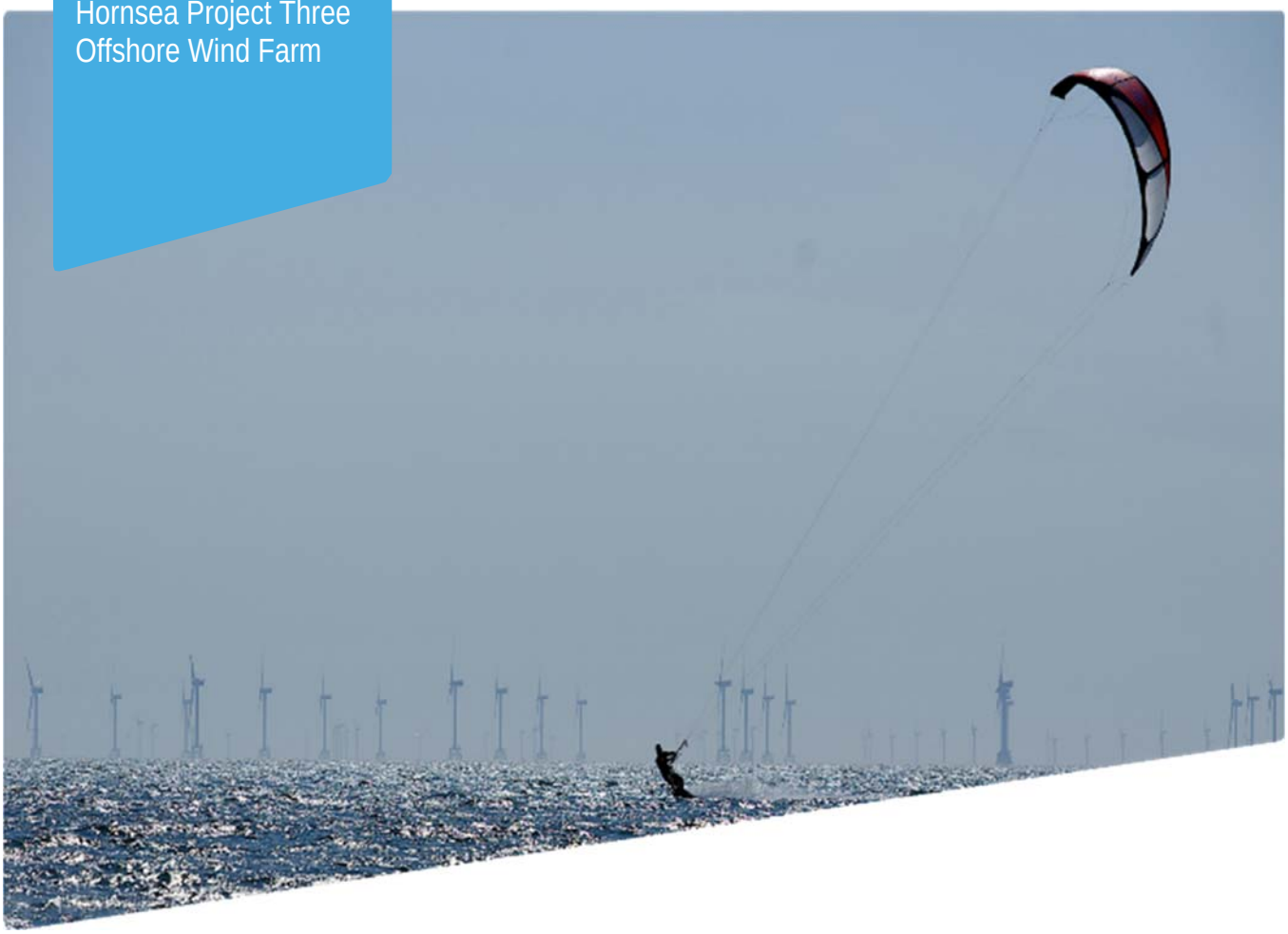
Hornsea Project Three
Offshore Wind Farm



Hornsea Project Three

Offshore Wind Farm

Appendix 30 submission to deadline 7 – Aviation Workshop Draft Minutes – Helicopter Operators

Date: March 2019

Hornsea 3
Offshore Wind Farm

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Appendix 30 submission to deadline 7 – Aviation Workshop Draft Minutes – Helicopter Operators

Ørsted

5 Howick Place,

London, SW1P 1WG

Front cover picture: Kite surfer near a UK offshore wind farm © Ørsted Hornsea Project Three (UK) Ltd., 2018.

