

**Moray Offshore Wind Farm (West) Ltd**

**Moray West**

**Gateway Documentation:**

**Stage 4**

**4A: Options Appraisal (Phase III– Final)**

**Including Safety Assessment**



## Authorship

Action	Role	Date
Produced	██████████ - Airspace Change Specialist NATS	February 2021
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## References

Ref No	Description	Hyperlinks
1	Moray Offshore Windfarm (West) Ltd Phase 1 CAA web page – progress through CAP1616	<a href="#">Link</a>
2	Stage 1 Assessment Meeting Presentation	<a href="#">Link</a>
3	Stage 1 Assessment Meeting Minutes	<a href="#">Link</a>
4	Stage 1 Design Principles	<a href="#">Link</a>
5	Stage 2 Design Options	<a href="#">Link</a>
6	Stage 2 Design Principle Evaluation	<a href="#">Link</a>
7	Stage 2 Options Appraisal (Initial) & Safety Assessment	<a href="#">Link</a>
8	Stage 3 Consultation Strategy	<a href="#">Link</a>
9	Stage 3 Full Options Appraisal	<a href="#">Link</a>
10	Stage 3 Consultation Document	<a href="#">Link</a>
11	Stage 3 Collate and Review Responses	<a href="#">Link</a>
12	NATS Windfarm Safety Assurance Report	Supplied separately to CAA

## Publication history

Issue	Month/Year	Change Requests in this issue
1.0	February 2021	Submitted to CAA

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## 1. Introduction

- 1.1 This document forms part of the document set required in accordance with the requirements of the CAP1616 airspace change process.
- 1.2 This document aims to provide adequate evidence to satisfy:  
Stage 4, Step 4A Options Appraisal (phase III – Final), including Safety Assessment.
- 1.3 This Options appraisal and safety assessment is unchanged from the equivalent Stage 3 Documents.

## 2. Final Options Appraisal

- 2.1 Table 2 is based on the key analyses described in CAP1616 Table E2.

Group	Impact	Level of Analysis	Evidence
Communities	Noise impact on health and quality of life	Qualitative	There are no proposed changes to air traffic patterns so there will be no impact for noise. The designated area is approx. 22.5 km from the Caithness coast and 24 km from the Aberdeenshire coast.
Communities	Air quality	Qualitative	No changes to aircraft trajectories below 1,000ft.
Wider society	Greenhouse gas impact	Monetise and quantify	The introduction of the wind farm is anticipated to provide CO <sub>2</sub> e benefits of c. 1 million tonnes per annum <sup>1</sup> which is a wider benefit enabled by, but not directly attributable to this proposal. This will only be realised if the airspace change is implemented. Only aircraft without an operational transponder may have to route around the TMZ. In summer, this is <2 flights per week and can be considered negligible.
Wider society	Capacity/resilience	Qualitative	This option will have no anticipated impact.
General Aviation	Access	Qualitative	For GA aircraft equipped with an operating transponder there would be no change in access due to the proposed TMZ. Aircraft without an operational transponder would be restricted from entering the TMZ without first being granted access to the TMZ from TMZ controlling Authority. Without this clearance they would be required to fly a route avoiding the TMZ. GA users without an operating transponder wanting to access the TMZ without obtaining access from the controlling authority will have a one-off cost implication (approx. £2,000) to purchase a transponder. Given the offshore location (22.5 km from Caithness coastline), the demand for GA aircraft without a transponder wanting to fly over this area is minimal. The vast majority of

<sup>1</sup> Calculated using <https://www.renewableuk.com/page/UKWEDhome> and <https://www.moraywest.com/>

			GA aircraft, >99%, are transponder equipped and will not be impacted by this airspace change.
General Aviation/ commercial airlines	Economic impact from change in effective capacity	Qualitative	There would be no change in effective capacity.
General Aviation/ commercial airlines	Fuel burn	Monetise	No expected change to fuel burn for commercial airlines as flight plannable routes will remain unchanged and they will be able to route through the TMZ as currently. GA users may incur increased fuel burn if they are forced to reroute around the TMZ if they do not have the relevant equipage. However, the likely volume of non-transponder equipped aircraft which may pass through this area and any potential increase in fuel burn as a result would be negligible (estimate <2 per week).
Commercial airlines	Training cost	Qualitative	N/A – there are not expected to be any airline training cost associated with this development.
Commercial airlines	Other costs	Qualitative	Updates to FMS and flight planning systems will be by the routine AIRAC updates. There are no other known costs which would be imposed on commercial aviation.
Airport/ Air navigation service provider	Infrastructure costs	Qualitative and quantitative	There would be no associated infrastructure costs. The developer has agreed to cover all engineering costs for implementation of the Radar RAG Blanking.
Airport/ Air navigation service provider	Operational costs	Qualitative	N/A – this proposal would not lead to changes in operational costs.
Airport/ Air navigation service provider	Deployment costs	Qualitative	N/A – no costs for the ANSP anticipated for the deployment of the TMZ.

Table 1: Option C analysis based on CAP1616 Table E2 Safety Assessment

This assessment is unchanged from the equivalent Stage 3 Document:

### 3. Safety Assessment

The Option C "WTG locations RAG blanked, with a TMZ plus a minimum 2 NM buffer to align with existing and planned TMZs" is proposed as the optimum solution to mitigate the impact of the MOWWL WTGs on the Allanshill PSR system.

This option will provide:

- RAG blanking will provide effective suppression of all primary radar clutter associated with the WTGs.
- The promulgation of a TMZ over the RAG blanked area will ensure that aircraft within the RAG blanked area must be transponder equipped and hence will remain visible to ATC via secondary surveillance radar.

- The dimensions of the TMZ include a 2 NM buffer which is adequate to ensure that ATC have sufficient time to identify when an infringement of the TMZ is taking place and take appropriate action.

Experience from previous wind farm developments has demonstrated that the implementation of radar RAG blanking coupled with an associated TMZ provides safe and effective mitigation against radar issues associated with WTGs.

Initial qualitative assessment from NATS Safeguarding has confirmed that the proposed Option C design would provide adequate mitigation to fulfil the requirements required of the NERL Allanshill: PSR Mitigation Scheme.

### 3.1 **Safety Assessment Conclusion**

The proposed Option C TMZs coupled with RAG blanking provides safe and effective mitigation against the radar issues associated with WTGs. (Ref 12).