



Sporad na Mara Offshore Wind Farm

Offshore Project

Environmental Impact Assessment Report

Appendix 17.2: Instrument Flight Procedures, Volume 2c

Document Reference No.: SNM-SNM-PAC-APP-1172

Date: February 2026



Quality Control Page

Document details	
Document title	Offshore Project Environmental Impact Assessment Report
Document subtitle	Appendix 17.2: Instrument Flight Procedures
Document reference no.	SNM-SNM-PAC-APP-1172
Date	February 2026
Version	1.0
Author	Trax International Ltd
Client Name	Sporad na Mara Ltd

Document history						
Version	Revision	Issued	Checked	Approved	Date	Comments
1.0	A	Trax International Ltd	WSP	SnM Ltd	February 2026	Final for submission



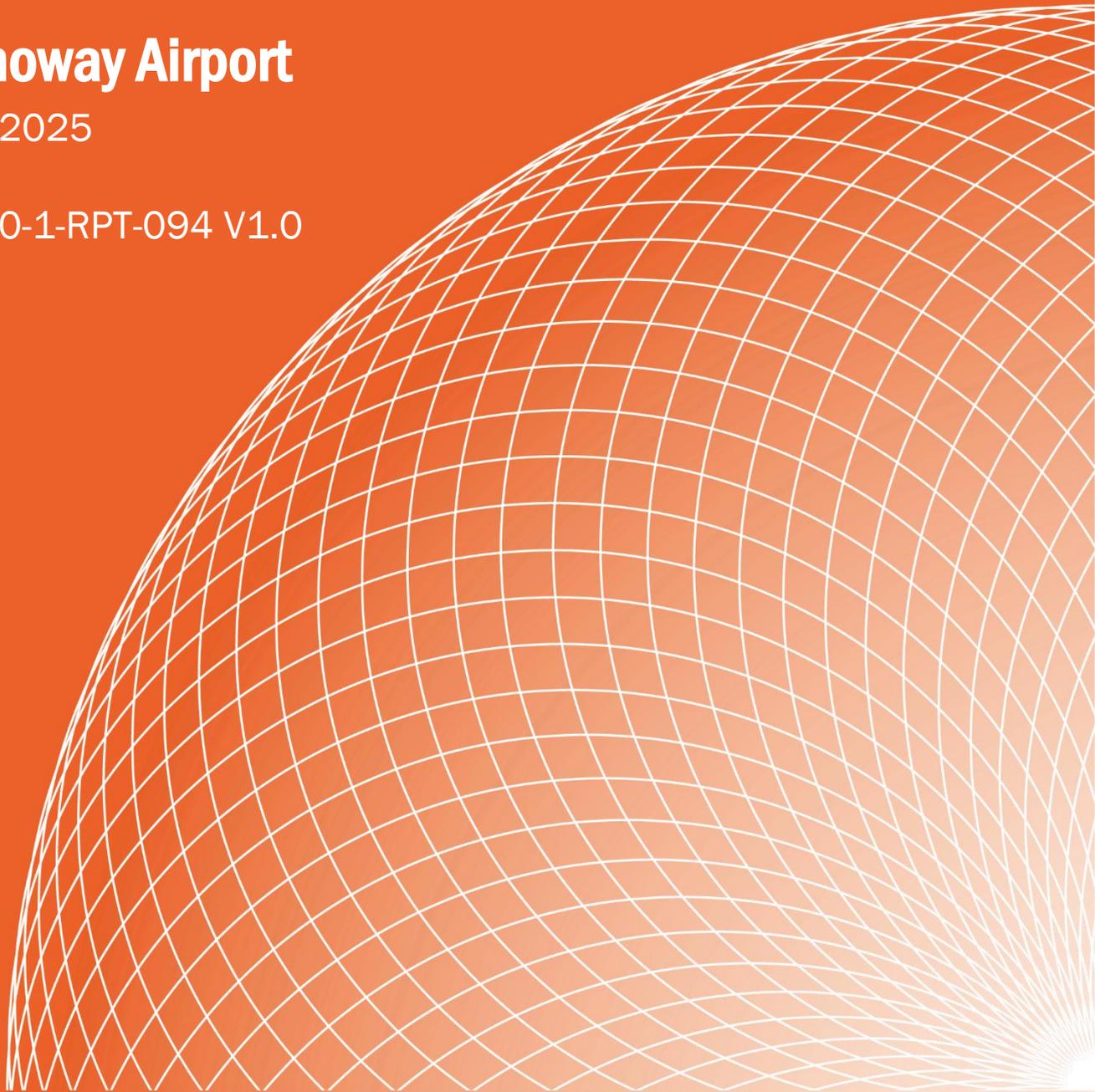
IFP Safeguarding Report

Spiorad na Mara Windfarm

Stornoway Airport

24 Jul 2025

IDL-020-1-RPT-094 V1.0





Document Authority

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Document Version History

Version	Date	Change History
1.0 Draft A	01/07/2025	Initial draft version.
1.0 Draft B	18/07/2025	Second draft for compliance checking and quality management.
1.0	24/07/2025	Initial version, no changes from draft B.



Executive Summary

This IFP Safeguarding Report assesses the impact of the proposed Spiorad na Mara Windfarm on Stornoway Airport's Instrument Flight Procedures (IFPs).

The proposed windfarm is to be located 30km northwest of the airport.

This IFP Safeguarding report is in respect of the IFPs currently published in the AIP and Stornoway's future RNP Instrument Approach Procedures. It does not attempt to assess any impact on any other future changes to the IFPs at Stornoway Airport, nor does it address any other aspects of aerodrome safeguarding.

The IFP safeguarding assessment found that the proposed windfarm **would have an impact** on Stornoway Airport's IFPs.

There is an impact to the initial approaches to RWY18 for the following Instrument Approach Procedures:

- RWY18 LOC/DME/NDB(L) – Procedure Turn
- RWY18 NDB(L)/DME – Procedure Turn
- RWY18 NDB(L) – Procedure Turn & Extended racetrack (CAT C,D)

The initial approach Minimum Obstacle Clearance Altitude in both cases would be required to increase by 100ft, from 2000ft to 2100ft. If a wind turbine with a maximum elevation of 309m or less was used, there would be no impact.

