

Introduction of RNP IAPs at Benbecula Airport

ACP-2023-018 Stage 2 Submission

Version	Content	Date
1.0	Original	24 January 2024
2.0	Updated following CAA feedback	1 March 2024

Change Record

CAA Feedback	Sponsor Response	Location of update(s)
The sponsor is required to produce a traffic forecast in terms of the total number and types of aircraft that will be operating at the aerodrome and those anticipated to use the RNP IAPs in the first two years after the introduction of the ACP.	Text and table added to submission.	Paragraphs 3.2.2-3.2.8 Table 4 Pages 12-14
The change sponsor is required to provide the estimated frequency of use (as a % of the total arrival movements) for the northern Y-bar approach leg to RWY24.		

Table of Contents

1. INTRODUCTION	3
1.1 PURPOSE OF THIS ACP	3
1.2 WHAT IS PERFORMANCE-BASED NAVIGATION (PBN)	3
1.3 THE AIRSPACE CHANGE PROCESS	4
1.4 STAGE 1 SUMMARY	4
1.5 CAP1616H LEVEL 3 PRE-SCALED ACP - STAGE 2	5
2. AIRPORT INFORMATION	8
2.1 GENERAL INFORMATION	8
2.2 AIR TRAFFIC MOVEMENTS	8
2.3 CURRENT PROCEDURES	9
3. PROPOSED OPTION	11
3.1 DEVELOPMENT OF OPTION	11
3.2 EXPECTED USE OF THE OPTION	12
3.3 OPTION NOT BEING PROPOSED	13
4. OPTION ASSESSMENT	14
4.1 SUMMARY OF CAP1616 REQUIREMENTS.....	14
4.2 EVALUATION METHODOLOGY	14
4.3 DESIGN PRINCIPLE EVALUATION	16
4.4 OPTIONS APPRAISAL.....	17
4.5 ATM SAFETY QUESTIONNAIRE.....	20
4.6 APDO FEEDBACK	20
4.7 HABITATS REGULATION ASSESSMENT – EARLY SCREENING CRITERIA.....	20
5. CONCLUSION.....	24

1. Introduction

1.1 Purpose of this ACP

- 1.1.1 Benbecula Airport is seeking to introduce Performance Based Navigation (PBN) Approaches at the airport.
- 1.1.2 Benbecula Airport planned to introduce PBN to improve approaches at the airport originally in 2013. However, as Civil Aviation Authority (CAA) approval was never received for the proposed designs, it has become necessary for Benbecula Airport to carry out an Airspace Change Proposal in accordance with CAP1616.
- 1.1.3 Due to the delay, it is now increasingly urgent for PBN approaches to be implemented at the airport, due to the forthcoming removal of the BEN DVOR¹ as part of the NATS NERL rationalisation programme.
- 1.1.4 Benbecula Airport are now carrying out a Level 3 ACP, in accordance with the CAP1616H, Appendix A² guidance and this document is the Stage 2 submission.

1.2 What is Performance-Based Navigation (PBN)

- 1.2.1. PBN improves the accuracy of where aircraft fly, by moving away from outdated conventional navigation – using ground-based beacons, to modern satellite navigation. This technology allows more flexible position of routes and enable aircraft to fly them more accurately. This helps improve operation performance and reduce delays. PBN is being introduced across the world.
- 1.2.2 There are various specification of PBN approach and Benbecula Airport are looking to introduce RNP (Required Navigation Performance) approaches. RNP use a series of satellite-based way points which aircraft follow, to fly the overall Instrument Approach Procedure (IAP). Aircraft join the IAP at the Initial Approach Fix (IAF) waypoint before proceeding to the Intermediate Fix (IF), then to the Final Approach Fix (FAF) and descent to either land or undertake a missed approach.

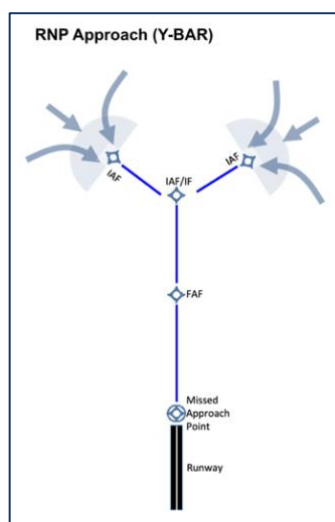


Figure 1: RNP Approach

¹ DVOR is a radio beacon for aviation navigation. The UK beacons are part of a rationalisation programme whereby many DVOR guidance facilities will either be withdrawn or become unsupported.

