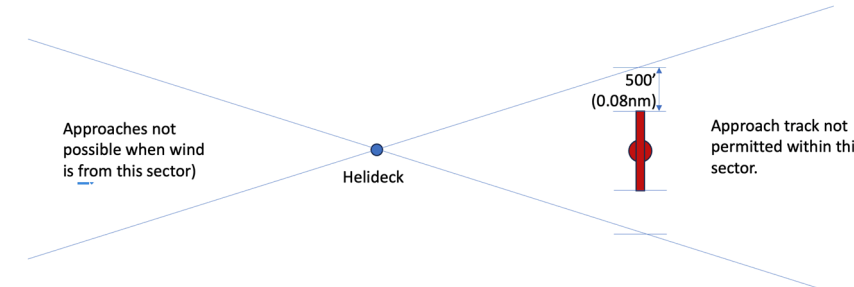


Question Number	Question	Perenco Response
Q4.21.1.1	<p>Take Off Space Required Provide a view, following the discussions at ISH 7 [EV-097 to EV-101], of whether 1.01nm is sufficient distance to allow for One Engine Inoperable take-offs.</p>	<p>As set out in Perenco's Deadline 3 written Summary of Oral Submission at ISH6 (REP3-154), the distance required for a take-off with one engine inoperable (OEI) under the least favourable (but not extreme) conditions is 1.42nm to the nearest turbine base. If the wind turbine rotors have a diameter of 300m, this would be 1.34nm to the nearest wind turbine rotor tip. With slightly less unfavourable conditions, the distance required would still be 1.3nm to the nearest rotor tip. Recognising the minimum wind turbine spacing of 1.05km, Perenco accepts that an OEI take-off could be executed with wind turbine rotor tips no nearer than 1.26nm from the helideck. Perenco does not accept that 1.01nm is sufficient distance to the nearest wind turbine rotor tip to execute an OEI take-off unless the aircraft payload were significantly restricted (which would in turn require more flights and increase the risk of major accidents on the Waveney installation).</p>
Q4.21.1.2	<p>Required Approach Distance Please provide a view, following the discussions at ISH 7 [EV-097 to EV-101], of whether 1.34nm for the approach is necessary and the effects on flights if it is less than 1.34nm.</p>	<p>Unlike the distance required for take-off, which is dependent on aircraft type, payload and meteorological conditions, the distance required for approach and landing is independent of aircraft type, payload and meteorological conditions. Perenco and the Applicant agree that a rate 1 turn followed by a stabilised approach is required. The Applicant has based their derivation of the distance required on a stabilised approach of 0.5nm. 0.5nm is the absolute minimum distance required for a stabilised approach under current policy and guidance. Only one helicopter operator in the North Sea uses 0.5nm for stabilised approach. All other North Sea helicopter operators use a longer stabilised approach of 0.7nm or 0.75nm. Perenco has based its determination of the distance required for approach and landing on a stabilised approach of 0.75nm as required by its Helicopter Operator. This results in a distance of no less than 1.26nm being required from the helideck to the nearest wind turbine rotor tip. If the wind turbine rotors have a diameter of 300m, this would equate to a distance of 1.34nm to the nearest wind turbine base. Were any wind turbines placed with rotor tips closer than 1.26nm, approaches would not be possible from that direction. As an approach</p>

		<p>must be made into wind, this would preclude operations when the wind is from any direction that would bring the approach path within 500' of the wind turbine rotor tips (as illustrated below).</p> <p style="text-align: center;">Impact on Approach and Landing when Wind Turbine Rotor Tips Less than 1.26nm from Helideck.</p>  <p style="text-align: center;">Approaches not possible when wind is from this sector)</p> <p style="text-align: center;">Helideck</p> <p style="text-align: center;">500' (0.08nm)</p> <p style="text-align: right;">Approach track not permitted within this sector.</p>
<p>Q4.21.1.4</p>	<p>Joint Statement</p> <p>Whilst it is apparent that there have been negotiations between Perenco and the Applicant, with a hope of an agreed negotiated position before the end of examination, at D7 please provide a joint statement setting out each party's position at that time and any remaining points of dispute, together with identified steps to a potential resolution within the Examination.</p>	<p>Status of Negotiations</p> <p>The Applicant and Perenco are in active discussions. Progress has been made on the template and wording for protective provisions regarding both the Waveney installation and Waveney to Durango pipeline. Both parties will submit draft Protective Provisions at Deadline 7. The significant difference being the distance which defines the "facilities proximity area" for the existing Waveney installation. Discussions are ongoing to resolve this remaining difference.</p> <p>Commercial discussions are also ongoing.</p> <p>The following, jointly agreed, comparison of Perenco and the Applicant's Analysis of the Impact of DEP on Helicopter Operations to Waveney, highlights the key differences between their respective positions.</p> <p>Comparison of Perenco and the Applicant's Analysis of</p>

the Impact of DEP on Helicopter Operations to Waveney.

