Technical Appendix

Swarclett Wind Farm

Appendix 14-1: IFP Safeguarding Report – Wick (John O'Groats) Airport

Swarclett Wind Energy Limited

December 2023

IFP Safeguarding Report
Swarclett Wind Farm

Wick (John O'Groats) Airport

28 Sep 2023

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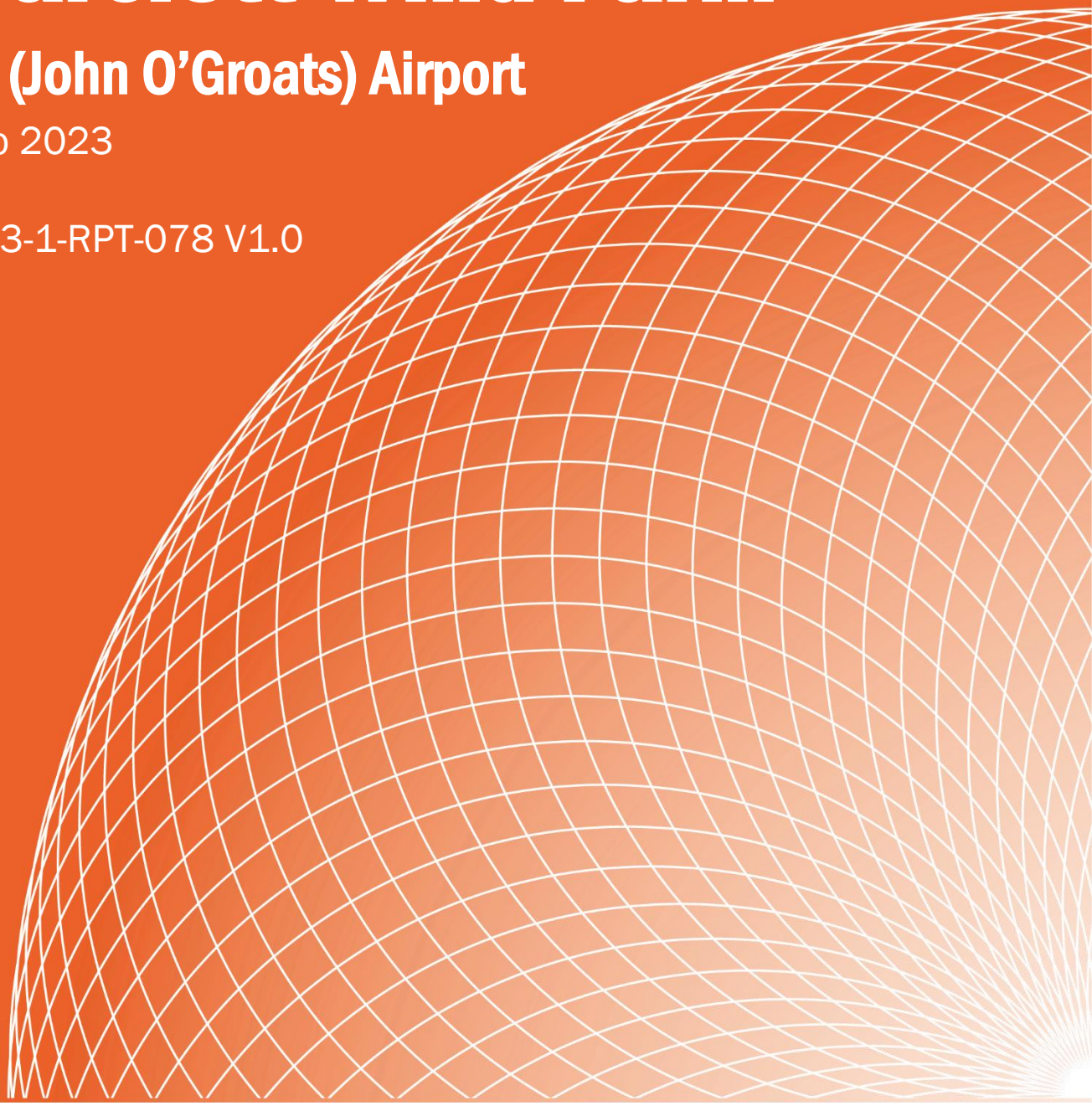