In addition, there is a predicted impact to the Terminal Arrival Altitudes for the future RNP Instrument Approach Procedure for RWY18.

Please see section 4 for further details.

For the above impacts, it may be possible to accommodate the 100ft increase but it would be subject to further investigation and the agreement of HIAL and Stornoway Airport.

It should also be noted that any IFP changes are subject to CAA approval. The CAA IFP regulatory process and subsequent publication timelines are lengthy, years not months, and the client should be cognisant of this.



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1. Introduction

IFP Design Ltd have been contracted by WSP UK LTD, via Trax International Ltd, to assess the impact of a proposed windfarm, on Stornoway Airport's Instrument Flight Procedures (IFPs).

1.1. Design Methodology

This report assesses all currently published Instrument Flight Procedures and the planned future RNP Instrument Approach Procedures at Stornoway Airport only and does not assess the Annex 14/CAP 168/CS-ADR-DSN (issue 6) Obstacle Limitation Surfaces.

The obstacle details, wind turbine coordinates, micrositing allowance and wind turbine details have been provided by WSP UK LTD.

A radius of 210.00m has been used for this assessment. This is comprised of half of the rotor diameter, of the largest candidate wind turbine, added to the micrositing allowance and a horizontal buffer of 20.00m.

The IFP safeguarding assessment has been performed against the Stornoway Airport currently published IFPs and the future RNP Instrument Approach Procedures¹ (IAPs) as they are known to IFP Design Limited at the time of this assessment.

The draft RNP IAP charts have been provided by HIAL and no coding tables have been provided. For information on when the RNP IAPs will be introduced, please enquire with HIAL.

This report only considers the IFP impact from the proposed windfarm 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 10 published in November 2024.

¹ CL-5570-DOC-003 V1.0 RNP APCH RWY 18 Chart 08092021, CL-5570-DOC-008 V1.0 RNP APCH RWY 36 Chart 08092021



1.2. Obstacle Details

The proposed windfarm is to be located 30km northwest of the airport.