Meteorological conditions

The Applicant and Perenco are in broad agreement as to the classification of meteorological conditions based on historic data. Table 1 below present this. The Applicant has split the data by year [REP4-039] whereas Perenco have provided a single figure [REP6-035].

Table 1 Equinor and Perenco classification of historic meteorological data for VMC, IMC usable and IMC no-fly.

Current CAA Limits	2020	2021	2022	Perenco [REP6-035]
Day VMC	92.3%	94.5%	95.4%	94% ¹
Day IMC (usable)	3.1%	3.6%	1.5%	2% ¹
Day IMC (no-fly)	4.6%	1.9%	3.1%	4% ¹
Future CAA Limits				
Day VMC	90.8%	93.3%	94.7%	94% ²
Day IMC (usable)	4.6%	4.8%	2.2%	2% ²
Day IMC (no-fly)	4.6%	1.9%	2.2%	4% ²

N.B. Perenco have the same percentages for conditions under both current and future Civil Aviation Authority (CAA) limits.. Perenco do not believe the future CAA limits will apply unless new wind turbines are placed closer than 3nm (assuming dispensation for the existing Dudgeon Wind Farm turbines

¹ Perenco: Comparative tables of information regarding helicopter access - Current Rules [REP6-035]

² Perenco: Comparative tables of information regarding helicopter access - With Proposed CAA Limitations near windfarms [REP6-035]

		<p>which has one wind turbine at 2.7nm from the Waveney installation). Both the Applicant and Perenco agree that with the Dudgeon Extension Project (DEP) wind turbines being within 3nm, helicopter access would no longer be possible under instrument meteorological conditions (IMC) useable flight weather.</p> <p>Impact of loss of Day usable IMC on accessing the Waveney installation</p> <p>The next step is calculating how the loss of useable IMC impacts flights to and from the Waveney installation. This step takes account for daily return flights and the weather windows in which Perenco typically access the Waveney installation. This is a step where the Applicant and Perenco have taken diverging methodologies and a side-by-side comparison of the numbers is not possible.</p> <p>The applicant has looked at historical flight data and coupled it with the meteorological data to identify flights that would have historically been impacted, had DEP wind turbines been present.</p> <p>Perenco have applied weather windows to the historical meteorological data to calculate further reduced access percentages.</p> <p>Perenco calculation of access reduction</p> <p>Perenco have taken the historical meteorological data above and applied further logistical restrictions, based on extensive operational experience.</p> <p>For access to Waveney installation:</p> <ul style="list-style-type: none">• a 2hr window of suitable conditions; and• requirement for 2 flights within the available day with at least 5hrs between them <p>For access to a non-production installation (NPI):</p> <ul style="list-style-type: none">• 2hr window of suitable conditions is assumed necessary for a flight to leave Norwich <p>The further restriction has been placed on the available VMC and IMC useable flight times in the meteorological data record. The percentage with no wind turbines represents the base case. The percentages for wind turbine rotor tips greater than 1.26nm away represents access in day VMC only (loss of usable day IMC). The percentages for wind turbine rotor tips less than 1.01nm represent the remaining access after the loss of day</p>
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usable IMC and the loss of VMC access where only the small percentage of time when an east-west approach would be possible.

