

**PERENCO RESPONSE TO STATEMENTS MADE BY THE APPLICANT WITHIN:
DEADLINE 4 SUBMISSION – 18.13 WAVENEY HELICOPTER ACCESS SUPPLEMENTARY ANALYSIS**

Introductory comment:

The positioning of Anatec within the “Waveney Helicopter Access Supplementary Analysis” is incorrect. The report gives the impression that Anatec are neutral reporters overseeing the Applicant’s and Perenco’s aviation specialists. The Applicant’s aviation specialist is contracted by Anatec who are contracted by Equinor.

Report Reference	Statement by Applicant	Statement Accepted / Not Accepted	Perenco Response
SECTION 1 INTRODUCTION			
Paragraph 1	Following the Dudgeon Extension Project (DEP) Issue Specific Hearing on 31 March 2023 that addressed helicopter access to the Waveney Platform in relation to Environmental Statement Chapter 16 – Petroleum Industry and Other Marine Users [APP-109], the Examining Authority’s Second Written Questions (WQ2) [PD-012] were published. This note addresses Questions Q2.21.1.2 and Q2.21.1.4.	Accepted	
Paragraph 2	Question 2.21.1.2 asked: <i>The Applicant’s submitted Helicopter Access Study [APP205, Paragraph 54] states that - “If an obstacle free circle of circa 1nm could be provided, then approaches and take-off under Day VMC conditions could be conducted safely. That would increase the daylight access from approximately 14.6% to 92.3% (2020) of day conditions”.</i> <i>Given the disagreement between parties at ISH6 [EV-086] [EV-090], over the accuracy of these figures, provide a set of jointly produced comparative calculations based on current guidance and restrictions.</i>	Accepted	Perenco agreed to provide a set of jointly produced comparative calculations based on current guidance and restrictions.
Paragraph 3	For Question 2.21.1.2, there are two main issues to address: firstly, the distance required for an approach and take-off which is addressed in Section 2.3.4 and Section 2.3.5 respectively; and secondly, the helicopter access to the Waveney platform under the current Commercial Air Transport Regulations (CAT) (Section 3.1.1).	Accepted	Perenco agrees that these are the two main issues in determining the safe proximity of wind turbine generators to the Waveney platform.
Paragraph 4	Question 2.21.1.4 asked:		

	Provide detail on any emerging guidance relating to helicopter access to installations such as that at Waveney from the CAA or that involved with Hornsea Project 4, as referred to in ISH6 [EV-086] [EV-090].		
Paragraph 5	Question 2.21.1.4 addresses the potential for the Civil Aviation Authority (CAA) to impose slightly higher weather limits for flights close to wind farms. As both the Applicant's aviation specialist and Perenco's aviation specialist have seen a draft of the CAA proposals, the impact of this change can also be considered. The result of these calculations are provided in Section 3.1.2.		Perenco has considered the draft proposals developed by the helicopter operators in conjunction with the CAA. Perenco's comments are provided at Paragraph 23 below.
Paragraph 6	A meeting was held between the Applicant's aviation specialist and Perenco's aviation specialist on 26 April 2023. The Perenco specialist was representing Bond Helicopters, which will commence the Perenco aviation contract from January 2024, replacing the incumbent, Bristow Helicopters. Prior to the meeting additional data and working assumptions had been exchanged between the parties.	Accepted	Prior to the meeting, information had been shared with the applicant in terms of 'flight' and 'meteorological' data.
SECTION 2 DATA AND WORKING ASSUMPTIONS			
Section 2.1 Paragraph 7	Meteorological Data Previously Perenco had provided the Applicant with meteorological data from the West Sole Alpha platform. The data had been sampled at 10-minute intervals between 15 January 2020 and 16 July 2021, resulting in 78,790 samples in total. The results from the analysis of that data are reported in Environmental Statement Appendix 16.2 – Helicopter Access Study [APP-205]. This set of data will be referred to as dataset 1.	Accepted	Perenco also refer to this data as dataset 1.
Section 2.1 Paragraph 8	Prior to the specialists' meeting, Perenco provided additional data from the West Sole Alpha covering the period 1 January 2021 to 31 December 2022. This second tranche of data was recorded on an hourly frequency, resulting in 17,477 samples in total. This set of data will be referred to as dataset 2. It was agreed that the different sampling frequency made it difficult to merge the data and so they would be assessed as separate data sets.	Accepted	Perenco also refer to this data as dataset 2. Each dataset was analysed by Perenco separately using the same methodology on each.
Section 2.2, Paragraph 9	Indicative layouts Two indicative layouts for DEP were provided to Perenco by the Applicant. These showed potential layouts for 15MW and 26MW wind turbines as illustrated in Environmental Statement Appendix 13.1 – Navigation Risk Assessment [APP-198] and Environmental	Accepted	The Applicant states that two indicative layouts were provided to Perenco. These layouts were helpful in discussions, but as they are only indicative they cannot be relied upon as a basis for agreeing turbine placement.

