fitted with a sound signal will also have a visibility meter. Sound signals will turn on when visibility is detected to be less than 2 nm. • Remote testing required.		
Visibility meters	Selected periphery structures: P01, P05, P11, P15, P21, P27, P30, P33, P37, P40, P43, P47	• Change in visibility will trigger all fog signals across the entire array. • Signal to activate when visibility is less than 2 nm. • Visibility meters should be installed as per manufacturers requirements.	Figure 6.1	IALA O-139 / G1162 and standard requirement
AIS	Selected periphery	• Availability of not less than 97.0% (IALA Category 3).	N/A	Regulator Requirement

Lighting and Marking Aspect	Relevant Structures	Specifications	Figure Illustration	Relevant Guidance
	structures: P01, P11, P21, P33	• Office of Communications (OFCOM) Licence is required for the AIS transmission. • Synthetic AIS AtoNs will be used, hosted from the OSP. • UPS of 96 hours.		
ID Marker Boards	All WTGs	• Lit via low-level baffled lighting: ○ Uniformity factor is suggested to be better than 1:4. ○ Mean luminance should be between 5cd/ square metre (m^2) and 10 cd/m^2. ○ Colour temperature should be between 2500 Kelvin (K) and	N/A	MGN 654

Lighting and Marking Aspect	Relevant Structures	Specifications	Figure Illustration	Relevant Guidance
		3500 K. • Black letters on yellow background (form of letters to be the site identifier “IC” followed by a space and then a three-digit sequence indicating the WTG row letter and number e.g. “A01” and not “A1”) • 360° visibility. • ID markings will be minimum of 500 millimetres (mm) in height. • ID marking will be on boards.		
WTG Paint	All WTGs	• Traffic yellow (RAL 1023) from	N/A	IALA R139/G1162 and standard requirement

Lighting and Marking Aspect	Relevant Structures	Specifications	Figure Illustration	Relevant Guidance
		HAT up to between[4] 18 and 24 m above HAT[5]). • Light grey (RAL 7035) upwards of between 18 and 24 m above HAT.		

[4] Range due to potential for two different types of foundations to be used across site.
[5] It is noted that handrails, ladders, boat landings, and other working areas may potentially be painted but will not be maintained (given wear and tear) as part of the process.

Table 6.2: Operational Phase OSPs' Marine Lighting and Marking Summary

Lighting and Marking Aspect	Specifications	Figure Illustrations	Relevant Guidance
ID Marker Boards	• Lit via low-level baffled lighting: ○ Uniformity factor is suggested to be better than 1:4 ○ Mean luminance should be between 5 cd/m^2 and 10 cd/m^2 ○ Colour temperature should be between 2500 K and 3500 K • Black letters on yellow background (letter height of 1m). • 360° visibility.	N/A	MGN 654
OSP Paint	• Traffic yellow (RAL 1023) from HAT to between 15 and 20m above HAT. • Topside Light Grey (RAL 7035) or other non-reflective grey materials. Excluding topside structures such as work cabins, cranes, ladders, and other working areas.	N/A	IALA R139/G1162 and standard requirement