Document Authority

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IPD	Gregson S	[redacted]	28/09/2023
QM	Boorman E	[redacted]	28/09/2023
DA	Henderson J	[redacted]	28/09/2023

Document Version History

Version	Date	Change History
1.0 Draft A	19/09/2023	Initial draft version.
1.0	28/09/2023	Initial version, no changes from draft A.

Executive Summary

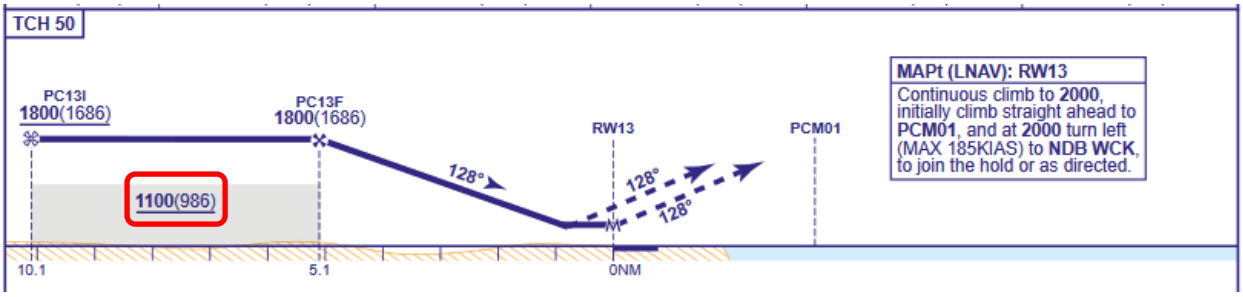
This IFP Safeguarding Report assesses the impact of the proposed Swarclett Wind Farm, 2 wind turbines, to be located 17.9Km NW of Wick Airport, on Wick Airport's Instrument Flight Procedures (IFPs).

This report is only in respect of the IFPs currently published in the AIP and does not address any other aspects of aerodrome safeguarding.

The IFP safeguarding assessment found that the proposed wind farm, using a radius of 136.50m for each turbine, **would have an impact** on Wick Airport's IFPs.

IAP[1] Runway 13 RNP (LNAV)

The impact is limited to the intermediate approach segment of this instrument approach procedure. The Swarclett Wind Farm would increase the segment minimum obstacle clearance altitude by 100ft, from 1100ft to 1200ft.



IAP Profile view and highlighted impact

If both Wind Turbines can be kept below 185m AMSL[2], at the supplied coordinates, then there would be no impact.

It should be noted, however, that the intermediate segment MOCA[3] may be increased by 100ft without having an operational impact to this IAP as the intermediate fix and final approach fix have a MOCA of 1800ft. However, any changes to this IAP are at the discretion of Wick Airport and HIAL, and subject to CAA approval.

Impacted IAC[4]: AD 2.EGPC-8-1 IAC RNP RWY 13 (CAT A,B,C) - ICAO

[1] IAP – Instrument Approach Procedure.
[2] AMSL – Above Mean Sea Level.
[3] MOCA – Minimum Obstacle Clearance Altitude.
[4] IAC – Instrument Approach Chart.

Contents

DOCUMENT AUTHORITY **1**
Document Version History 1
EXECUTIVE SUMMARY **2**
IAP Runway 13 RNP (LNAV) 2
CONTENTS **3**
1. INTRODUCTION **4**
1.1. Design Methodology 4
1.2. Obstacle Details 5
1.3. Obstacle Data 5
2. ASSESSMENT **6**
3. CONCLUSION **8**
3.1. IAP Runway 13 RNP (LNAV) 8

List of figures

Figure 1: Obstacle location 5
Figure 2: IAP Profile view and highlighted impact 8

List of tables

Table 1: Obstacle coordinates & elevations 5
Table 2: IFP Assessment Result 7

1. Introduction

IFP Design Ltd have been contracted by Cyrrus Ltd, via Trax International Ltd, to assess the impact of a proposed wind farm, on Wick Airport's Instrument Flight Procedures (IFPs).