	Statement Chapter 15 Figures – Seascape and Visual Impact Assessment – Part 2 of 18 [APP-136].		<p>During discussions, the Applicant was asked whether they could commit to a layout before completion of the DCO Examination. The Applicant advised they could not. Perenco asked whether they could be part of the approval of a final layout and the Applicant said that this would not be acceptable to them.</p> <p>The Applicant’s DCO incorporates flexibility in the placement, spacing and size of wind turbine generators. Accordingly, the <i>Rochdale Envelope</i> methodology applies to the DCO examination process and a “cautious worst case” must be assumed.</p>
Section 2.3.1, Paragraph 11	Rate of Turn to be Applied A Rate 1 Turn, that results in a turn rate of 3° per second would be applied to all turns.	Accepted	Perenco also comments that this turn rate is independent of payload.
Section 2.3.2, Paragraph 12	Approach and Departure Speed The approach speed to the stabilisation point on approach and post take-off was agreed at 80 kts. The combination of rate of turn and aircraft speed determines the distance necessary to make a turn.	Accepted	
Section 2.3.3, Paragraph 13	Stabilisation Point on Approach A number of accidents have occurred both in commercial airlines and offshore helicopters due to unstable approaches. The helicopter operators have adopted aviation industry best practice and apply stabilised approach criteria during an approach. Basically, this requires the crew to be on the correct flightpath, at a fixed airspeed and power, with all checks complete at a fixed distance before landing. The helicopter industry collaborated through their trade body, HeliOffshore, to develop Flightpath Management Guidance ¹ . The latest stabilisation point in the guidance is shown as 0.5nm, which is also the distance used by Perenco’s current helicopter contractor, Bristow Helicopters. During the meeting it was stated that Bond Helicopters use a stabilisation point at 0.75nm due to the minimum range of their radar. The radar is used to cross check the distance to the landing point against the navigation system to confirm the correct deck is being approached. World-wide, a number of incidents have occurred where a helicopter has landed on the wrong helideck. However in the case of Waveney there are no nearby platforms and so the risk of a “wrong deck landing” is extremely remote. Therefore, during the meeting it was	Not Accepted	<p>The Applicant states that the “stabilisation point in the guidance is shown as 0.5nm”. It is important to recognise that this is a minimum distance at which the criteria for a stabilised approach have already been met otherwise the approach should not continue. The criteria for a flight being stabilised are given in the guidance as:</p> <ol style="list-style-type: none"> The aircraft is on the correct flight path and the correct navigational data has been confirmed as entered into the navigation system for final approach to the desired airport, heliport, helideck, or other landing site. Only small changes in heading, track, and power are required to maintain the correct flight path. It is recognised that certain environmental conditions will require larger power changes than normal. All briefings and checklists have been completed, except for the final landing check. The aircraft is in the correct landing configuration. In addition to previously mentioned landing gear, approach speed, and power criteria, there may be other unique,

agreed that a stabilisation point at 0.5nm could be applied, as it is line with Perenco's current operator. By adopting a 0.5nm stabilisation point Bond Helicopters would require a change to their draft Operations Manual and some additional crew training.

aircraft-specific configuration requirements that should be addressed e.g., rotor speed selection.

- e. The sustained rate of descent is no greater than 700 fpm upon arrival at the stabilised approach gate, or as recommended by the instrument procedure. If an approach requires a rate of descent greater than 700 fpm, this should be clearly briefed, with a focus on procedures to address the higher-than normal rate of descent.
- f. Once the final approach minimum is reached, confirmation of the correct airport, heliport, helideck, or landing site must be made.

Perenco further notes that, to meet criteria a. and b., the aircraft must already have come out of its turn and be on a straight-line approach to the helideck. Thus, adding the length of the final approach track to the radius of turn is an underestimate of the distance required.

The Applicant observes that Perenco's helicopter Operator's approved offshore approach procedures require an approach to be stabilised by 0.75nm.