Table of Contents

1. Introduction

1.1 The Applicant and Spirit Energy met with Southern North Sea helicopter operators on February 27, 2019. The purpose of the meeting was to agree the assumptions used to inform the aviation assessments presented by the Applicant in regard to the potential effect of Hornsea Three on helicopter access to the Spirit Energy operated platforms.

1.2 The slides presented by the Applicant as an aid to the discussion are included as Annex 1 to this Appendix. The draft meeting summary makes reference to the slides included as Annex 1.

2. Key points from Helicopter Operators meeting 27 February 2019

Key points from aviation meeting 27 February 2019

Meeting Objectives

- To understand what approaches helicopter operators will be able to continue to fly the Chiswick and Grove platforms with Hornsea Three and under what meteorological conditions these approaches will be flown.
- To understand what approaches helicopter operators consider may be restricted as a result of Hornsea Three.
- To discuss alternative flight paths which could be flown to the Chiswick and Grove platforms which would reduce any restrictions on access arising as a result of Hornsea Three, and to consider how technology can be used to enhance safety and operations.

Slide 13 ARA

This slide is correct – with exception 60knots is over helideck and gusts. VMC should read and not and / or

Slide 14 ARA

- This slide is correct – with exception CHC fly Intermediate Fix 7nm and FAF 5nm (CHC OM) not 6 and 4, as per the EASA Guidance. Other operators fly EASA profile.
- Up to a 15-degree drift angle is allowed (CHC OMA, other operators did not disagree) . This equates to a 30-degree offset from the wind with 30 knots of wind.
- MAP turn is a minimum of 30 degrees but can turn more.

Slide 15 En Route descent

- This slide is correct – with exception VMC should read and not and/or.
- En route is preferred approach. When weather minima dictate an ARA is flown.
- A captain can choose to change to an ARA.

Slide 16 Shuttle and circling flights

- Circling approaches can be flown. With the exception of a higher MDH, they follow the same approach profile and so should be considered as a subset of the ARA procedure.
- Circling approach can be flown down wind or cross wind and then circle to land into wind.

- Flight can be made to Chiswick and then visual shuttle to wells. Space to turn.

Other topics

- Departures: A turn away from the array can be made at 1,000 ft 1,000 ft coincides with the end of the Second Sector OEI Climb.
- Logistics: Dictated by the client not the helicopter operator.

Slide 17 Restricted approaches as a result of Hornsea Three

Approach	Restriction due to Hornsea Three
VFR	No (day) Night visual gate of 2 nm required and must be lined up by 2nm. No night flights are currently flown inside wind farms.
ARA	Yes – when weather minima require ARA and wind dictates approach from east over wind farm
En Route	No (day) Night visual stabilised gate of 1/2 nm required and must be lined up by 2nm .
Shuttle	No
Circle	ARA criteria apply. The installation has to be visual by the MAP and kept in sight at all times.

Slide 17 Alternative arrangements to reduce any restricted access

Topics agreed for consideration	Actions
PinS – future for aviation CHC AW139s are RNP 0.3 approved. LPV minima is most preferred by CHC.	To be discussed with Osprey and others to define what is practical.
Footprint	MP to draw footprint of each available approach. This to be shared with helicopter operators for their input into effect of Hornsea Three on each footprint. Orsted/Spirit to calculate impact on operation of each restriction.

Hornsea Project Three

Aviation Workshop

Proximity to Chiswick and Grove platform

Ørsted

27th February 2019

Attendees

Company	Attendee
Ørsted	[redacted]
	[redacted]
RPS Energy	[redacted]
Anatec	[redacted]
Spirit Energy	[redacted]
Aviateq consultant	[redacted]
	[redacted]
Bristow Group	[redacted]
CHC	[redacted]
	[redacted]
Uni-fly	[redacted]
Babcock	[redacted]

Agenda

	Item
1	Introductions
2	Objectives of meeting
3	Hornsea Three overview
4	Spirit Energy overview
5	Available approaches to Chiswick and Grove platform with Hornsea Three • ARA flights • En Route let down • Shuttle flights • Circling approaches • Departures Considering regulations and weather minima; Restrictions as a result of Hornsea Three; and Alternative arrangements to reduce any restricted access
6	Summary of discussion

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1. Introductions

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2. Meeting Objectives

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Meeting Objectives

- To understand what approaches can be flown by helicopter operators to the Chiswick and Grove platforms with Hornsea Three and under what meteorological conditions these approaches will be flown.
- To understand what approaches helicopter operators consider may be restricted as a result of Hornsea Three.
- To discuss alternative flight paths which could be flown to the Chiswick and Grove platforms which would reduce any restrictions on access arising as a result of Hornsea Three, and to consider how technology can be used to enhance safety and operations.