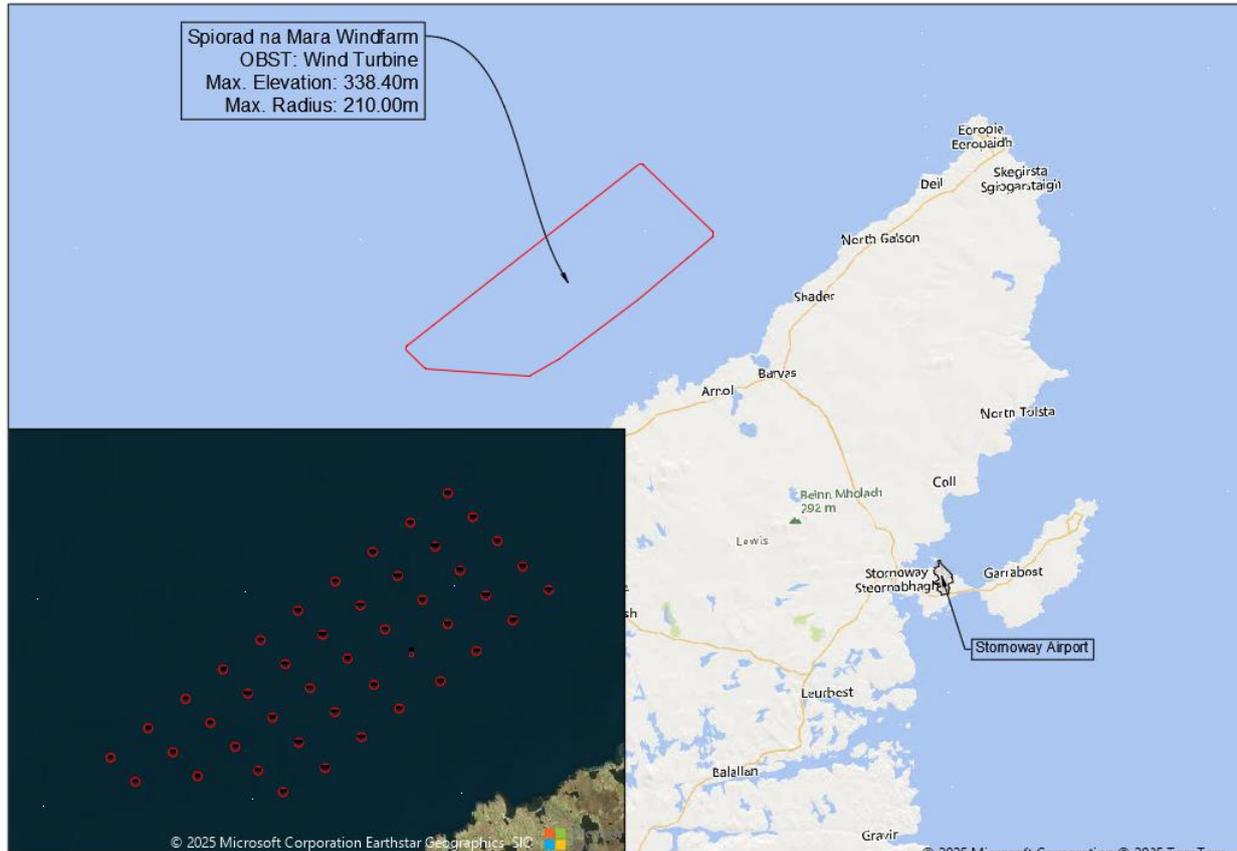


Figure 1: Windfarm location

1.3. Obstacle Data

Obstacle ID	Obstacle Type	OSGB Easting	OSGB Northing	Latitude	Longitude	Elevation (m) AMSL	Radius (m)
WT1	OBST: Wind_Turbine	109372.146	953830.810	58.3760833333333	-6.97338333333333	338.40	210.00
WT2	OBST: Wind_Turbine	110458.937	952520.764	58.3650805555556	-6.9532250000000	338.40	210.00
WT3	OBST: Wind_Turbine	111356.119	955087.754	58.3886416666667	-6.9411666666667	338.40	210.00
WT4	OBST: Wind_Turbine	112444.078	953778.504	58.3776416666667	-6.9209916666667	338.40	210.00
WT5	OBST: Wind_Turbine	113339.958	956343.406	58.4011805555556	-6.9089277777778	338.40	210.00
WT6	OBST: Wind_Turbine	113530.839	952469.409	58.3666388888889	-6.9008500000000	338.40	210.00
WT7	OBST: Wind_Turbine	114427.959	955035.348	58.3901861111111	-6.8887555555556	338.40	210.00
WT8	OBST: Wind_Turbine	115322.942	957599.380	58.4137138888889	-6.8766805555556	338.40	210.00
WT9	OBST: Wind_Turbine	115515.920	953727.356	58.3791888888889	-6.8685972222222	338.40	210.00