In order to ensure the safety of its passengers and crew, each helicopter operator maintains procedures for its pilots that comply with policy, guidance, industry best practice, and draw on its own experience. Operations manuals are approved by the CAA on a case by case basis, it cannot be assumed that two operators will be given identical approvals as the size, experience and operational arrangements all differ. Pilots fly to many different destinations, so ensuring consistency is of the utmost importance for safe operations. Perenco's helicopter operator (Bond) requires a stabilised approach to be established no less than 0.75nm from the destination helideck. The stabilised approach distance is derived from the industry stabilisation guidance and the minimum effective range of the helicopter radar required to ensure that the destination waypoint and radar return are coincident, a requirement of wrong deck landing prevention protocols. As noted by the Applicant, one reason for this is that the airborne radar carried

			<p>by all North Sea operators of AW139 helicopters has a minimum range of 0.75nm and the radar is used to cross check the distance to the landing point (this is the offshore helicopter variant, Search and Rescue AW139 are fitted with a different radar). This minimum range of the radar is not unique to Bond. Another reason for Bond requiring the stabilisation point to be no less than 0.75nm from the destination is that this provides a consistent operating rationale for all Offshore Standard Approach Procedures in the Bond Operations Manual enhancing operational safety for and providing pilots with a standard procedure irrespective of weather, approach type, or destination.</p> <p>The Applicant suggests that “during the meeting it was agreed that a stabilisation point at 0.5nm could be applied”. This is incorrect. It is possible that an exception to the normal procedures, subject to other safeguards, could be made, but there is no guarantee of this, nor in the view of Perenco would it be advisable, to ask their helicopter operator to deviate from their standard practice – especially given the proven links between standardisation and safety.</p>
Section 2.3.4, Paragraph 14	<p>Approach Distance Required: Applying a stabilisation point at 0.5nm, and the agreed turn and speed criteria, the minimum approach distance required was calculated as 1.01nm. This is the distance between the platform helideck and the closest wind turbine tip. The distance to the closest turbine tip should be used for determining the obstacle free environment as this is independent of the size of wind turbine eventually installed.</p>	Not Accepted	Perenco is not applying a stabilisation point of 0.5nm, as the Helicopter Operator (Bond) uses a stabilisation point of 0.75nm. Refer to response to in Section 2.3.3, Paragraph 13 above.
Section 2.3.5, Paragraph 15	<p>Take-off Distance Required The take-off distance must take into account the remote possibility of an engine failure during the take-off; this is known as a One Engine Inoperative (OEI) condition. A worse case assumption is that the engine fails immediately on rotation from the helideck. The take-off performance will vary with the ambient wind temperature and pressure, with higher pressure and lower temperature improving performance</p>	Accepted	

Section 2.3.5, Paragraph 16	The two aviation specialists agreed that the AW139 maximum offshore take-off mass from Waveney of 6,800kg should be the basis for the take-off distance assessment. However, it should be noted that a lower take-off mass is usually sufficient to provide a full payload of 12 passengers from Waveney to Norwich Airport. The relevant performance graphs from Supplement 50 in the AW139's Rotorcraft Flight Manual were agreed	Not Accepted	Perenco seeks to maximise the payload (passengers and freight) on all flights, therefore it is not true to say that a lower take-off mass is usually sufficient. The relevant performance graphs were agreed as stated by the Applicant.
Section 2.3.5, Paragraph 17	For his OEI calculations, the Applicant's specialist used a pressure of 1013 hPa and a temperature of 20°C. Perenco's specialist chose a lower pressure of 993 hPa and a temperature of 20°C. In the opinion of the Applicant's specialist 993 hPa and 20°C is an extreme case. Dataset 1 contained pressure data, which dataset 2 did not. Dataset 1 contained 78,790 samples, of which only one single 10-minute period had a pressure as low as 993 hPa with a temperature as high as 20°C. In comparison, there were 36,652 10-minute periods when the pressure was 1013 hPa or higher. The Mean pressure over the 18 months of data was 1010 hPa. Therefore, the Applicant's calculations are considered to be conservative based on the historical data	Not Accepted	It should be noted that it is the operators duty to ensure that all calculations are made in the safe sense, 1013 is the international mean pressure, 993 is a low but not extreme pressure, and while it was only seen once in the 18 months of data recorded in dataset 1, it is certainly possible that a combination of low pressure and an air temperature of 20° may be seen, and more so as global temperature variations increase. The difference between the calculated performance at the temperatures (20°C) and pressures (1013hPa and 993hPa) chosen by the Applicant and Perenco are a continued take-off distance difference of 4 meters, a drop-down difference of 16 feet, a path 1 difference of 24 meters and path 2 to 500 ft of zero, the total difference is 28 meters for a turn at 500ft overall difference of 1.9%. For context 28 meters equates to a delay in turning by the pilot of 0.7 seconds.
Section 2.3.5, Paragraph 18	Applying the Applicant's environmental conditions of 1013 hPa and 20°C the OEI distance required, followed by a 30° turn away from any obstacle was 0.97nm. The Applicant's aviation specialist chose a 30° turn as that is sufficient to avoid a turbine in the take-off flightpath. The Perenco distance, using 993 hPa and 20°C, followed by a turn of 90° resulted in a distance of 1.32nm. The Perenco aviation specialist applied a turn of 90° as his calculations were conducted prior to the meeting, without the benefit of seeing the indicative DEP turbine layout	Not Accepted	The Applicant's comments imply that a 30° turn was agreed as sufficient to avoid wind turbine generators and make an approach to the Waveney helideck. This was not agreed. It is true that, in the two specific indicative layouts presented, no more than a 30° turn would be required. However, (as amplified in our response to Section 2.2, paragraph 9 above), Perenco cannot rely on the indicative layouts and a <i>Rochdale Envelope</i> approach needs to be used. Basing the minimum distance to the nearest wind turbine generator on a 90° turn would ensure access irrespective of the actual turbine layout ultimately chosen.
Section 2.3.5, Paragraph 19	It was agreed that if the final wind turbine layout was similar to the DEP indicative turbine layouts provided by the Applicant (realistic worst case scenarios for 15MW and 26MW wind turbines respective to navigation risk and seascape and visual impacts illustrated in	Not Accepted	The Applicant suggests that One Engine Inoperable (OEI) take-off distance is not a factor in determining the minimum separation between wind turbine generators and the Waveney platform. This statement has again been made based on indicative layouts