² [CAP1616H](#)

1.3 The Airspace Change Process

- 1.3.1 In December 2017, the CAA reformed the airspace change process and introduced CAP1616 Airspace Change Guidance detailing the regulatory process for changing the design of airspace over the UK, including flight paths and procedures.
- 1.3.2 In correspondence with the CAA prior to the commencement of this ACP, the CAA advised HIAL that they should follow the Part 1C Airspace Change Proposal format, the process of which is laid out in CAP1616 (Edition 4), Part 1c, pages 97-102³.
- 1.3.3 The process is similar to the full Level 1 ACP as laid out in CAP1616, with 7 stages, however the requirements and outputs differ, as do the timescales.
- 1.3.4 At the start of this ACP, on 5 October 2023 Edition 4 of CAP1616 was in use. However, CAP1616 had undergone a consultation and update earlier in 2023 and Edition 5 was published at the end of October 2023, after the Statement of Need and Assessment meeting for this ACP had taken place. As a consequence of the update to CAP1616, a Part 1C ACP has now been renamed as a Level 3 Pre-Scaled ACP.
- 1.3.5 This ACP was initiated under CAP1616 Edition 4 and Stage 1 was in accordance with the requirements of that document.
- 1.3.6 Following discussion with the CAA, Stage 2 onwards will be written in accordance with the new CAP1616H, Pre-Scaled ACP, Appendix A, pages 24-31.

1.4 Stage 1 Summary

- 1.4.1 HIAL submitted a Statement of Need to the CAA in March 2023 and held an Assessment Meeting with the CAA on 5 October 2023.
- 1.4.2 The full Statement of Need can be found on the CAA Portal [here](#) and the minutes from the Assessment Meeting are available [here](#).

Benbecula Airport is currently served by IAPs relying on conventional navigational aids (BBA NDB and BEN DVOR). The current UK DVOR infrastructure was installed circa 1982-1991 is operation well beyond design life and cannot be support in the long term, hence the decision taken to reduce the UK infrastructure of en-route DVOR from 46 down to 19. To address ongoing support capability, the DVORs at BEB were to be rationalised (removed from service) by December 2019 since they did not form part of the requirement to maintain a reduced en-route capability in line with NERLs diminished capability to provide support and maintain appropriate levels of competence for such support.

HIAL planned to introduce RNP (originally GNSS) approaches to Benbecula as part of its aim to innovate and move to a PBN environment, but more importantly to mitigate the loss of the BEN DVOR. The charts and safety case were initially submitted to the CAA in 2013, with a revised chart submission in 2014. This was approximately 4 years prior to the introduction of CAP1616. However, CAA approval was never received and the directive on HIAL is that the introduction of RNP IAPs must now follow the CAP1616 process.

Through conversation with HIAL, NERL have mitigated the delay to the approval of RNP procedures by extending the operational use of DVOR at BEB until 31st

³ [CAP1616](#), 4th edition, published March 2021

December 2023. However, the risk associated with the design life and available support is not mitigated since the agreement is based on planned and corrective maintenance on a reasonable endeavour basis only.

The NDB IAPs are prone to ground effect and regular outages in the harsh environment of the Western Islands of Scotland. RNP IAPs will not have the same dependency on either weather or engineering support (weather permitting, it can take 2 days for an ATSEP to travel to the Island, thus increasing the risk exponentially). Dependency on old and unreliable technology such as the terrestrial based NDB is not sufficient to ensure the sustainability of airport operations and vital connectivity to islands communities, including out of hours medical emergency and SAR flights, nor will there be any resilience following the permanent removal of the DVOR.

The introduction of RNP IAPs are an essential measure at Benbecula to cater for the DVOR rationalisation programme, together with the unreliable nature of the NDB, to provide IAPs to life-line services to the island community. RNP are the means by which HIAL aim to support the CAA future airspace and PBN aspirations.

- 1.4.3 Unlike the full level 1 ACP CAP1616 process, there is no requirement for stakeholder engagement in Stage 1, so following the agreement of the assessment meeting minutes the CAA authorised HIAL to move into Stage 2 of the process.