WT10	OBST: Wind_Turbine	116411.795	956292.135	58.402722222222	-6.856497222222	338.40	210.00
WT11	OBST: Wind_Turbine	116525.044	952444.370	58.368361111111	-6.849825000000	338.40	210.00
WT12	OBST: Wind_Turbine	117306.669	958855.247	58.426238888889	-6.844397222222	338.40	210.00
WT13	OBST: Wind_Turbine	117500.854	954984.016	58.391719444444	-6.836322222222	338.40	210.00
WT14	OBST: Wind_Turbine	117624.601	951257.010	58.358444444444	-6.829641666667	338.40	210.00
WT15	OBST: Wind_Turbine	118395.749	957548.857	58.415250000000	-6.824213888889	338.40	210.00
WT16	OBST: Wind_Turbine	119290.562	960111.982	58.438763888889	-6.812088888889	338.40	210.00
WT17	OBST: Wind_Turbine	118645.474	953612.694	58.380183333333	-6.815136111111	338.40	210.00
WT18	OBST: Wind_Turbine	119485.802	956241.552	58.404250000000	-6.804025000000	338.40	210.00
WT19	OBST: Wind_Turbine	120379.632	958805.536	58.427769444444	-6.791908333333	338.40	210.00
WT20	OBST: Wind_Turbine	119805.907	952227.622	58.368530555556	-6.793677777778	338.40	210.00
WT21	OBST: Wind_Turbine	120574.748	954935.320	58.393255555556	-6.783869444444	338.40	210.00
WT22	OBST: Wind_Turbine	121273.336	961367.501	58.451269444444	-6.779775000000	338.40	210.00
WT23	OBST: Wind_Turbine	121469.752	957499.413	58.416775000000	-6.771722222222	338.40	210.00
WT24	OBST: Wind_Turbine	122364.579	960062.093	58.440280555556	-6.759561111111	338.40	210.00
WT25	OBST: Wind_Turbine	121745.455	953562.521	58.381713888889	-6.762252777778	338.40	210.00
WT26	OBST: Wind_Turbine	123257.271	962624.126	58.463777777778	-6.747419444444	338.40	210.00
WT27	OBST: Wind_Turbine	122631.964	956066.600	58.404688888889	-6.750166666667	338.40	210.00
WT28	OBST: Wind_Turbine	123454.539	958755.920	58.429280555556	-6.739380555556	338.40	210.00
WT29	OBST: Wind_Turbine	124348.331	961318.683	58.452783333333	-6.727211111111	338.40	210.00
WT30	OBST: Wind_Turbine	123734.360	954771.255	58.393791666667	-6.729811111111	338.40	210.00
WT31	OBST: Wind_Turbine	125241.080	963879.777	58.476269444444	-6.715041666667	338.40	210.00
WT32	OBST: Wind_Turbine	125439.485	960013.301	58.441786111111	-6.707013888889	338.40	210.00
WT33	OBST: Wind_Turbine	126332.185	962575.216	58.465277777778	-6.694836111111	338.40	210.00
WT34	OBST: Wind_Turbine	125891.919	955911.353	58.405352777778	-6.694388888889	338.40	210.00
WT35	OBST: Wind_Turbine	126549.394	958686.837	58.430608333333	-6.686483333333	338.40	210.00
WT36	OBST: Wind_Turbine	127223.696	965135.463	58.488752777778	-6.682661111111	338.40	210.00
WT37	OBST: Wind_Turbine	127424.128	961269.731	58.454275000000	-6.674627777778	338.40	210.00
WT38	OBST: Wind_Turbine	128315.978	963831.703	58.477763888889	-6.662438888889	338.40	210.00
WT39	OBST: Wind_Turbine	127805.601	957219.335	58.418255555556	-6.663302777778	338.40	210.00
WT40	OBST: Wind_Turbine	128552.092	959903.175	58.442744444444	-6.653744444444	338.40	210.00
WT41	OBST: Wind_Turbine	129408.960	962527.341	58.466766666667	-6.642216666667	338.40	210.00
WT42	OBST: Wind_Turbine	129735.213	958536.957	58.431247222222	-6.631933333333	338.40	210.00
WT43	OBST: Wind_Turbine	130495.692	961142.800	58.455044444444	-6.622019444444	338.40	210.00