	<p>Environmental Statement Appendix 13.1 – Navigation Risk Assessment [APP-198] and Environmental Statement Chapter 15 Figures – Seascape and Visual Impact Assessment – Part 2 of 18 [APP-136]), then OEI distance required was not a factor as the wind turbines were spaced sufficiently to be avoided. These layouts were provided to aid discussion and discussion is ongoing about how an agreement may be reached</p>		<p>and cannot be taken as a general statement applying to the Application.</p> <p>The minimum separation between wind turbine generators has been given by the Applicant as 1.05km in ES Vol 1, Table 4.10, pg 79 (APP-090). Thus, if the Waveney platform were between rows, or between turbines in a row, the distance to the nearest turbine would at best be 0.742km which is less than the OEI take-off distance of 1.32nm (or even that of 0.97nm suggested by the Applicant).</p> <p>The OEI take-off distance is therefore a factor in determining the minimum separation between wind turbine generators and the Waveney platform</p>
SECTION 3 WEATHER DEPENDENT HELICOPTER ACCESS			
Paragraph 20	<p>The Waveney platform is only approved for daytime operations. It is assumed in Environmental Statement Appendix 16.2 – Helicopter Access Study [APP-205] that only operations under Visual Meteorological Conditions (VMC) will be permitted after DEP is constructed. At present flights to Waveney can be flown under both VMC and Instrument Meteorological Conditions (IMC), so the potential loss of access under IMC will be assessed. During decommissioning, a Non-Productive Installation (NPI), such as a jack-up platform, will be positioned over Waveney; these installations are usually equipped with a helideck approved for night flying. Therefore, for any period of time when a NPI is located at Waveney, the potential loss of night flying should be considered</p>	Accepted	
Paragraph 21	<p>Dataset 2 for 2021 and 2022 recorded hourly data. It was agreed between the Applicant and Perenco that the following parameters would be used to calculate VMC, IMC and no-fly conditions:</p> <ul style="list-style-type: none"> • Timestamp – date and time • Visibility- recorded in metres • Windspeed – recorded in kts • Cloud height1- lowest cloud (cloud base) recorded in ft • Wind direction 2 – recorded in degrees • Air temperature – recorded in degrees Celsius • Dew point - recorded in degrees 	Accepted	<p>The parameters used in analysis of the met-ocean data were agreed to be those stated by the Applicant.</p> <p>The limits for day VMC, IMC and no-fly conditions are agreed.</p>

The current day VMC conditions require a cloud base of 600ft or higher and a visibility of 4,000m or higher. IMC are when the weather is below VMC limits. No-fly conditions exist when the cloud base and visibility are too low for an Airborne Radar Approach, there are icing conditions present at the lowest available transit height, or the wind speed exceeds 60 kt. A more detailed explanation of no-fly conditions is given in Section 2.2.6 of Environmental Statement Appendix 16.2 – Helicopter Access Study [APP-205]. A sea state with the Significant Wave Height above 6m is also a limit for the AW139 helicopter but was not applied as dataset 1 was missing that parameter.