1.5 CAP1616H Level 3 Pre-Scaled ACP - Stage 2

Design Principles

- 1.5.1 A Level 3 Pre-Scaled ACP, Appendix A recognises that the options associated with the implementation of an RNP IAP are very limited, and for this reason, there is no requirement for sponsors' own Design Principles to be developed beyond the mandatory Design Principles (MDP) outlined in CAP1616H and CAP1616F⁴. These are MDP Safety and MDP Policy.
- *MDP Safety: The airspace change proposal must maintain a high standard of safety and should seek to enhance current levels of safety.*
 - *MDP Policy: The airspace change proposal should not be inconsistent with relevant legislation, the CAA's airspace modernisation strategy or Secretary of State and CAA's policy and guidance.*
- 1.5.2 Guidance from the Secretary of State to the CAA recognises that the CAA must consider the environmental impacts of a proposal before making a decision, but that the Air Navigation Guidance 2017 does not apply to these types of airspace change proposals. The MDP Environment therefore does not apply to this pre-scaled process. However, change sponsors must produce an assessment of any design options considered against the following environmental design principle:
- *The airspace change proposal should avoid overflight of densely populated areas where possible⁵.*

⁴ [CAP1616F page 20](#)

⁵ This is in line with the government's policy to limit and, where possible, reduce the number of people in the UK adversely affected by aircraft noise and the impacts on health and quality of life associated with it.

- 1.5.3 Whilst the sponsor must include these three design principles, they should also include other design principles that reflect local considerations or impacts to other airspace users, so that they are considered part of the design process.
- 1.5.4 The development of these design principles can be undertaken without additional engagement.
- 1.5.5 Benbecula Airport has decided to add a fourth design principle:
- *The proposal should replicate existing design/traffic patterns to the greatest extent possible.*
- 1.5.6 All design options will need to demonstrate how they meet (or don't meet) the design principles developed at this stage. This is shown in our Option(s) Evaluation in Section 4.3 of this document.

Environmental Assessment Requirements

- 1.5.7 The CAA must consider the environmental impact of a proposal before making a decision, but Air Navigation Guidance does not apply to this type of ACP⁶.
- 1.5.8 The sponsor should consider the environmental impact of any potential design option and should set out the change that is anticipated from the introduction of the proposed IAP, along with any supporting evidence. This should include:
- *The anticipated change in the number of aircraft using the aerodrome;*
 - *The change in the type of aircraft using the aerodrome;*
 - *Changes in altitude of aircraft using the procedures; and,*
 - *Change in areas overflown by the introduction of the IAPs.*
- 1.5.9 No further environmental assessment will be necessary if:
- *The sponsor can reasonably demonstrate that the introduction of RNP IAP is not expected to increase the total number of aircraft movements at the aerodrome in the first two years after introduction, by 10% or more (by at least a minimum of 3,6540 movements per year), and;*
 - *The proposal does not change the normal final approach path of aircraft within 1nm of the runway, and;*
 - *The proposal will not change the environmental impact of aircraft utilising other aerodromes.*

Additional Requirements

- 1.5.10 The sponsor should engage with an Approved Procedure Design Organisation (APDO) to understand the potential design options in the context of the circumstances at the aerodrome (for example, obstacles, nearby airspace structures as well as environmental considerations).
- 1.5.11 The change sponsor will need to develop their operational concept and complete the CAA's ATM Safety Questionnaire. The review and associated feedback of this

⁶ CAP1616H Appendix A, para A6

Questionnaire allows the sponsor to continue to develop their final Safety Case for the operation of the procedures.

- 1.5.12 The change sponsor must complete the habitats regulations assessment early screen criteria form, available at CAP1616i, Environmental Assessment Requirements and Guidance for Airspace Change Proposals⁷. If the sponsor can reasonably demonstrate that the airspace change proposal is unlikely to have a significant effect on a European site, no further habitats regulations assessment will be required.

⁷ [CAP1616i](#)

2. Airport Information

2.1 General Information

- 2.1.1 Benbecula Airport is situated on the island of Benbecula in the Outer Hebrides, off the West Coast of Scotland. The airport provides scheduled services to the Scottish mainland and other Hebridean islands. It is also used by emergency air ambulance flights, and by flight supporting the nearby range (EFD701 Danger Area Complex).
- 2.1.2 There are two runway strips containing RWYs 06/24, 837m long and 46m wide; and RWYs 17/35, 1208m long and 46m wide.
- 2.1.3 An overview of the airspace, infrastructure and operations at Benbecula Airport are provided within the aerodrome specific section of the UK Aeronautical Information Publication (AIP) at AD2. EGPL, [here](#).