WT44	OBST: Wind_Turbine	131654.849	959854.536	58.444225000000	-6.6007111111111	338.40	210.00
OSS	OBST: Offshore Substation	124620.182	957365.214	58.417568007876	-6.717819592095	110.00	100.00

Table 1: Wind Turbine coordinates & elevation



2. Current IFPs Assessment

The table below details the result of the assessment of the proposed windfarm against Stornoway Airport's currently published IFPs:

IFP	Impact
Minimum Sector Altitudes (All Sectors)	The proposed windfarm is located within the NW (090°-180°) MSA Sector only. However, the proposed windfarm's elevation is less than the NW MSA Sector MOCA ² minus MOC ³ . Therefore, there is no impact.
Holds (SAY & STN)	The proposed windfarm is located within the Hold buffer areas. However, the LHA ⁴ minus the applicable MOC is greater than the wind turbine elevation. Therefore, there is no impact.
Visual Circling Total Area (All Aircraft Categories)	The proposed windfarm is located outside of the VMC (Total) protection areas. Therefore, there is no impact.
Visual Circling East of RWY 18/36 (All Aircraft Categories)	The proposed windfarm is located outside of the (Restricted) protection areas. Therefore, there is no impact.
RWY18 LOC/DME	Some of the proposed windfarm's wind turbines are located within the lateral extents of the initial approach, procedure turn, of this IAP and the wind turbines have an impact on the Initial Approach MOCA. Therefore, there is an impact. See section 4.1 for further details. The windfarm is outside of the lateral extents of the remaining IAP protection areas.
RWY18 NDB/DME	Some of the proposed windfarm's wind turbines are located within the lateral extents of the initial approach, procedure turn, of this IAP and the wind turbines have an impact on the Initial Approach MOCA. Therefore, there is an impact. See section 4.1 for further details. The windfarm is outside of the lateral extents of the remaining IAP protection areas.
RWY18 NDB	Some of the proposed windfarm's wind turbines are located within the lateral extents of the initial approaches, procedure turn and extended racetrack (CAT C, D), of this IAP and the wind turbines have an impact on the Initial Approach MOCA. Therefore, there is an impact. See section 4.1 for further details. The windfarm is outside of the lateral extents of the remaining IAP protection areas.
RWY18 VSS (Visual Surface Segment)	The proposed windfarm is located outside of the VSS protection areas. Therefore, there is no impact.

² MOCA - Minimum Obstacle Clearance Altitude

³ MOC – Minimum Obstacle Clearance

⁴ LHA – Lowest Holding Altitude.



Direct Arrival to RWY18	The proposed windfarm is located outside of the Direct Arrival protection areas. Therefore, there is no impact.
RWY36 LOC/DME	The proposed windfarm is located outside of the lateral extents of the IAP protection areas. Therefore, there is no impact.
RWY36 LOC/NDB	The proposed windfarm is located outside of the lateral extents of the IAP protection areas. Therefore, there is no impact.
RWY36 NDB/DME	The proposed windfarm is located outside of the lateral extents of the IAP protection areas. Therefore, there is no impact.
RWY36 NDB	The proposed windfarm is located outside of the lateral extents of the IAP protection areas. Therefore, there is no impact.
RWY36 VSS (Visual Surface Segment)	The proposed windfarm is located outside of the VSS protection areas. Therefore, there is no impact.
Direct Arrival to RWY36	The proposed windfarm is located outside of the Direct Arrival protection areas. Therefore, there is no impact.
VOR/DME to ADM	The proposed windfarm is located outside of the lateral extents of the IAP protection areas. Therefore, there is no impact.
Direct Arrival to ADM	The proposed windfarm is located outside of the Direct Arrival protection areas. Therefore, there is no impact.