3.1 DAY VMC and IMC

Section 3.1.1,
Paragraph 22

Current Limitations

For operations to the Waveney platform only day conditions need to be considered. The Day VMC results for 2020 are shown in Environmental Statement Appendix 16.2 – Helicopter Access Study [APP-205]. Following the exchange of dataset 2, the Applicant and Perenco specialists compared their results, and it was agreed they were very similar. The Applicants figures are shown in Table 3.1.

Table 3.1 Day VMC, IMC and No Fly Conditions

Condition	2020 ^{Note} Dataset 1	2021 Dataset 2	2022 Dataset 2
Day VMC	92.3%	94.5%	95.4%
Day IMC	7.7%	5.5%	4.6%
Day No-Fly Conditions	4.6%	1.9%	3.1%
Day Usable IMC (IMC minus No-Fly)	3.1%	3.6%	1.5%

Note: Table 4.2 of Environmental Statement Appendix 16.2 – Helicopter Access Study [APP-205].

Not Accepted

Since the datasets being analysed were the same, it is not surprising that, where the same methodology was used, similar results were generated. Perenco confirm that the percentages of data points for Day VMC, Day IMC and no-fly conditions are similar to those presented by the Applicant. However, the Applicant has undertaken an over-simplified methodology that does not give a fair representation of the impact on flight operations to/from the Waveney field.

Throughout this and the following sections, the Applicant presents the % of data points that fulfil the relevant conditions (e.g. for Day VMC). The impact of DEP on flights to Waveney is assumed by the Applicant to simply be the differences between these percentages calculated currently and post-DEP. This is a gross over-simplification. The majority of work on the Waveney platform is carried out by dropping a crew off at the platform and collecting them later in the day. This requires two flights within the same day separated by enough time for work to be accomplished. As the Waveney platform has no accommodation other than strictly for emergency use, a crew would not be flown to the platform unless there was high confidence that they could be collected again by another flight later in the day. As set out in Section 3 of Perenco’s ‘Technical Note on the impacts of accessing the Waveney installation with DEP turbines within 1.5nm’ (REP4-050), Perenco’s analysis considers this aspect in

			<p>determining the likely impact of DEP on undertaking work on the Waveney platform.</p> <p>In order for a flight to take place, it is not sufficient for there to be an isolated data point with the right conditions. A flight would not leave Norwich unless there was high confidence that the conditions at Waveney would permit a landing and subsequent take-off. As set out in Section 3 of Perenco’s ‘Technical Note on the impacts of accessing the Waveney installation with DEP turbines within 1.5nm’ (REP4-050), Perenco’s analysis considers this aspect in determining the likely impact of DEP on undertaking work on the Waveney platform.</p>																
Section 3.1.2, Paragraph 23	<p>Proposed New CAA Limitations</p> <p>The CAA is consulting on operational limits within 3nm of wind farms. The Applicant and Perenco aviation specialists have seen the draft proposal and agree the following should be applied to this analysis:</p> <ul style="list-style-type: none"> • Day VMC only operations within 3nm of a wind farm; and • Within 3nm of a wind farm, the VMC limits are increased from a minimum cloud base of 600ft to 700ft with the visibility increased from a minimum of 4,000m to 5,000m. 	Accepted	<p>Perenco agree that the anticipated revised operational limits for flying within 3nm of a windfarm resulting from the CAA’s consultation with windfarm operators are likely to be as stated by the Applicant in Paragraph 23 (Section 3.1.2).</p> <p>It should however be noted that the consultation process is still ongoing and further restrictions may also come into effect. For example, the CAA, in their letter to the Secretary of State in the context of the Hornsea 4 DCO Application refer to “changes to CAP764 policy and guidance in respect of Helicopter Main Routes”.</p>																
Section 3.1.2, Paragraph 24	<p>Table 3.2 shows the difference between the current VMC and proposed VMC access</p> <p>Table 3.2 Day VMC Under Current and Proposed Minima</p> <table border="1"> <thead> <tr> <th>Condition</th> <th>2020 Dataset 1</th> <th>2021 Dataset 2</th> <th>2022 Dataset 2</th> </tr> </thead> <tbody> <tr> <td>Current Day VMC Cloud base >=600ft AND Visibility >=4000m</td> <td>93.2%</td> <td>94.5%</td> <td>95.4%</td> </tr> <tr> <td>Draft Day VMC Limitations Cloud base >=700ft AND Visibility >=5000m</td> <td>90.8%</td> <td>93.3%</td> <td>94.7%</td> </tr> <tr> <td>Loss of DAY VMC</td> <td>2.4%</td> <td>1.2%</td> <td>0.7%</td> </tr> </tbody> </table>	Condition	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2	Current Day VMC Cloud base >=600ft AND Visibility >=4000m	93.2%	94.5%	95.4%	Draft Day VMC Limitations Cloud base >=700ft AND Visibility >=5000m	90.8%	93.3%	94.7%	Loss of DAY VMC	2.4%	1.2%	0.7%	Not Accepted	<p>Perenco confirm that the percentages of data points for Day VMC, and Draft Day VMC are similar to those presented by the Applicant. However, as discussed in Perenco’s response to Section 3.1.1, Paragraph 22, the Applicant has undertaken an over-simplified methodology that does not give a fair representation of the impact on flight operations to/from the Waveney field.</p>
Condition	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2																
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Section 3.1.2, Paragraph 25	<p>Under the proposed CAA change, the percentage of day VMC access will reduce slightly, the percentage of IMC will increase slightly, the percentage of no-fly conditions will remain unchanged. Table 3.3 updates the figures shown in Table 3.1 to reflect this change.</p>	Not Accepted																	