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3. Hornsea Three overview

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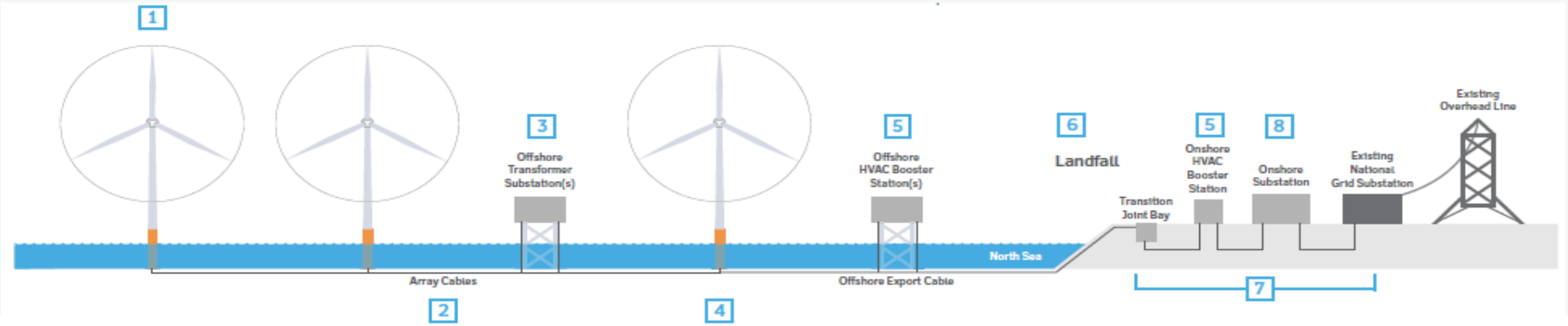
Hornsea Three: The Proposal

- Up to 300 offshore wind turbines across 696 km^2 array area. A new network of subsea array cables, offshore substation(s), offshore converter stations and offshore accommodation platforms.

- Electricity generated transported via either a high voltage alternating current (HVAC) or high voltage direct current (HVDC) transmission system. Making landfall west of Weybourne (Muckleburgh Military Collection), before continuing south and connecting into a HVDC converter/HVAC substation and subsequently the National Grid at the existing Norwich Main Substation.



Hornsea Three wind turbines and platforms

Maximum number of turbines	Maximum blade tip height above LAT (m)	Maximum rotor diameter (m)	Minimum turbine Spacing (m)
300	250	195	1,000
160	325	265	1,000

Parameter	Location	Design envelope
Number of accommodation platforms	Array	3
Number of offshore transformer substations (HVAC only)	Array	12
Number of offshore convertor substations (HVDC only)	Array	4
Number of offshore booster substations (HVAC)	Offshore export cable route (40 to 60% or onshore)	4