1.1. Design Methodology

This report assesses all Instrument Flight Procedures at Wick Airport only and does not assess the Annex 14/CAP 168 Obstacle Limitation Surfaces.

The obstacle details, coordinates OSGB, ground height, and candidate wind turbine details have been provided by Cyrrus Ltd.

A radius of 136.50m was used for IFP impact assessment. This is comprised of ½ of the rotor diameter plus a 50m micrositing allowance and a 20m horizontal buffer.

This report only considers the IFP impact from the proposed obstacles and does not consider any operational ATC or Aerodrome mitigations that may be available.

Wherever possible, data validation checks were carried out to ensure the accuracy of the data.

All the calculations and the drawing constructions were based on design criteria in ICAO Doc 8168 Vol II Edition 7, Amendment 9 published in November 2020.

1.2. Obstacle Details

The wind farm's proposed location is 17.9Km NW of Wick Airport. The wind farm has 2 proposed wind turbines.

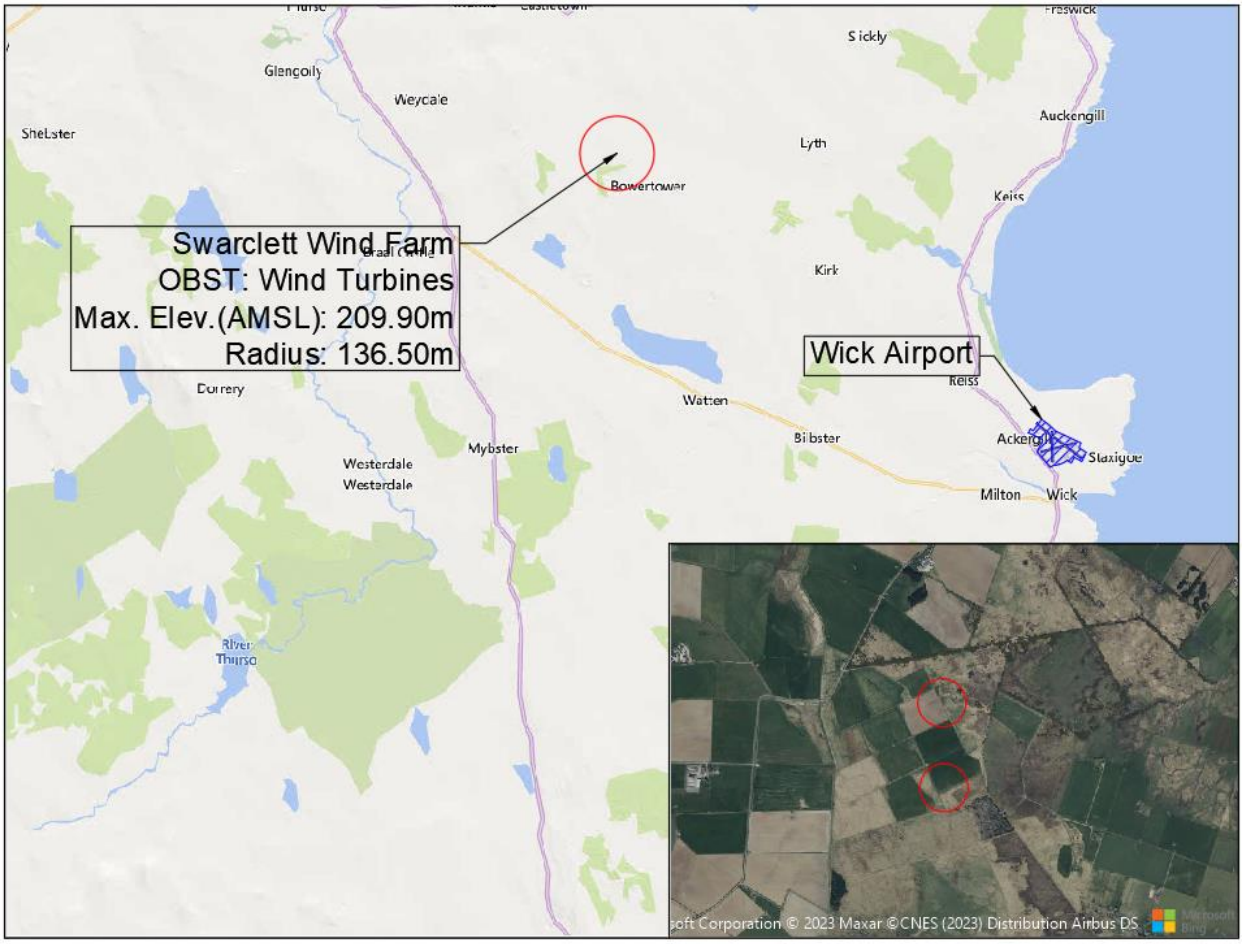


Figure 1: Obstacle location

1.3. Obstacle Data

The wind turbine coordinates, elevations (above mean sea level) and radius used for the assessment may be found below.

Obstacle ID	Obstacle Type	OSGB Easting	OSGB Northing	Latitude	Longitude	Elevation AMSL (m)	Radius (m)
WT1	OBST: Wind_turbine	321247.00	963173.00	58.5494600044	-3.3548563956	209.90	136.50
WT2	OBST: Wind_turbine	321252.00	962691.00	58.5451332500	-3.3546034481	201.90	136.50

Table 1: Obstacle coordinates & elevations

2. Assessment

The table below details the result of the assessment of the obstacle against Wick Airport's IFPs:

IFP	Impact
MSA – All Sectors	The obstacles' elevations are less than the published sector MOCA - MOC[5]. Therefore, there is no impact to those sectors.
TAA RWY 13	The Obstacles' elevations are less than the published arrival area MOCA - MOC. Therefore, there is no impact.