Table 3.3 Day VMC, IMC and No Fly Conditions- Applying CAA Draft Limits

Condition	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2
Day VMC	90.8%	93.3%	94.7%
Day IMC	9.2%	6.7%	5.3%
Day No-Fly Conditions	4.6%	1.9%	3.1%
Day Usable IMC (IMC minus No-Fly)	4.6%	4.8%	2.2%

Section 3.1.2, Paragraph 26

The increased weather limits will have a minor impact on day helicopter access to the Waveney platform.

Not Accepted

Overall Perenco calculates that on average there will be a reduction of 7% to times when work can be carried out on the Waveney platform. The impact varies from month to month, with some periods of the year seeing up to a 16% reduction. It is incorrect to describe this as “a minor impact”.

3.2 Night VMC and IMC

Section 3.2, Paragraph 27

Due to a lack of specific equipment installed, flights to the Waveney platform are constrained to day operations. A NPI located over Waveney would normally be equipped for night operations and so the loss of night access needs to be considered. This is a logistic issue which can usually be overcome, as flights can be scheduled to take place in daylight.

Any emergency flights for sick or injured personnel would be flown by MCA helicopters who operate under Civil Aviation Publication 999, permitting greater flexibility and lower day and night weather limits.

Not Accepted

In discussing the loss of night flying due to the proposed windfarm, the Applicant dismisses the impact by stating: “This is a logistic issue which can usually be overcome, as flights can be scheduled to take place in daylight.” This is a gross oversimplification.

In Table 3.4, the Applicant records the number of hours in each year that are night (i.e. not daylight) and those that fall within the Norwich Airport operating hours. The Applicant’s statement that “only 24.7% of all night hours in 2022 are actually available for flights to Waveney” is an annual average.

The main impact of loss of night flying would be on winter operations. A non-producing installation (NPI) such as a rig would typically be deployed for a period of 1-3 months which could occur at any time of year. If we consider the impact on a one-month programme, the night hours currently available that would become unavailable due to the proximity of the proposed windfarm would be as given in Table 1 below.

Month	Currently available night hours (% of all night hours)
January	39%
February	32%
March	26%

April	12%
May	3%
June	0%
July	0%
August	8%
September	18%
October	28%
November	37%
December	40%

Table 1: Currently available night hours that would be lost as a result of proposed windfarm proximity.

Should work be required between October and March, the impact of being unable to fly outside of daylight hours is much greater than stated by the Applicant and can lead to as much as 40% of airport operating hours being unavailable

Section 3.2, Paragraph 28

CAT flights to a NPI would be limited by the Norwich Airport opening times, promulgated as 06:00 to 21:30. It was agreed by the Applicant and Perenco that the earliest flight arrival at Waveney would be the airport opening time plus 30 minutes (06:30hrs) and the latest take-off time from Waveney would be the airport closing time minus 30 minutes (21:00hrs). Table 3.4 shows the time when night flights can currently be conducted to any NPI over Waveney, before DEP is constructed

Accepted

Norwich Airport operating hours and an assumed 30-minute flight time, giving an earliest arrival at Waveney of 06:30 and a latest departure from Waveney of 21:00 were agreed with the Applicant as recorded in Paragraph 28 (Section 3.2).