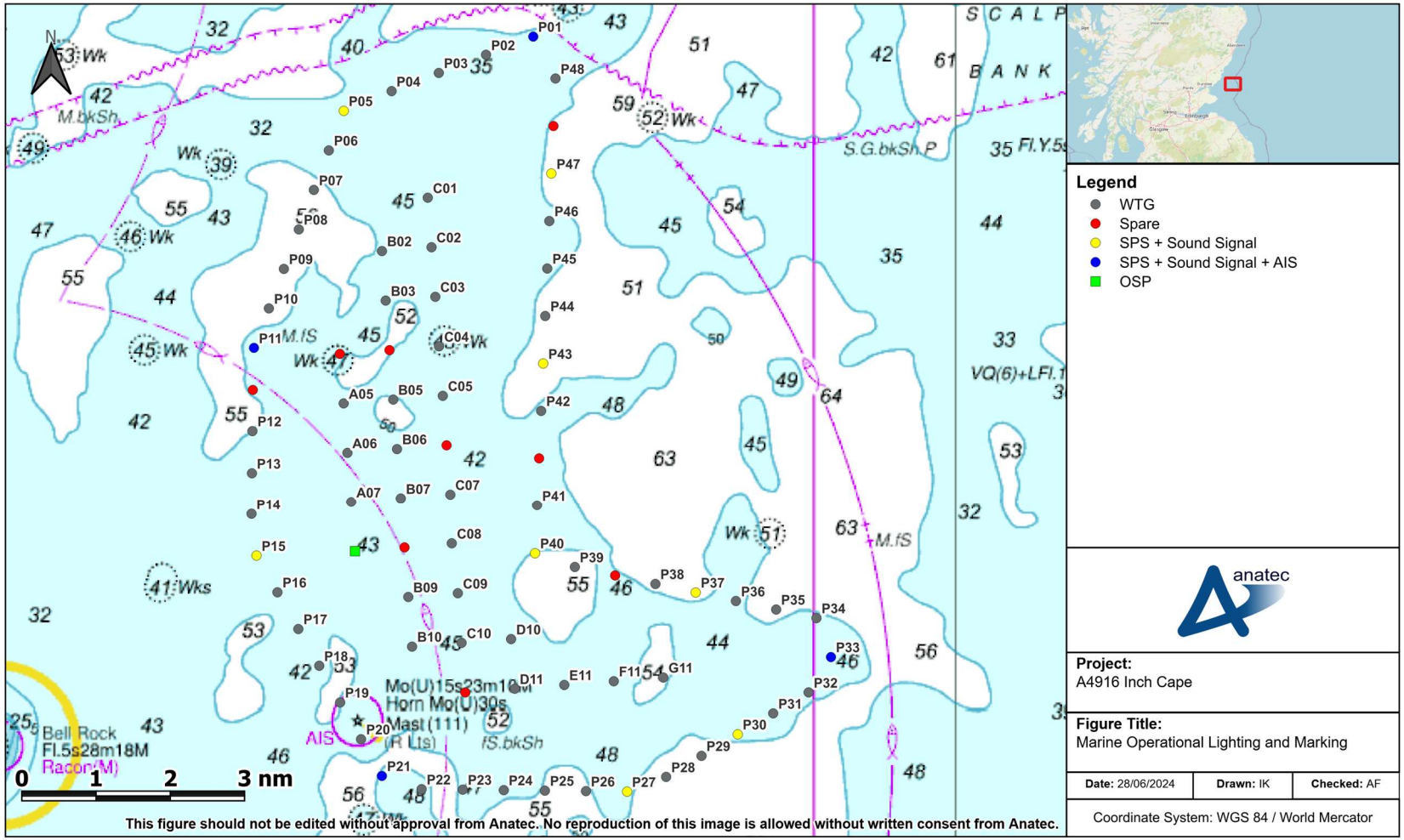

Figure 6.1: Marine Operational Lighting and Marking

6.2 Aviation

Aviation lighting and marking to be implemented during the operations phase is summarised in Table 6.3 for the WTGs and Table 6.4 for the OSP. These include a guidance column, which lists the guidance relevant to each aviation lighting and marking aspect where appropriate (guidance is also detailed in Section 4.2).

The overarching aviation lighting and marking scheme is then presented in Figure 6.2.

In the event that an unviable position is on the periphery of the proposed layout and use of a back up is required (meaning that a peripheral WTG shown in Figure 6.2 is not installed), consultation would be undertaken with the CAA to determine if any aspects of the aviation LMP scheme require updating.

6.2.1 Failure of Aviation Lighting

The ANO (CAA, 2016) states 'In the event of the failure of any light which is required by this article to be displayed by night the person in charge must repair or replace the light as soon as reasonably practicable."

It is accepted that there may be occasions when meteorological or sea conditions prohibit the safe transport of personnel for repair tasks. Furthermore, there may be fault conditions that are wider ranging and would take longer to diagnose or repair. In such cases, international standards and recommended practices require the issue of a Notice to Airmen (NOTAM).

The CAA's Directorate of Airspace Policy considers the operator of an offshore wind farm as an appropriate person for the request of a NOTAM relating to the lighting of their wind farm. Should the anticipated outage be greater than 36 hours, the Wind Farm shall request a NOTAM to be issued by informing the NOTAM section of the UK Aeronautical Information Service as soon as possible. Contact is the CAA's Airspace Regulation (AROps@caa.co.uk / 0207 453 6599).

Upon completion of the remedial works, the Aeronautical Information Service shall be notified as soon as possible to enable a cancellation to be issued.