TAA RWY 31	The Obstacles' elevations are less than the published arrival area MOCA - MOC. Therefore, there is no impact.
Visual Circling – CAT A (Total Area)	The Obstacles are located outside of all VMC protection areas. Therefore, there is no Impact.
Visual Circling – CAT B (Total Area)	The Obstacles are located outside of all VMC protection areas. Therefore, there is no Impact.
Visual Circling – CAT C (Total Area)	The Obstacles are located outside of all VMC protection areas. Therefore, there is no Impact.
Visual Circling – CAT D (Total Area)	The Obstacles are located outside of all VMC protection areas. Therefore, there is no Impact.
Visual Circling – CAT A (North of RWY 13/31)	The Obstacles are located outside of all VMC protection areas. Therefore, there is no Impact.
Visual Circling – CAT B (North of RWY 13/31)	The Obstacles are located outside of all VMC protection areas. Therefore, there is no Impact.
Visual Circling – CAT C (North of RWY 13/31)	The Obstacles are located outside of all VMC protection areas. Therefore, there is no Impact.
Visual Circling – CAT D (North of RWY 13/31)	The Obstacles are located outside of all VMC protection areas. Therefore, there is no Impact.
RNP RWY 13 (CAT A, B, C) (LNAV)	**The Obstacles are located within the intermediate segment of the instrument approach procedure and impact the segment MOCA. The segment MOCA would be required to increase by 100ft to accommodate the wind farm. Therefore, an impact.**
VOR/DME RWY 13	The Obstacles are located within the intermediate segment. However, there is no impact.
VOR/DME RWY 13 (No DME)	The Obstacles are less than MOCA or OCA[6] – MOC for all segments. Therefore, there is no impact.
NDB(L)/DME RWY 13	The Obstacles are located within the intermediate segment. However, there is no impact.
NDB(L)/DME RWY 13 (No DME)	The Obstacles are less than MOCA or OCA – MOC for all segments. Therefore, there is no impact.