As noted in Perenco's response to Section 3.2, paragraph 27 above, the Applicant has presented annual averages in Table 3.4 when in fact seasonal variations must be considered.

Table 3.4 Night Flights to NPI over Waveney

Condition	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2
Total Hours of Night	3582 ^{Note 1}	3822	3816
Hours of Available Night (Norwich Airport Open +30 mins Closed -30 mins)	721 ^{Note 2}	941	941

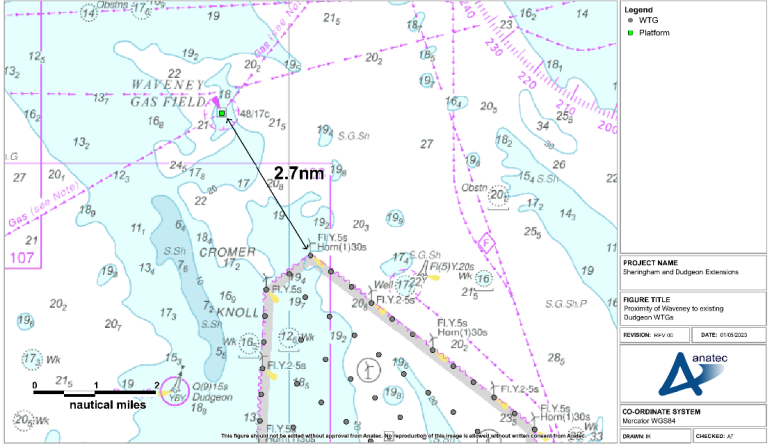
Condition	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2
Current Percentage of Night Operating Hours Available	20.1%	24.6%	24.7%

Note1: Data 1 starts 15/1/2020 at 12:10
Note2: As Dataset 1 is recorded every 10 minutes, it provided a more accurate assessment of total night and available night hours.

Section 3.2, Paragraph 29

Night VMC limits are a minimum cloud base of 1200ft and a minimum visibility of 5,000m

Accepted

<p>Section 3.2, Paragraph 30</p>	<p>Even with a suitably equipped NPI located over Waveney, the number of available night operating hours to Waveney is constrained by the Norwich Airport opening times; for example, only 24.7% of all night hours in 2022 are actually available for flights to Waveney.</p>	<p>Not Accepted</p>	<p>As noted in Perenco’s response to Section 3.2, paragraph 27 above, the Applicant’s 24.7% in 2022 is an annual average. Seasonal variations must be considered.</p>
<p>Section 3.2.1, Paragraph 31</p>	<p>The draft CAA regulations will prohibit night flights within 3nm of a wind farm. The current Dudgeon wind farm is within 3nm of Waveney, with the closest turbine 2.7nm away, as shown in Figure 3.1. If the CAA implements the new regulations in full, then no night CAT operations will be possible to a NPI over Waveney and so DEP will have no material impact on night access.</p>  <p>Figure 3.1 Proximity of Dudgeon Wind Farm Turbines to the Waveney Platform</p>	<p>Accepted</p>	<p>However refer to Perenco’s response to Section 3.2.1, paragraph 32.</p>
<p>Section 3.2.1, Paragraph 32</p>	<p>Historically, the CAA has provided dispensations to operators, providing they are supported by a safety case. Based on previous cases, it is possible that the CAA will provide a limited dispensation for night operations.</p>	<p>Accepted</p>	<p>Given that there is only a single wind turbine within 3nm and it is nearly 3nm away, it is highly likely that the CAA would grant a dispensation such that the anticipated new rules concerning flights within 3nm of a windfarm would not preclude night flying to Waveney.</p>
<p>Section 3.2.2, Paragraph 33</p>	<p>Potential Night Operations Under a CAA Dispensation If a dispensation from day only operations was granted by the CAA, then some limited night operations might be possible to an NPI located at Waveney. It was agreed that, subject to a CAA dispensation, approaches when the wind was from 110° clockwise to 240° could be conducted safely. These approaches would be flown into wind, i.e. from the reciprocal of the wind direction, and permit a night stabilised approach point at 2nm or greater. The</p>	<p>Accepted</p>	<p>Perenco shares the Applicant’s view, as set out in Paragraph 33 (Section 3.2.1), that following construction of DEP night operations to a non-producing installation (NPI) at Waveney may be a restricted to when the wind is from 110° clockwise to 240°. For the avoidance of doubt, this restriction would not apply prior to construction of DEP.</p>

percentage of time when a Night VMC approach could be conducted, with the wind from the appropriate direction, and Norwich Airport open is shown in Table 3.5.