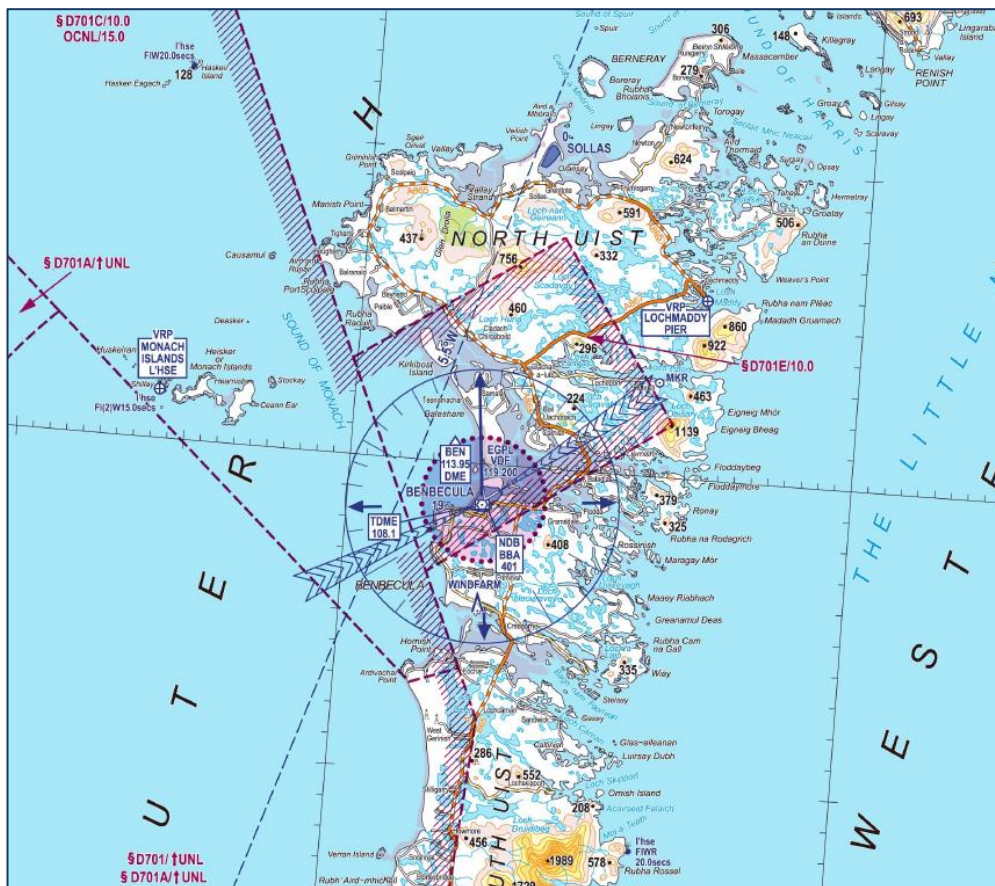


Figure 2: Local Area Chart (Benbecula)

- 2.1.4 The airport provides Air Traffic Control (ATC) and Aerodrome Flight Information Officer (AFISO) services to aircraft operators.
- 2.1.5 The Airport operates on a Prior Permission Required (PPR) only basis and restricts traffic according to its operational capability.

2.2 Air Traffic Movements

- 2.2.1 Benbecula Airport operates on a Prior Permission Required (PPR) only basis and restricts traffic according to its operational capability. The scheduled aerodrome opening hours are (UTC):

Mon/Wed/Fri 0800-1545; Tue/Thu 0745-1745; Sat 0800-0830, 1015-1145, 1215-1245; Sun 1245-1400⁸.

- 2.2.2 The following tables summarise the air traffic movements at Benbecula Airport since 2019.