Table 2: Current IFP Assessment Result



3. Future IFP Assessment

The table below details the result of the assessment of the proposed windfarm against Stornoway Airport's future RNP IAPs:

IFP	Impact
Minimum Sector Altitudes (25NM & 10NM)	The proposed windfarm is located within the MSA uni-sector. However, the MSA sector MOCA minus MOC is greater than the wind turbine's elevation. Therefore, there is no impact.
Holds (SAY & STN)	The wind turbines are located within the Hold buffer areas. However, the LHA minus buffer MOC is greater than obstacle elevation. Therefore, there is no impact.
Visual Circling Total Area (All Aircraft Categories)	The proposed windfarm is located outside of the VMC (Total) protection areas. Therefore, there is no impact.
Visual Circling East of RWY 18/36 (All Aircraft Categories)	The proposed windfarm is located outside of the (restricted) protection areas. Therefore, there is no impact.
RWY18 TAA	The proposed windfarm is located within the lateral extents of IAWP1 10NM and 25NM and IAWP2 25NM and has an impact on the TAA MOCA for IAWP2. See section 4.2 for further details.
RWY18 RNP (LNAV)	The proposed windfarm is located outside of the protection areas for this Instrument Approach Procedure (IAP). Therefore, there is no impact.
RWY18 RNP (LNAV/VNAV)	The proposed windfarm is located outside of the protection areas for this Instrument Approach Procedure (IAP). Therefore, there is no impact.
RWY18 VSS (Visual Surface Segment)	The proposed windfarm is located outside of the VSS protection areas. Therefore, there is no impact.
RWY36 TAA	The proposed windfarm is located within the lateral extents of IAWP6 TAA. However, the TAA MOCA minus MOC is greater than the wind turbine elevation. Therefore, there is no impact.
RWY36 RNP (LNAV)	The proposed windfarm is located outside of the protection areas for this Instrument Approach Procedure (IAP). Therefore, there is no impact.
RWY36 RNP (LNAV/VNAV)	The proposed windfarm is located outside of the protection areas for this Instrument Approach Procedure (IAP). Therefore, there is no impact.
RWY36 VSS (Visual Surface Segment)	The proposed windfarm is located outside of the VSS protection areas. Therefore, there is no impact.

Table 3: Future RNP IAP Assessment Result



4. Conclusion

The assessment concludes that the proposed windfarm, based on the supplied obstacle data contained within Section 1, **would have an impact** on Stornoway Airport's Instrument Flight Procedures.

Impact description and possible mitigation.

4.1. Currently published IFP impact

4.1.1. RWY18 LOC/DME/NDB(L) – Initial Approach (PT⁵)

10 wind turbines are located within the lateral extents of the protection area for the initial approach, 45°-180° procedure turn. However, only wind turbines 43 and 44 have an impact on the procedure turn's MOCA of 2000ft. The wind turbines would require an increase in MOCA of 100ft to 2100ft.

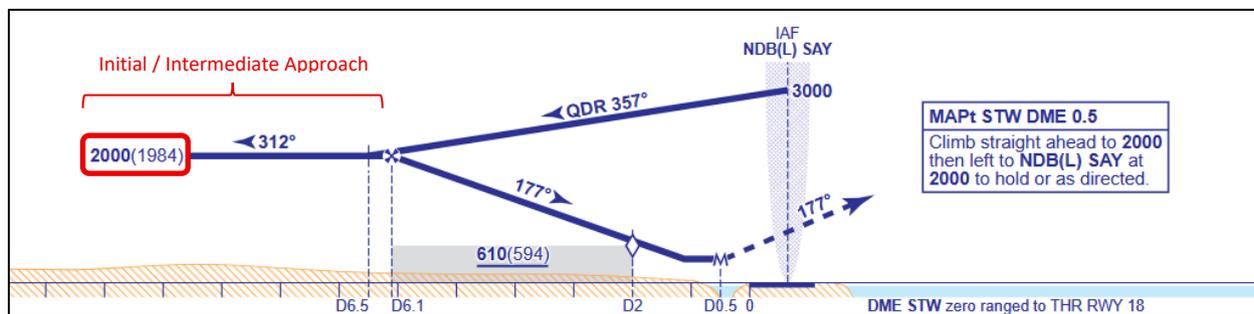


Figure 2: RWY18 LOC/DME/NDB(L) profile view

Possible mitigation:

- If wind turbines 43 and 44 are excluded from the windfarm then there would be no impact to this IAP's initial approach, procedure turn (45°-180°)
- If wind turbines 43 and 44 maximum elevation is reduced from 338.40m to 309.00m or less there would be no impact to this IAP's initial approach.