4. Spirit Energy overview

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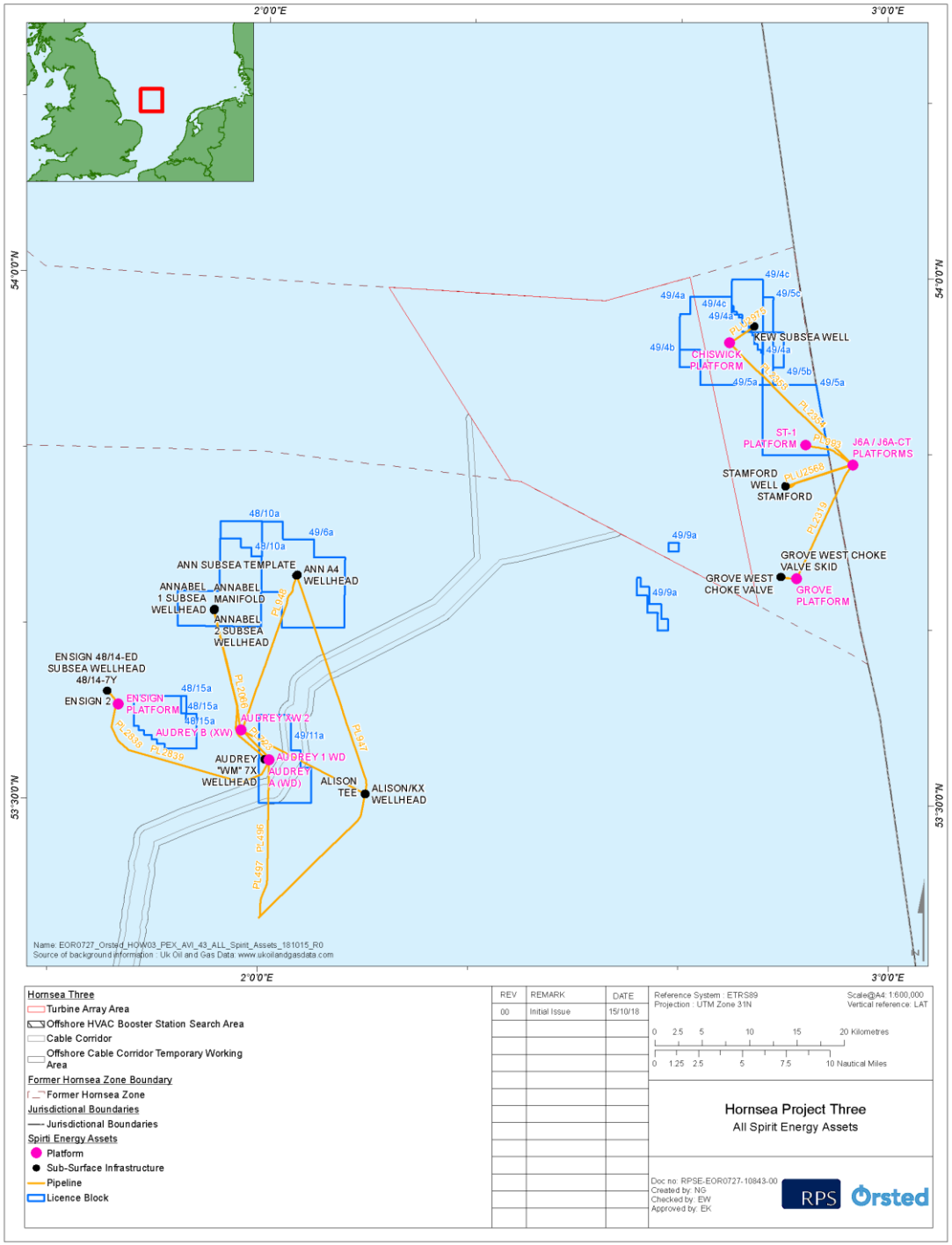
Spirit Energy assets

Spirit Energy operate the Greater Markham Area, Producing fields straddling UK / Dutch sector

- J6 Platform - main processing hub and accommodation platform: multiple flights/day
- Chiswick platform – NUI: 140-400 flights/year
- Grove platform – NUI: 140-400 flights/year
- G5, C6, C7 – Subsea wells:

Multiple flights/day when rig on any well
Day and night flights possible at all locations

Platform	Distance to Hornsea Three (NM)	Distance to Hornsea Three (km)
Chiswick platform	1.5	2.7
J6A platform	6.9	12.7
Grove platform	2.4	4.5
J6A – Chiswick	9.9	18.3
J6A - Grove	7.2	13.4
Subsea Wells		
G5	1.5	2.7
C6 & C7 (planned)	-0.5	-0.9



5. Available approaches post Hornsea Three

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Airborne Radar Approaches

- Define regulations which control approaches
- Define what weather limits apply

Flight restricted	- Sea state greater than or equal to 6 m SWH (significant wave height) and/or - Wind speed greater than or equal to 60 knots at helideck or gusting at 60 knots. - Icing conditions
VMC	VMC Day: - Cloud base greater than or equal to 600ft and - Visibility greater than or equal to 4 km CAT.OP.MPA.247
VMC	VMC Night: - Cloud base greater than or equal to 1200ft and visibility greater than or equal to 5 km *(VMC Night:* - *Cloud base greater than or equal to 1000ft and/or* - *Visibility greater than or equal to 5km SPA.HOFO)*
IMC	IMC conditions are defined as when it is not VMC
ARA lower limits	ARA lower limits are set in accordance with requirement to descend to 200 ft day (clear of cloud) and 300 ft night clear of cloud) and being able to see platform from MAP (3/4 nm).