Table 2 Perenco calculation for Daylight Access

Operations possible at Waveney NUI	No Wind Turbines	With Wind Turbine Rotor Tips >1.26nm	With Wind Turbine Rotor Tips <1.01nm
January	65%	61%	6%
February	61%	54%	6%
March	62%	55%	4%
April	77%	75%	2%
May	78%	73%	3%
June	78%	73%	2%
July	72%	67%	2%
August	77%	75%	3%
September	74%	71%	4%
October	71%	66%	2%
November	66%	62%	3%
December	60%	54%	2%
Annual average	71%	67%	3%

Table 3 Perenco calculation for non-production installation access (day and night access)

Operations possible at NPI	No Wind Turbines	With Wind Turbine Rotor Tips >1.26nm	With Wind Turbine Rotor <1.01nm
January	92%	65%	7%
February	80%	64%	8%
March	76%	64%	5%
April	91%	89%	4%
May	91%	86%	6%
June	91%	86%	4%

July	91%	79%	5%
August	85%	89%	5%
September	91%	83%	7%
October	90%	81%	3%
November	90%	70%	6%
December	86%	62%	3%
Annual average	88%	77%	5%

Applicant calculation of access reduction

The Applicant has used historical Vantage Personnel On Board (POB) data supplied by Perenco to determine the impact on flights to and from the Waveney installation. This data contains the timings of historic flights to the Waveney NUI in 2020 and 2021 and by matching these flights to the meteorological record it is possible to infer what impact the loss of helicopter access during usable IMC would have had. This analysis is provided in Appendix A of the Helicopter Access Study [APP-205]. From this analysis the Applicant sees that 2 out of 72 flights flown in 2020 would have been affected and 1 in 64 helicopter flights flown in 2021 would have been affected. Looking at the specific meteorological conditions surrounding these flights the Applicant believes that there could have been sufficient conditions for helicopter flights to either be brought forward or delayed. Loss of working time would have been 2 hours and 32 minutes across the two years of helicopter flight access.

Table 4 Equinor analysis of historical flight data

	2020	2021
Helicopter Flights Impacted	2.77%	1.56%
Hours of access lost (hh:mm)	02:16	00:16

If these helicopter flights could not be delayed or brought forward and therefore the corresponding return or outbound flight was also lost due to

		<p>an insufficient weather window, then the percentages increase to 5.54% and 3.12% which is similar to the 4% loss of daylight access to Waveney installation that Perenco predicts for wind turbines rotors at a distance >1.26nm.</p> <p>The Applicant has not carried out an analysis of night-time access to an NPI as historical flight data was only available for routine access to the Waveney installation.</p> <p>Summary</p> <p>As reflected at ISH7 the Applicant and Perenco broadly agree on the split of VMC, IMC usable, and IMC no fly.</p> <p>For access to the Waveney installation usable IMC access would be lost with wind turbines closer than 3nm and this accounts for 2 to 4.8% of daylight hours.</p> <p>The Applicant's and Perenco's secondary analysis of how loss of IMC usable flight time effects access to Waveney installation follows different methodologies and are not directly comparable. Perenco have applied weather windows and return flight criteria whilst the applicant has used historical flight data provided by Perenco.</p> <p>Perenco calculate a loss of access for Waveney installation as 4% (down to 67%) with wind turbine rotor tips over 1.26nm and 68% (down to 3%) with wind turbine rotor tips closer than 1.01nm.</p> <p>The Applicant's analysis for the Waveney installation calculates that 2 out of 72 (2.8%) flights would have been impacted in 2020 and 1 out of 64 (1.6%) in 2021 with wind turbine tips 1.01nm from Waveney installation. The Applicant believes, based on the historic meteorological data, that these flights could have been rescheduled. However, assuming a worst case that rescheduling was not possible and therefore the corresponding return or outbound flight was made redundant, the Applicant calculates losses of 5.54% and 3.12% which is similar to the loss of daylight access to Waveney installation that Perenco predicts for wind turbines rotors at a distance >1.26nm.</p> <p>Perenco calculate a loss of access for a NPI at the Waveney installation as</p>
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		<p>11% (down to 77%) with wind turbine rotor tips over 1.26nm and 83% (down to 5%) with wind turbine rotor tips closer than 1.01nm.</p> <p>The Applicant has not carried out a historical flight data review for a non-production installation at Waveney installation as historical flight data for a decommission operation at Waveney installation does not exist.</p> <p>The key point of difference between the Applicant and Perenco is the distance at which VMC in all wind directions is retained. The Applicant maintains VMC access in any wind condition is possible at 1.01nm based on the current helicopter operators 0.5nm stabilised approach distance.</p> <p>Perenco maintains that 1.26nm is required for VMC access in any wind direction based upon a 0.75nm stabilised approach distance of the future helicopter operator.</p>
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