If an outage is expected to last longer than 14 days, then the CAA shall also be notified directly to discuss any issues that may arise and longer-term strategies.

Table 6.3: Operational Phase WTGs' Aviation Lighting and Marking Summary

Lighting and Marking Aspect	Relevant WTGs	Specifications	Figure Illustration	Relevant Guidance
Aviation Warning Lighting	All peripheral WTGs, corresponding to all IDs containing the letter "P". Includes any utilised spare positions on the periphery.	• Red 2,000 cd (+/- 25%) light displayed at night[6]. • Dimmable to 200 cd when visibility is greater than 5 km in all directions at night. • Off during the day. • Synchronised flashing Morse 'W'. • Capable of being switched off at the request of the MCA during SAR operations (alternate red light used for SAR purposes). • 360° visibility. • Compatibility with NVIS of infrared wavelength between 800nm and 900 nm. • UPS of 8 hours required to maintain all aviation warning lights[7].	Figure 6.2	ANO (CAA, 2016 (a)) CAP 764 (CAA, 2016 (b)) MGN 654 SAR Annex 5 (MCA, 2021)

[6] Definition of night / day as per ANO (CAA, 2016 (a)). 2,000 cd

[7] Within these 8 hours either the Aids to Navigation will again be made operational, or if this is not possible, a longer term solution/plan will be executed to allow aviators to be made aware of the site.

Lighting and Marking Aspect	Relevant WTGs	Specifications	Figure Illustration	Relevant Guidance
Aviation Warning Lighting Visibility Meters	Specific peripheral WTGs: P01, P11, P21, P33	• Intensity: 2,000 cd when visibility < 5 km in any direction. • Intensity: 200 cd when visibility ≥ 5 km in all directions.	N/A	CAA standard requirement CAP 764
SAR lights	All WTGs	• Red 200 cd light. • Steady when in use at MCA request, switched off otherwise. • 360° visibility. • Compatible with NVIS of infrared wavelength between 800 nm and 900 nm.	Figure 6.2	MGN 654 SAR Annex 5
Green Heli-hoist Light	All WTGs	• Low intensity green light. • 360° visibility. • Light off when WTG is not safe for heli-hoist operations. • Flashing when WTG is being prepared for heli-hoist operation. • Steady when WTG is ready for heli-hoist operation. • Intensity: +2 to +10°: 365 cd or 115 cd. • Intensity: >10 to +90°: 122 cd or 38 cd.	N/A	CAP 437

Lighting and Marking Aspect	Relevant WTGs	Specifications	Figure Illustration	Relevant Guidance
Blade Markings	All WTGs	• Three red marks (preferably dots) at 10, 20, and 30m intervals from the root of the blade. • Marks to be placed near the trailing edge of the blade, allowing visibility when blades are feathered and parked at Y or offset Y (one or two blades angled forward into the wind) positions, so the marks lie upwards in view of the helicopter pilot. • At least 600 mm in diameter. • Direct consultation will be undertaken with the MCA if a variation to this requirement is needed.	N/A	MGN 654 SAR Annex 5
Blade Tip Marking	All WTGs	• From blade tip to a point on the blade corresponding to 2% of the blade length when measured from tip. In line with MGN 654, the final design will be confirmed with the MCA noting lighting protection may mean the tip and part of blade leading edge cannot be painted. • Direct consultation will be undertaken with the MCA if a variation to this requirement is needed.	N/A	MGN 654 SAR Annex 5
ID Marking	All WTGs	• ID numbers will be marked on the WTG nacelle roofs. • Not less than 1.5 m in height, with proportional width.	N/A	MGN 654 SAR Annex 5 CAP 764

Lighting and Marking Aspect	Relevant WTGs	Specifications	Figure Illustration	Relevant Guidance
Hoist Area Marking	Are not covered within the LMP but should meet the standard set out in the following guidance documents and in consultation with the appropriate authorities: • CAA CAP 764 – Policy and Guidelines on Wind Turbines (CAA, 2016 (b)) • CAA CAP 437 – Standards for Offshore Helicopter Landing Areas (CAA, 2021 (a))			