[5] MOC – Minimum Obstacle Clearance.
[6] OCA – Obstacle Clearance Altitude.

Direct Arrivals to VOR/NDB(L) RWY 13	The Obstacles are less than MOCA – MOC for the direct arrival. Therefore, there is no impact.
VSS[7] RWY 13	Obstacles are located outside of all the VSS. Therefore, there is no Impact.
RNP RWY 31 (CAT A, B, C) (LNAV)	The Obstacles are located within the intermediate / final missed approach. However, there is no impact.
VOR/DME RWY 31	The Obstacles are located within the intermediate / final missed approach. However, there is no impact.
VOR/DME RWY 31 (No DME)	The Obstacles are located within the intermediate / final missed approach. However, there is no impact.
Direct Arrivals to VOR/DME RWY 31	The Obstacles are less than MOCA – MOC for the direct arrival. Therefore, there is no impact.
NDB(L)/DME RWY 31	The Obstacles are located within the intermediate / final missed approach. However, there is no impact.
NDB(L)/DME RWY 31 (No DME)	The Obstacles are located within the intermediate / final missed approach. However, there is no impact.
Direct Arrivals to NDB(L)/DME RWY 31	The Obstacles are less than MOCA – MOC for the direct arrival. Therefore, there is no impact.
VSS RWY 31	Obstacles are located outside of all the VSS. Therefore, there is no Impact.

Table 2: IFP Assessment Result

[7] Visual Segment Surface.

3. Conclusion

Assessment concludes that the Swarclett Wind Farm, based on the supplied coordinates, elevations (AMSL) and wind turbine details, **would have an impact** on Wick Airport's Instrument Flight Procedures.

The impact and possible mitigation is detailed below.

3.1. IAP Runway 13 RNP (LNAV)

The Swarclett Wind Farm is located within the intermediate approach segment of this IAP and has an impact on the segment MOCA. The Wind Farm would increase the segment minimum obstacle clearance altitude by 100ft, from 1100ft to 1200ft.

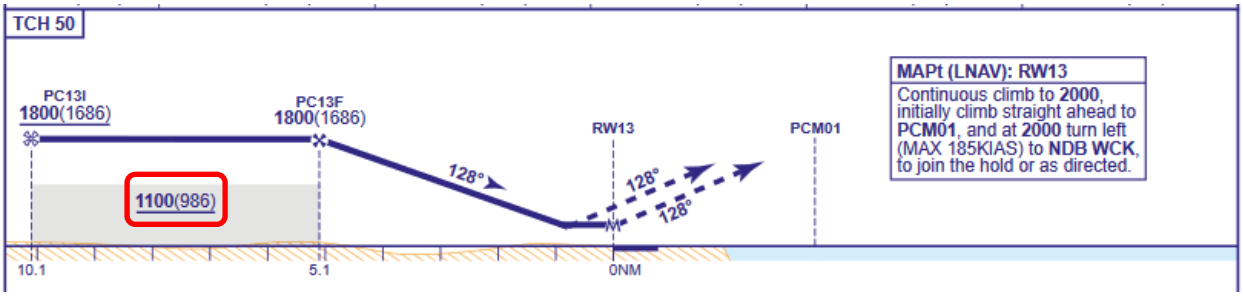


Figure 2: IAP Profile view and highlighted impact

If both Wind Turbines can be kept below 185m AMSL, at the supplied coordinates, then there would be no impact.

It should be noted, however, that the intermediate segment MOCA may be increased by 100ft without having an operational impact to this IAP as the intermediate fix and final approach fix have a MOCA of 1800ft. However, any changes to this IAP are at the discretion of Wick Airport and HIAL, and subject to CAA approval.

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