# Morecambe Offshore Windfarm: Generation Assets

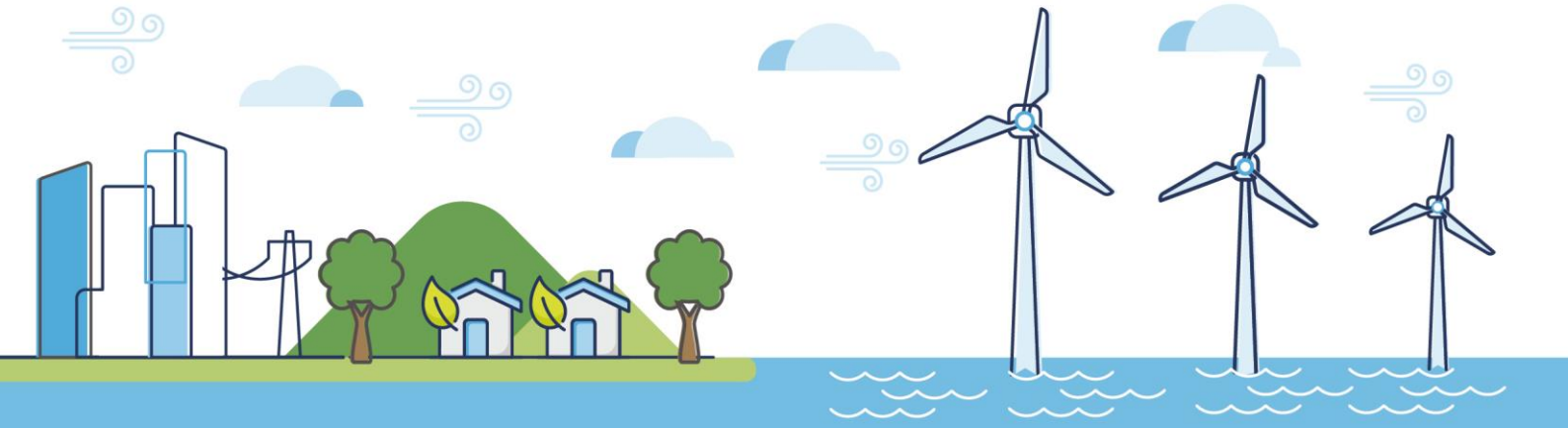
## Examination Documents

## Volume 9

## Impact Assessment of Proposed Morecambe Bay Windfarm Against Selected Instrument Flight Procedures

Document Reference: 9.44

Rev 01



## Document History

| | | | |
|---|---|---|---|
| **Doc No** | MOR001-FLO-CON-ENV-NOT-0022 | **Rev** | 01 |
| **Alt Doc No** | n/a | | |
| **Document Status** | Approved for Use | **Doc Date** | 22 January 2025 |
| **PINS Doc Ref** | 9.44 | **APFP Ref** | n/a |

| Rev | Date | Doc Status | Originator | Reviewer | Approver | Modifications |
|---|---|---|---|---|---|---|
| **01** | 22 January 2025 | Approved for Use | NATS | NATS | NATS | n/a |

# Walney Airport Safeguarding Report

## Impact Assessment of Proposed Morecambe Bay Windfarm Against Selected Instrument Flight Procedures.

V1.0

October 2024

Prepared by:

[redacted]

# Walney Airport Safeguarding Report

Version 1.0

31/10/2024

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| Version Number | Changes | Date |
|---|---|---|
| 1.0 | First Issue | 31/10/2024 |

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# 1. Introduction

## 1.1. Executive Summary

NATS Procedure Design were tasked with assessing the potential impact to Instrument Flight Procedures (IFPs) at Walney Airport resulting from the establishment of a Wind Farm in Morecambe Bay. The report concludes that there is a minor impact.

## 1.2. Project Scope

### 1.2.1. Customer Requirements

The **NATS Procedure Design** brief was to assess the instrument flight procedures as described in the latest Periodic Review: **5345—Walney 5 Year Review v2.0** (2020) for potential infringement from the wind farm. The periodic review has not yet been approved by the CAA and so. where necessary, additional checks have been made against the IFPs as published in the AIP. Since the periodic review was submitted, the LPV procedures have been withdrawn and as such have been excluded from this assessment.