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Airborne Radar Approaches

- Discuss what helicopter operators work to.

ARA requirements	An ARA can be flown with an Intermediate Fix at 6nm, Final Approach Fix at 4 nm (EASA GM1 SPA.HOFO.125 (a) General).
ARA requirements	The final approach path (from the FAF) can be flown out of wind where the drift angle does not cause increased workload. ((EASA GM1 SPA.HOFO.125 (a)(3))
MAP	It is permitted under AMC 1 SPA.HOFO.125 (e) that pilots haven the option to move MAP from 0.75 to 1 or 1.5 nm to provide more room to fly a Missed Approach. AMC 1 SPA.HOFO.125 (e)states that the decision range (MAP) should not be less than 0.75, i.e. more is permitted
MAP	A Missed Approach can be flown with a turn left or right turn. The MAP and any offset beyond 1.5nm will take account of the obstacle environment.
OEI	It is agreed that OEI can be flown along same route as an AEO go-around. The position of the MAP and go-around will take account of aircraft performance and the obstacle environment.
MAP	It is agreed that flights turn 10 degrees at 1.5 nm and then 30 degrees at MAP point (Fig 1 to GM1 SPA.HOFO.125) to initially avoid the destination platform.
MAP	It is agreed that a second turn can be made once at a safe height, in a similar manner to an onshore missed approach procedure. A straight climb to MSA does not have to be made.

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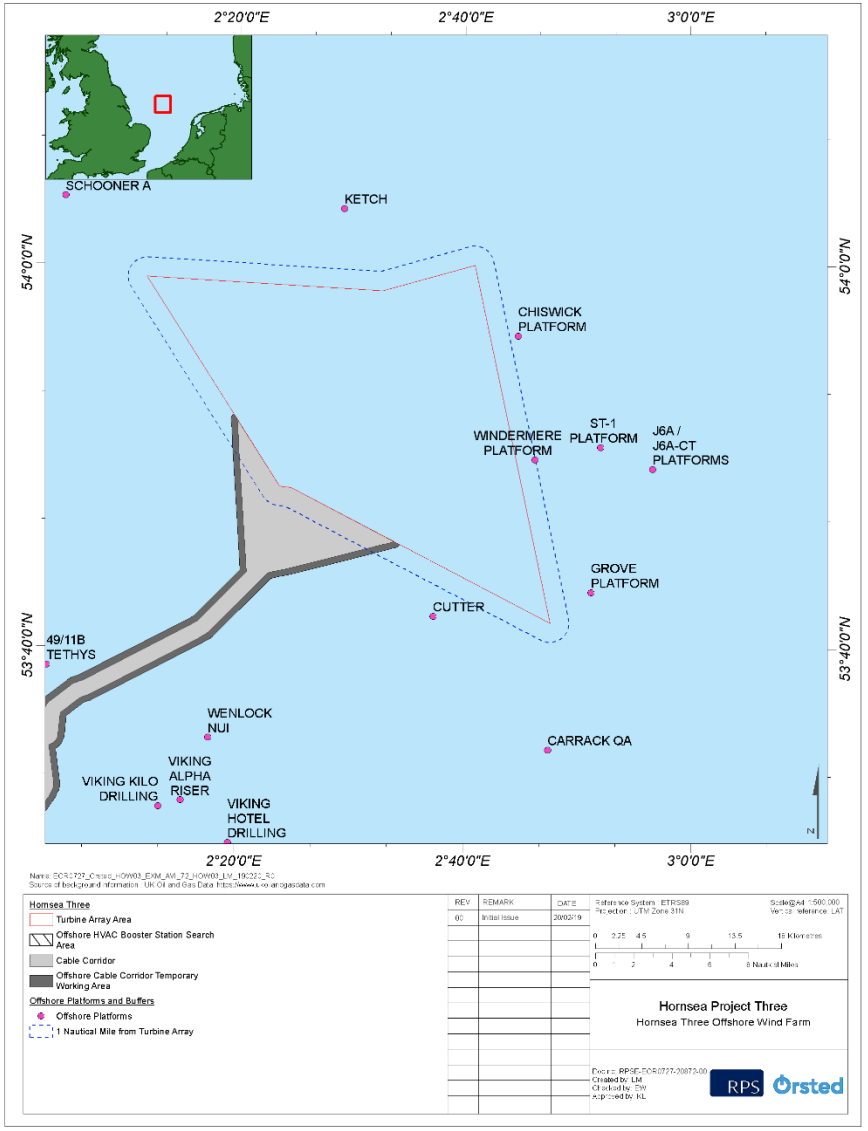
En Route Descents