Commercial Movements						Non-Commercial Movements						
	Total	Air Transport	Of Which			Test & Training	Other flights by AT Operators	Aero Club	Private	Official	Military	Business Aviation
			Air Taxi	Positioning Flights	Local Movements							
2019	3484	3182	1271	162	2	12	5	0	62	0	59	0
2020	2367	2222	953	84	15	2	3	0	17	0	24	0
2021	2931	2591	1019	220	6	0	6	0	56	0	52	0
2022	2772	2254	328	189	65	5	167	1	47	22	16	6

Table 1: Air Traffic Movements 2019-2022⁹

- 2.2.12 The principal operator at Benbecula Airport is Loganair, who operate scheduled services to/from Glasgow, Inverness, and Stornoway Airports. Benbecula Airport also has flights from Gama (air ambulance) and Bristow's (Search and Rescue), Castle Air, (Qinetiq installation support) and UK military aircraft.

2.3 Current Procedures

- 2.3.1 The existing instrument approaches for aircraft arriving at Benbecula Airport are VOR/DME, DME and NDB (L).
- 2.3.2 Over the last 5 years at Benbecula Airport, Runway 06 was in use approximately 32.2% of the time and Runway 24 was in use approximately 67.8% of the time.
- 2.3.3 The approximate usage of the existing procedures is in the following table.

	Current approximate usage		
	VOR Approaches	NDB Approaches	Visual Approaches
RWY 24	95%	Less than 1%	Approx. 4%
RWY 06	80%	Less than 1%	Approx. 19%

Table 2: Existing procedures % usage

- 2.3.4 The following images show the existing approaches to Runway 06 at the airport.

⁸ Subject to change depending on Loganair schedule

⁹ Information taken from CAA airport data [here](#)