Additionally, an assessment of the impact to conceptual designs for RNP instrument approach procedures to runway 05/23 (as described in report 5340 Barrow 0523, 2021) will be performed. Furthermore, an indicative assessment of the possible impact on the viability of Runway 11/29 as an instrument approach runway will be performed.

This report identifies whether potential obstacles are located within the lateral bounds of the instrument procedures and if so, whether it interferes in the vertical plane such that MOCA, OCA or required climb gradients (CGs) require adjustment in order that the procedure is permitted.

The following IFPs are assessed:

- RNP 17
- ILS/DME/NDB 35
- LOC/DME/NDB 35
- RNP 35
- NDB/DME 35
- NDB/DME to Aerodrome

Future viability of the following procedures is considered:

- RNP 05
- RNP 23
- RNP 11
- RNP 29

#### 1.2.1.1. Exclusions

- Additional structures, not listed in §2.5.
- CAP 168 OLS analysis
- Further operational and safety related mitigations that may result from a formal HAZID process being conducted.
- Previously published LPV procedures. Since the five-year Periodic Review these have been withdrawn from the AIP.

### 1.2.2. Assessment Baseline

The decision as to whether an obstacle impacts a procedure is based on its possible lateral or vertical infringement of the obstacle protection areas.

The protection areas held by NATS and used for this safeguarding assessment were designed as part of **5345—Walney 5 Year Review v2.0** (2020) and remains pending CAA approval. For the purposes of this safeguarding report, the requested obstacle has been assessed against the protection areas of these procedures. Results of this impact assessment may need to be reviewed if obstacle protection areas require changing prior to CAA approval.

# 2. Design Methodology

## 2.1. Design Criteria

The procedures taken from the Periodic Review were constructed in accordance with **ICAO Doc 8168 PANS-OPS Volume II 6th Edition Amendment 8** as amplified by any differences required by the **CAA**, published or otherwise. Since the designs were submitted to the **CAA**, PANS-OPS 7th Edition has come into force, but this has no material impact for the purposes of this report.

## 2.2. Roles and Responsibilities

- Procedure Design Project Manager (UK APD): [redacted] (MS)
- Procedure Designer (UK APD): (MS)
- Verification and Validation (UK APD): (CO)

## 2.3. Assumptions

- Information from the developer regarding the wind farm's elevation and location are correct.
- Rather than specific turbines, an area has been modelled within which all turbines will be contained. The report assumes that all activity will occur within the bounds of this areas.
- All runways, runway data, published navigation aids, and runway lighting will be "fit for purpose."
- Survey information received is correct.
- Procedures designed in the Periodic Review report **5345—Walney 5 Year Review v2.0** (2020) are accepted by the CAA without the need to alter the size or position of those obstacle protection areas.

## 2.4. Obstacle Data

An area wind farm operation has been modelled by placing an obstruction of 315 m AMSL at each of the vertices of the wind farm area.

| NATS ID | Lat | Long | Max Elevation AMSL (m) | Model Radius (m) |
|---|---|---|---|---|
| Derived | Supplied | Supplied | Modelled | Modelled |
| MorecambeBay_1 | 535011.0367N | 0033631.6592W | 315 | 1 |
| MorecambeBay_2 | 534941.7263N | 0033415.6932W | 315 | 1 |
| MorecambeBay_3 | 534945.1495N | 0032948.0016W | 315 | 1 |
| MorecambeBay_4 | 534516.8158N | 0032938.4588W | 315 | 1 |
| MorecambeBay_5 | 534500.7800N | 0033604.8000W | 315 | 1 |
| MorecambeBay_6 | 534645.9584N | 0034053.8938W | 315 | 1 |