Table 6.4: Operational Phase OSPs' Aviation Lighting and Marking Summary

Lighting and Marking Aspect	Specifications	Figure Illustration	Relevant Guidance
SAR Lights	• Red 200 cd light. • Steady when in use at MCA request, switched off otherwise. • 360° visibility. • Compatible with NVIS of infrared wavelength between 800 nm and 900 nm.	Figure 6.2	MGN 654 SAR Annex 5
OSP ID Marking	• ID numbers will be marked on the OSP topside. • Not less than 1.5 m in height with proportional width.	N/A	MGN 654 SAR Annex 5 CAP 764

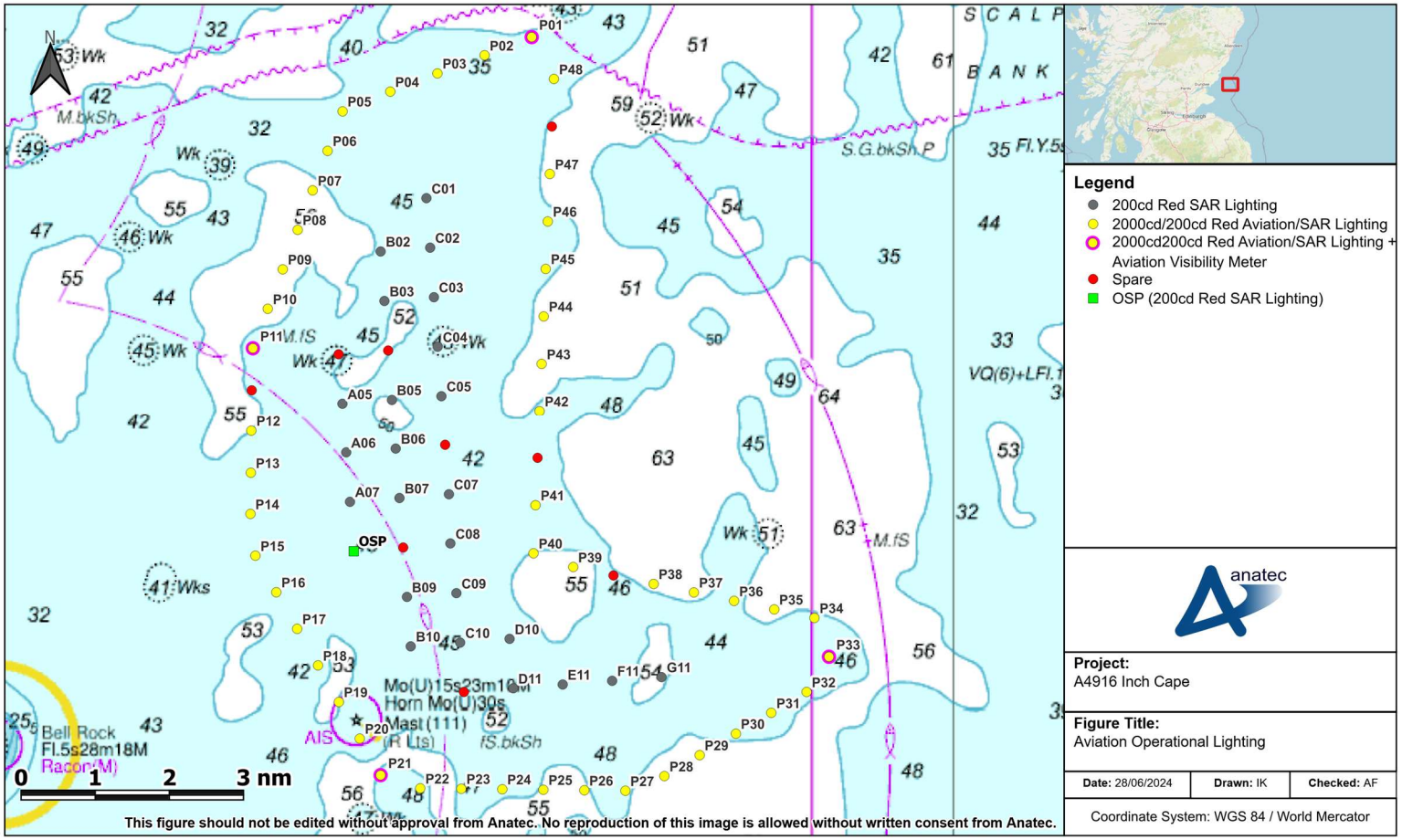

Figure 6.2: Aviation Operational Lighting

7 Reference Documents

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