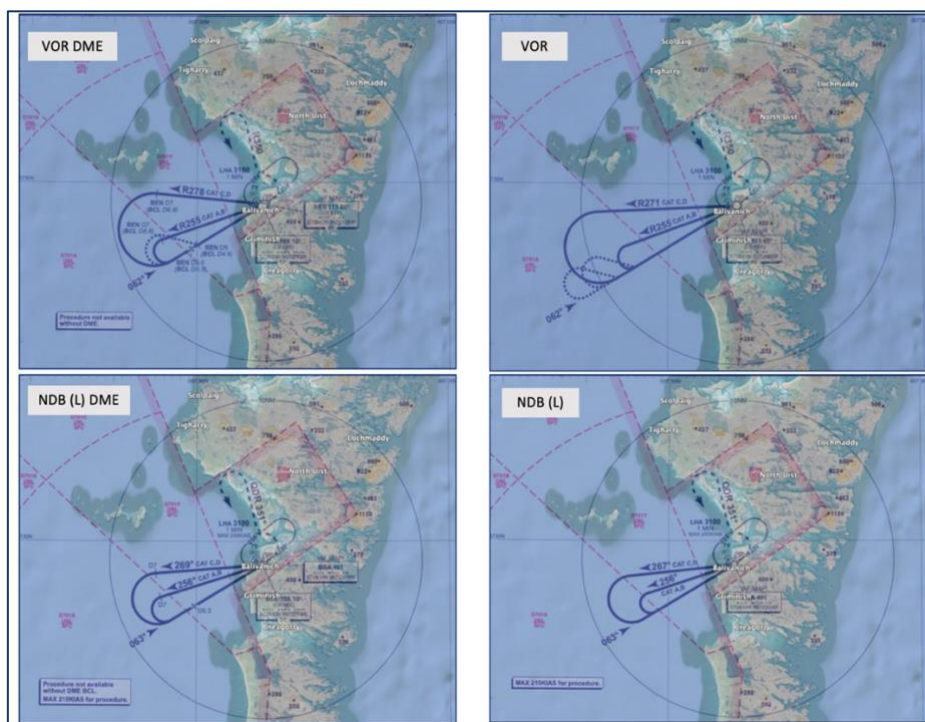


Figure 3: Existing approaches to Runway 06

2.3.5 The following images show the existing approaches to Runway 24 at the airport.

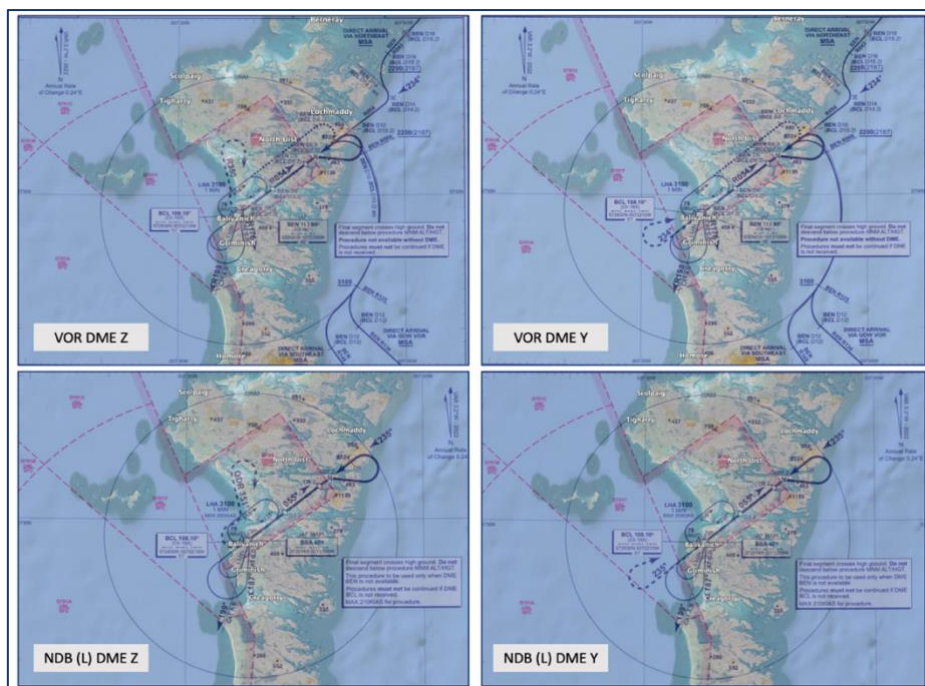


Figure 4: Existing approaches to Runway 24

2.3.6 The existing VOR based procedures will continue to be available at Benbecula Airport until the VOR is withdrawn by NATS (NERL), at which point they will be removed from the AIP. The NDB DME procedures will remain.

3. Proposed Option

3.1 Development of Option

- 3.1.1 For a Level 3 ACP, it is acceptable, with supporting justification, for the sponsor to produce one option.
- 3.1.2 The original options for RNP approaches to Benbecula Airport were designed by Cyrrus and submitted to the CAA in late 2012/early 2013. These designs were amended in 2013 and in 2016 and to address CAA feedback and re-submitted to the CAA. They were subject to further feedback from the CAA in 2020 and were subsequently amended again.
- 3.1.3 The current option is the design which has already been through a long process of IFP design, stakeholder feedback and has incorporated feedback following CAA IFP review, as well as supporting HIAL safety case development.
- 3.1.4 The designs look to replicate what is currently flown and overfly the water to the greatest extent possible.
- 3.1.5 The following image illustrates the option for the RNP Approach to Runway 06 (red line) overlaid onto the existing approaches to Benbecula Airport.