Table 3.5 Night Flights to NPI over Waveney

Condition	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2
Total Night Hours	3582 ^{Note 1}	3822	3816
Hours of Night VMC Approaches post DEP Available Night AND VMC AND Wind from the safe arc	335	335	421
Percentage of Available Night Access Dependant on a CAA dispensation	46.5%	35.6%	44.7%

Note1: Data 1 starts 15/1/2020 at 12:10

Perenco agree with the Applicant's calculations of the percentage of available night access.

4 Summary

Paragraph 34	The distance necessary for an approach was agreed as 1.01nm	Not Accepted	<p>The Applicant states that the “distance necessary for an approach was agreed as 1.01nm”. This was not agreed.</p> <p>As set out in Section 3.8 of Perenco’s ‘Summary of Oral Submission at ISH6’ (REP3-154), the distance to wind turbine rotor tip required for an approach is 1.26nm (or as stated in the document 1.34nm to turbine base, assuming a wind turbine rotor diameter of 300m).</p>
Paragraph 35	The Applicant’s calculation of the OEI take-off distance required was 0.97nm and Perenco’s distance was 1.32nm. The Applicant believes that their temperature and pressure assumptions are sufficiently conservative whilst Perenco’s are excessively conservative. Notwithstanding this difference, both parties agreed that if, for example, the final wind turbine layout is similar to the indicative drawings provided, the OEI take-off distance required will not reduce helicopter access. These example layouts were provided to aid discussion which is ongoing about how an agreement may be reached	Not Accepted	<p>Comments against temperature and pressure assumptions have been clarified in paragraph 17 above.</p> <p>The indicative layouts were provided to Perenco. These layouts were helpful in discussions, but as they are only indicative, they cannot be relied upon as a basis for agreeing turbine placement.</p>
Paragraph 36	The meteorological data supplied by Perenco demonstrates that the impact of DEP on operations to the Waveney platform will be minor. See Table 3.1	Not Accepted	As set out in Figure 3 of Perenco’s ‘Technical Note on the impacts of accessing the Waveney installation with DEP turbines within 1.5nm’ (REP4-050), the likely impact of DEP on

			undertaking work on the Waveney platform is not minor, resulting in losses of up to 16%.
Paragraph 37	The updated meteorological limits proposed by the CAA will only have a minor impact of day access to the Waveney platform. For example, the day VMC access in 2021 reduced from 94.5% to 93.3%.	Not Accepted	As set out in Figure 3 of Perenco's 'Technical Note on the impacts of accessing the Waveney installation with DEP turbines within 1.5nm' (REP4-050), the likely impact of DEP (which arises primarily from the reduction in day VMC access under the updated meteorological limits proposed by the CAA) on undertaking work on the Waveney platform is not minor, resulting in losses of up to 16%.
Paragraph 38	The existing Dudgeon wind farm has wind turbines within 3nm of Waveney. If the CAA implements their draft regulations in full, then all future flights to any helideck located over Waveney will be day VMC only (including any NPI operations). In this case DEP will have no additional impact on night operations, as they will already be forbidden. The CAA may issue a helicopter operator with a dispensation from the regulations, when supported by a safety case. If a dispensation is provided, then some limited night operations to a helideck at the Waveney site may be possible.	Accepted	Given that there is only a single wind turbine within 3nm and it is nearly 3nm away, it is highly likely that the CAA would grant a dispensation such that the anticipated new rules concerning flights within 3nm of a windfarm would not preclude night flying to Waveney, other than within the existing limitations of night flights.
Paragraph 39	Subject to a CAA dispensation, when a NPI is located at Waveney, some night access, subject to Norwich Airport opening times, will be available. Table 3.4 shows the available night access when Norwich Airport is open: the access varies between 20.1% and 24.7%.	Accepted	
Paragraph 40	A CAA dispensation might also allow night operations after DEP is constructed. Both parties agreed that safe approaches could be made when the wind is from an arc 110° clockwise to 240°. This access is reported in Table 3.5: of the available hours of night access based on Norwich Airport opening hours, the access varies between 35.6% and 44.7%.	Not Accepted	As set out in Figure 2 of Perenco's 'Technical Note on the impacts of accessing the Waveney installation with DEP turbines within 1.5nm' (REP4-050), the likely impact of DEP on undertaking work on an NPI stationed at Waveney is far from minor, resulting in losses of up to 48%.