Impacted IAC⁶: AD 2.EGPO-8-1 INSTRUMENT APPROACH CHART LOC/DME/NDB(L) RWY 18 - ICAO

4.1.2. RWY18 NDB(L)/DME – Initial Approach (PT)

10 wind turbines are located within the lateral extents of the protection area for the initial approach, 45°-180° procedure turn. However, only wind turbines 43 and 44 have an impact on the procedure turn's MOCA of 2000ft. The wind turbines would require an increase in MOCA of 100ft to 2100ft.

⁵ PT – Procedure Turn
⁶ IAC: Instrument Approach Chart

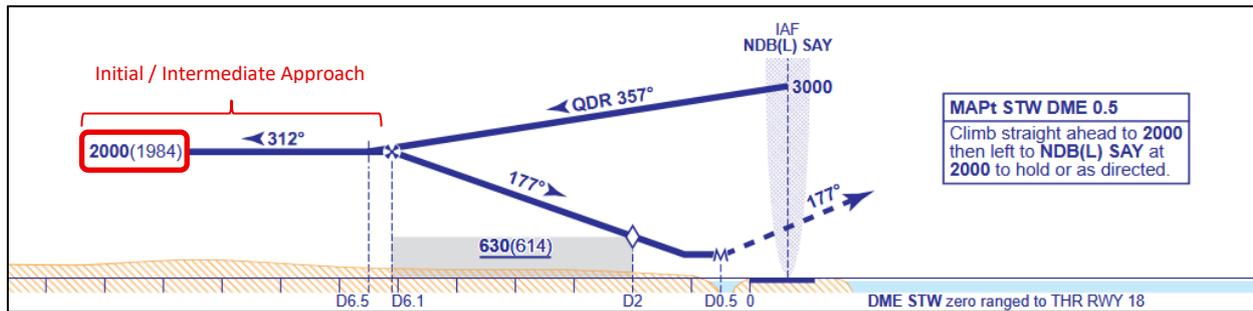


Figure 3: RWY18 NDB(L)/DME profile view

Possible mitigation:

- If wind turbines 43 and 44 are excluded from the windfarm then there would be no impact to this IAP's initial approach, procedure turn (45°-180°)
- If wind turbines 43 and 44 maximum elevation is reduced from 338.40m to 309.00m or less there would be no impact to this IAP's initial approach.

Impacted IAC: AD 2.EGPO-8-2 INSTRUMENT APPROACH CHART NDB(L)/DME RWY 18 - ICAO

4.1.3. RWY18 NDB(L) – Initial Approach (PT)

10 wind turbines are located within the lateral extents of the protection area for the initial approach, 45°-180° procedure turn. However, only wind turbines 43 and 44 have an impact on the procedure turn's MOCA of 2000ft. The wind turbines would require an increase in MOCA of 100ft to 2100ft.