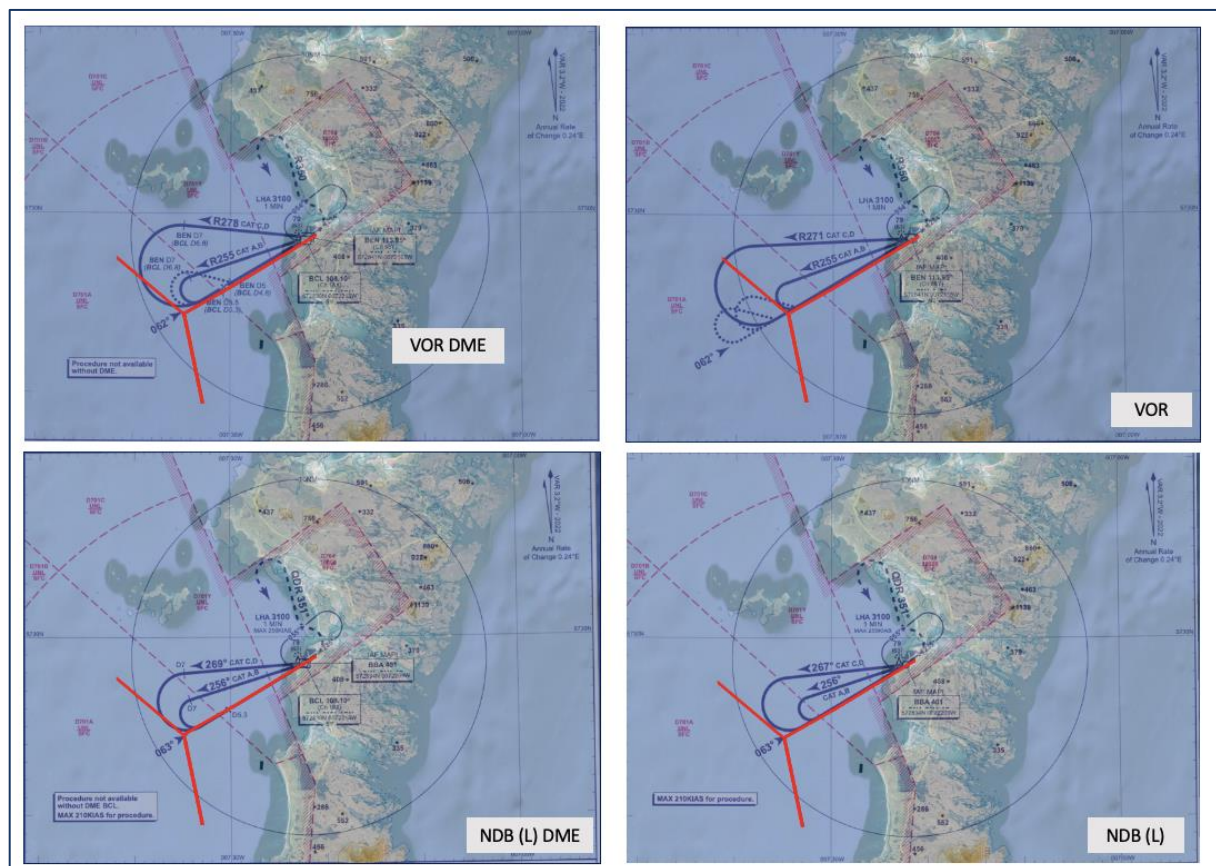


Figure 5: Design option for RNP Approach to Runway

- 3.1.6 The following 4 images shows the option for the RNP Approach to Runway 24 (red line) overlaid onto the existing approaches at Benbecula Airport.