- Define regulations which control approaches
- Define what weather limits apply

Flight restricted	- Sea state greater than or equal to 6 m SWH (significant wave height) and/or - Wind speed greater than or equal to 60 knots.
VMC	VMC Day: - Cloud base greater than or equal to 600ft and - Visibility greater than or equal to 4 km CAT.OP.MPA.247
VMC	VMC Night: - Cloud base greater than or equal to 1200ft and - Visibility greater than or equal to 5 km
IMC	IMC conditions are defined as when it is not VMC



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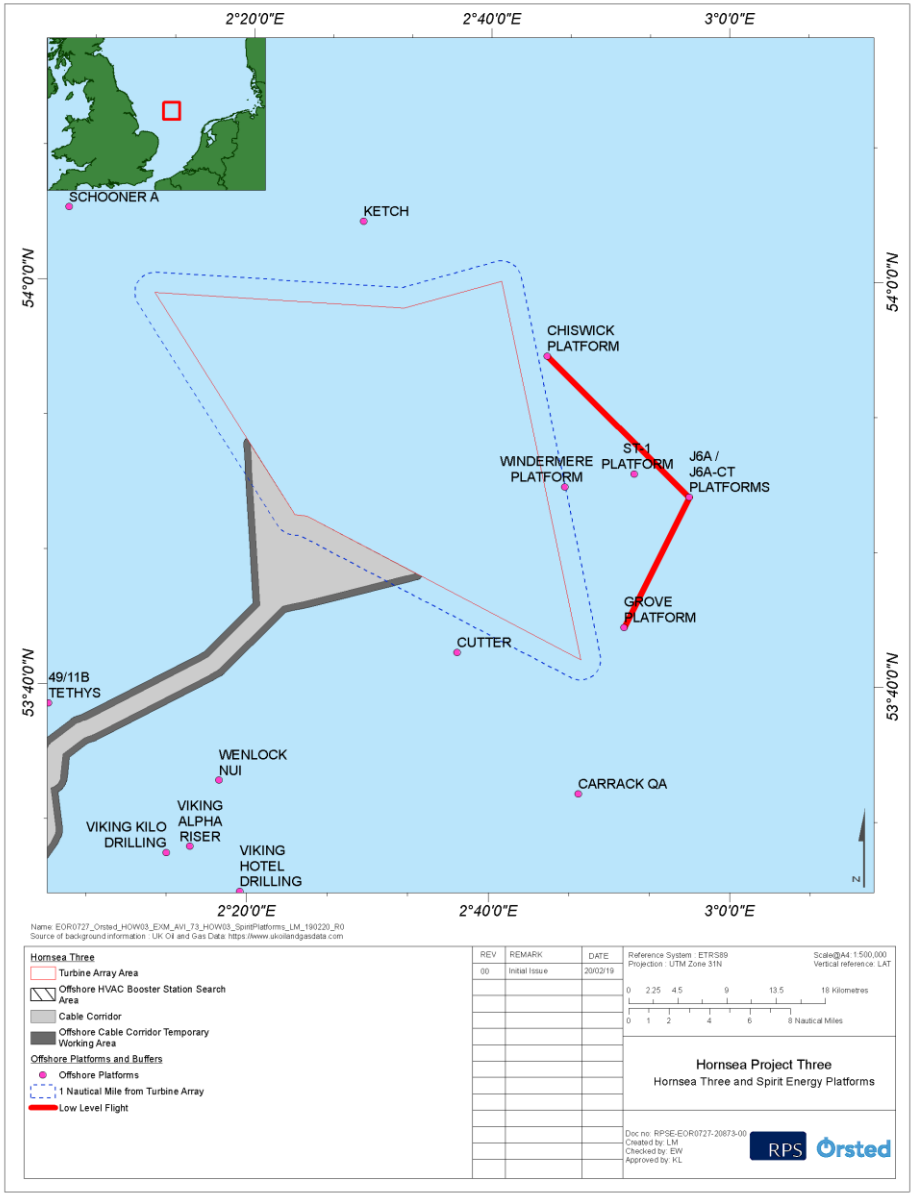
Shuttle and Circling flights