Table 1 Morecambe Bay wind farm area

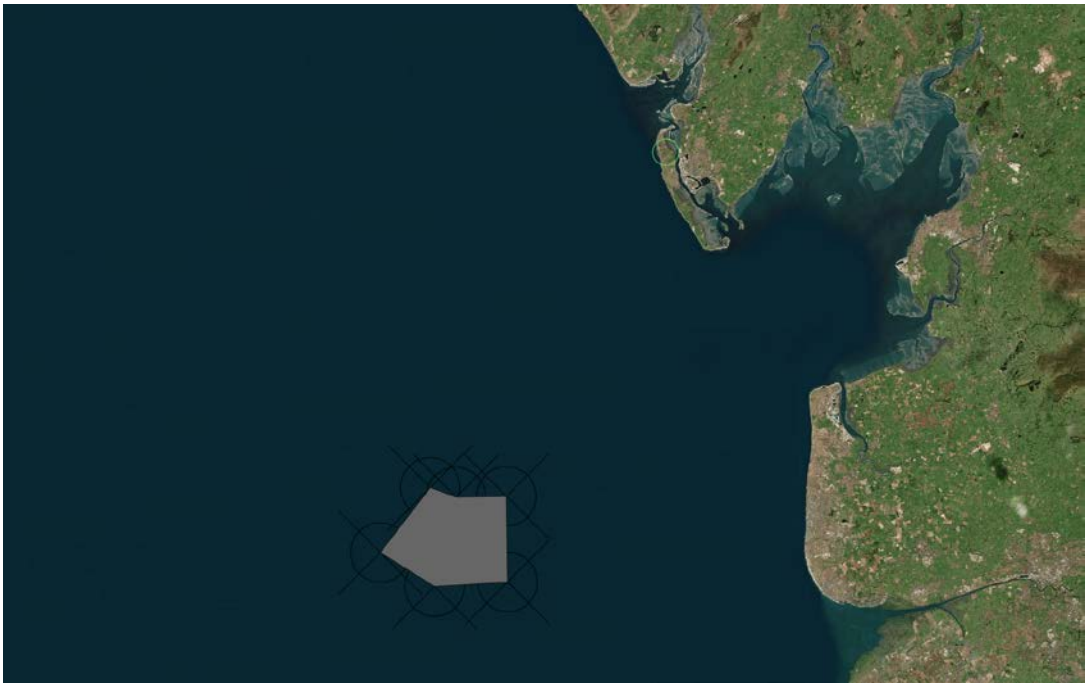

Figure 1 Position of Morecambe Bay windfarm (grey) in relation to Walney (green circle)

# 3. Analysis

The tables below show the assessed procedures and details of lateral and vertical infringement.

*Note that **Yes** entries in the vertical infringement column indicate minima will need to be increased or there is an impact to the procedure. **No** entries indicate no requirement to increase minima or any other impact to the procedure.*

## 3.1. Obstacle Analysis of Current Procedures

| | Procedure Segment | Infringement | |
|---|---|---|---|
| | | Lateral | Vertical |
| **VM(C)** | Whole Area | No | - |
| **MSA NDB 10NM WL** | 360°–090° | No | - |
| | 090°–180° | No | - |
| | 180°–270° | No | - |
| | 270°–360° | No | - |
| **MSA NDB 25NM WL** | 360°–090° NE | No | - |
| | 090°–180° SE | No | - |
| | 180°–270° SW | Yes | Yes |
| | 270°–360° NW | No | - |
| **RNAV Hold NLM05** | Whole Area | No | - |
| **Hold WL** | Whole Area | No | - |
| **ILS DME RWY 35** | Initial (Base turn) | No | - |
| | Initial (Racetrack) | No | - |
| | Intermediate | No | - |
| | Precision Segment (CRM) | No | - |
| | Missed Approach (Inter) | No | - |
| | Missed Approach (Final) | No | - |
| | VSS | No | - |
| **LOC DME RWY 35** | Initial (Base turn) | No | - |
| | Initial (Racetrack) | No | - |
| | Intermediate | No | - |
| | Final | No | - |
| | Missed Approach (Init) | No | - |
| | Missed Approach (Inter) | No | - |
| | Missed Approach (Final) | No | - |
| | VSS | No | - |