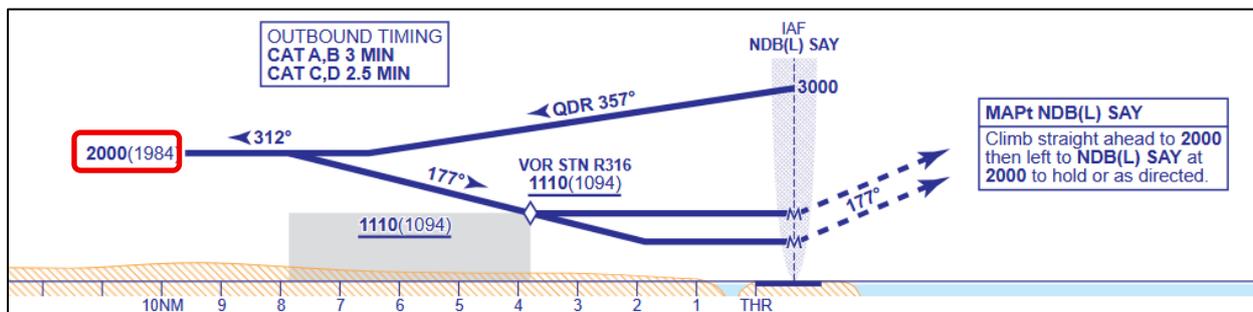


Figure 4: RWY18 NDB(L) profile view

Possible mitigation:

- If wind turbines 43 and 44 are excluded from the windfarm then there would be no impact to this IAP's initial approach, procedure turn (45°-180°)
- If wind turbines 43 and 44 maximum elevation is reduced from 338.40m to 309.00m or less there would be no impact to this IAP's initial approach.

Impacted IAC: AD 2.EGPO-8-3 INSTRUMENT APPROACH CHART NDB(L) RWY 18 – ICAO



4.1.4. RWY18 NDB(L) – Initial Approach (RT⁷ CAT C,D)

23 wind turbines are located within the lateral extents of the protection area for the initial approach, Racetrack CAT C, D. However, wind turbines 31 to 44 have an impact on the procedure turn's MOCA of 2000ft. The wind turbines would require an increase in MOCA of 100ft to 2100ft.

See figure 4.

Possible mitigation:

- If wind turbines 31 to 44 are excluded from the windfarm, then there would be no impact to this IAP's initial approach, procedure turn (Racetrack)
- If wind turbines 31 to 44 maximum elevation is reduced from 338.40m to 309.00m or less there would be no impact to this IAP's initial approach.

Impacted IAC: AD 2.EGPO-8-3 INSTRUMENT APPROACH CHART NDB(L) RWY 18 - ICAO

4.2. Future IFP impact

4.2.1. RWY18 RNP Terminal Arrival Altitude (TAA)

The windfarm is located within the lateral extents of the TAAs for IAWP1 10 & 25NM and IAWP2 25NM and has an impact on the TAA MOCA for IAWP2. Therefore, there is an impact. The TAA MOCA would be required to be increase by 200ft, from 1900ft to 2100ft.

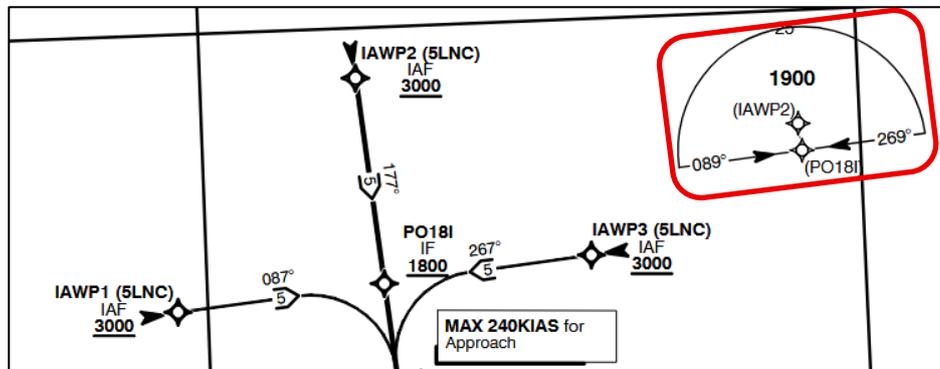


Figure 5: RWY18 RNP TAAs

However, the IAWP2 altitude restriction is not below 3000ft. Therefore, the wind turbine derived TAA MOCA is able to be accommodated without impact to the overall IFP design. It should be noted that the TAA MOCAs are generally aligned with the IAF altitude restriction whereas in this case it seems to be aligned purely to the obstacle environment when V1.0 was designed. This TAA MOCA will be re-evaluated when the Stornoway RNP designs are refreshed. This work will be commencing in the near future. This should be confirmed with HIAL and if this is an impact or not.

Impacted IAC: CL-5570-DOC-003 V1.0 RNP APCH RWY 18 Chart 08092021

⁷ RT – Racetrack.

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