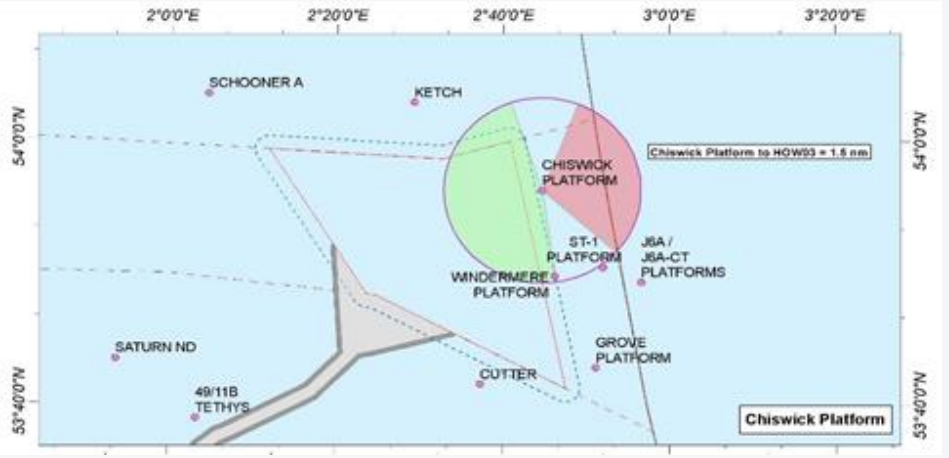
- Define regulations which control approaches
- Define what weather limits apply

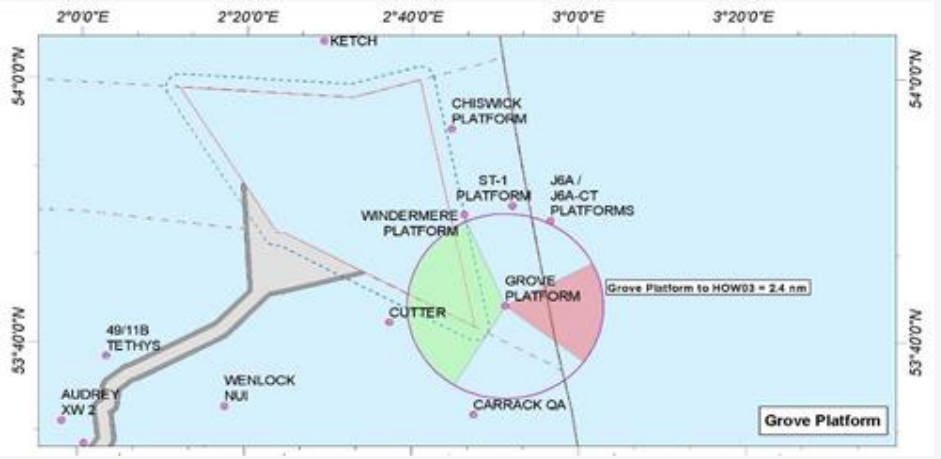
Flight restricted	- Sea state greater than or equal to 6 m SWH (significant wave height) and/or - Wind speed greater than or equal to 60 knots.
Shuttle flights	In Class G airspace when flying between offshore locations where the overwater sector is less than 10nm, VFR flight may be conducted when the limits are at, or better than, the following: <u>2 pilots:</u> - Day 300 ft clear of cloud 2 km visibility *(or 2 nm (NAA))* - Night 500 ft clear of cloud 5 km visibility. (EASA SPA.HOFO.130).
ARA Circling flights	- Day 300ft clear of cloud – no vis EASA SPA.HOFO - *(1 nm visibility)* - Night 500 ft clear of cloud – no vis EASA SPA.HOFO - *(1.5 nm visibility)*



Restricted approaches as a result of Hornsea Three

Approach	Restriction
VFR	
ARA	
En Route	
Shuttle	
ARA Circling	





Alternative arrangements to reduce any restricted access

Topics agreed for consideration	Actions

6. Summary