| | Procedure Segment | Infringement | |
|---|---|---|---|
| | | Lateral | Vertical |
| **RNP RWY 35** | TAA | Yes | Yes |
| | Initial | No | - |
| | Intermediate | No | - |
| | Final | No | - |
| | LNAV/VNAV OAS | No | - |
| | Missed Approach (Init) | No | - |
| | Missed Approach (Inter) | No | - |
| | Missed Approach (Final) | No | - |
| | VSS | No | - |
| **NDB/DME RWY 35** | Initial (Base turn) | No | - |
| | Initial (Procedure Turn) | No | - |
| | Initial (Racetrack) | No | - |
| | Intermediate | No | - |
| | Final | No | - |
| | Missed Approach (Init) | No | - |
| | Missed Approach (Inter) | No | - |
| | Missed Approach (Final) | No | - |
| | VSS | No | - |
| **RNP RWY 17** | TAA | Yes | No |
| | Initial | No | - |
| | Intermediate | No | - |
| | Final | No | - |
| | LNAV/VNAV OAS | No | - |
| | Missed Approach (Init) | No | - |
| | Missed Approach (Inter) | No | - |
| | Missed Approach (Final) | No | - |
| | VSS | No | - |
| **NDB/DME to Aerodrome** | Initial (Base turn) | No | - |
| | Initial (Racetrack) | No | - |
| | Intermediate | No | - |
| | Final | No | - |
| | Missed Approach (Init) | No | - |
| | Missed Approach (Inter) | No | - |
| | Missed Approach (Final) | No | - |
| | VSS | No | - |

Table 2 Obstacle Analysis of Current Procedures

## 3.2. Obstacle Analysis of Conceptual Designs

| | Procedure Segment | Infringement | |
|---|---|---|---|
| | | Lateral | Vertical |
| **RNP RWY 05** | TAA | Yes | Yes |
| | Initial | No | - |
| | Intermediate | No | - |
| | Final | No | - |
| | LNAV/VNAV OAS | No | - |
| | Missed Approach (Init) | No | - |
| | Missed Approach (Inter) | No | - |
| | Missed Approach (Final) | No | - |
| | VSS | No | - |
| **RNP RWY 23** | TAA | No | - |
| | Initial | No | - |
| | Intermediate | No | - |
| | Final | No | - |
| | LNAV/VNAV OAS | No | - |
| | Missed Approach (Init) | No | - |
| | Missed Approach (Inter) | No | - |
| | Missed Approach (Final) | No | - |
| | VSS | No | - |

Table 3 Obstacle Analysis of Conceptual Designs

## 3.3. Assessment of Future Use of Runway 11/29

No conceptual designs exist for this runway at present. However, it is considered that the presence of the wind farm would not preclude the future development of instrument Flight Procedures to this runway. The wind farm is too far away to present any significant difficulty in developing a PANS-OPS compliant Instrument Approach Procedures.

# 4. Conclusion

## 4.1. Current Procedures

The proposed windfarm would have the following impacts on existing Instrument Flight Procedures at Walney.

› MSA based on WL Southwest sector would need to rise to 2100.

› RNP 35: TAA based on UVNUB to 10nm would need to rise to 2100.

› RNP 35: Initial Approach Fix UVNUB altitude constraint would need to become 2100 or above.

If these changes were implemented the procedures would remain PANS-OPS compliant. A small descent would be introduced into the RNP 35 intermediate segment, but the resultant gradient would be well within the range allowed by PANS-OPS.

The increased MSA in the southwest quadrant would have minimal practical impact on instrument approach procedures.

## 4.2. Future Procedures

### 4.2.1. Runway 05/23

Conceptual designs have been developed RNP Instrument Approach Procedures for Runway 05/23. The design for Runway 23 would not be impacted by the presence of the Morecambe Bay windfarm. The design for Runway 05 would require minor modification. The central IAF/IF (Dual purpose Initial Approach Fix and Intermediate Fix) would require raising to 2100ft. The consequent descent gradient in the intermediate segment would be well within PANS-OPS limits and the conceptual designs would remain PANS-OPS compliant.

### 4.2.2. Runway 11/29

In the opinion of NATS Procedure Design, the presence of Morecambe Bay Windfarm would not preclude the future development of Instrument Approach Procedures to Runway 11/29. The site of the windfarm is too far away to present any significant difficulties in developing a viable configuration for Instrument Approaches to this runway.