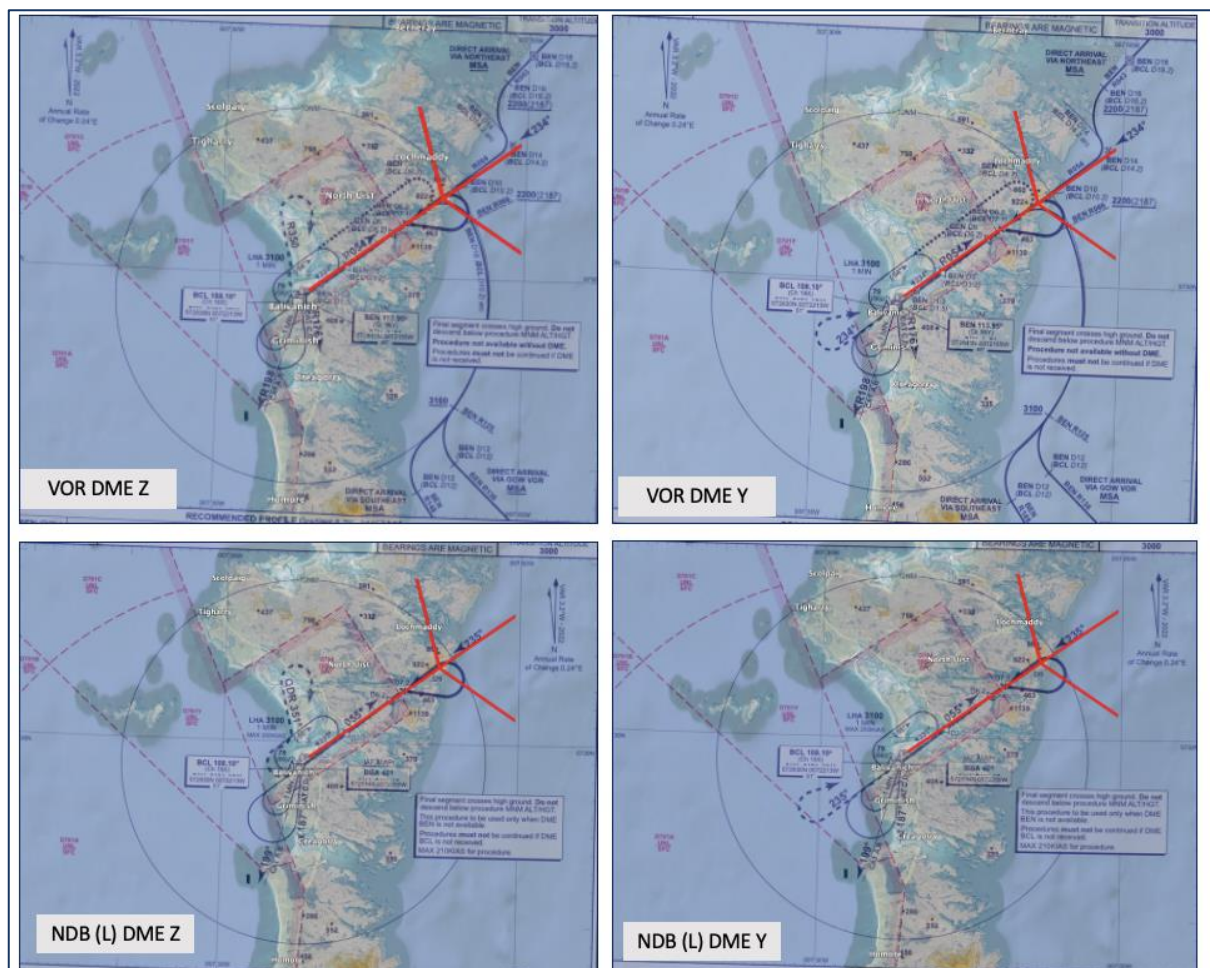


Figure 6: Design option for RNP Approach to Runway 24

3.2 Expected use of the option

- 3.2.1 The estimated use of the RNP Approach and the remaining approaches is in the table below.

	Approximate usage with RNP Approach (and loss of VOR)		
	RNP Approaches	NDB Approaches	Visual Approaches
RWY 24	95%	Less than 1%	Approx. 4%
RWY 06	80%	Less than 1%	Approx. 4%

Table 3: Forecast use of approaches

- 3.2.2 Following the assessment of the Stage 2 submission, the CAA requested the following additional information from Benbecula Airport.

“The sponsor is required to produce a traffic forecast in terms of the total number and types of aircraft that will be operating at the aerodrome and those anticipated to use the RNP IAPs in the first two years after the introduction of the ACP.”

and

“The change sponsor is required to provide the estimated frequency of use (as a % of the total arrival movements) for the northern Y-bar approach leg to RWY24.”

- 3.2.3 The following table is the estimated usage, rounded to the nearest whole number, based on 2023 data. These numbers are likely to be an overestimate, as it assumes all arrivals are capable of flying an RNP approach, which is not the case in reality.

	Approximate usage with RNP Approach (and loss of VOR) ¹⁰		
	RNP Approaches	NDB Approaches	Visual Approaches
RWY 24 (68%)	737	8	31
RWY 06 (32%)	295	59	15

Table 4: Estimated use of approaches based on 2023 ATMs

- 3.2.4 Around 55% of Benbecula’s scheduled arrivals come from the north across the year. The vast majority of private and air charter traffic arrives from the south. 55% of westerly scheduled arrivals works out to be approximately 236 arrivals per year.
- 3.2.5 In terms of forecasting, numbers are expected to be fairly static with the limited operators and lifeline/PSO¹¹ related traffic that utilise both airports. The main operator, Loganair, have updated their fleet so the current traffic levels and aircraft types would be a reasonable benchmark for Benbecula airport. As an example, total movements at Benbecula were 2772 in 2022 and 2573 in 2023.
- 3.2.6 Therefore, we do not currently anticipate an increase in movement numbers.

Forecast types of aircraft

- 3.2.7 The table shows the breakdown of all aircraft types arriving at Benbecula in 2023. It can be assumed that the most typical aircraft types expected to use the RNP APCH procedures are AT45, AT46, AT75, BE200, E145 and SF34 which make up 94% of total movements.
- 3.2.8 The anticipated type of aircraft using the aerodrome in the future remains the same.

3.3 Option not being proposed

- 3.3.1 ‘Do nothing’ is not being proposed as an option for this ACP, as this would not meet the requirements of the proposal or the Statement of Need, which is to introduce a replacement procedure for the DVOR and provide HIAL with resilience with the pending withdrawal of the BEN DVOR.

¹⁰ The figures in this table have been rounded to the nearest whole number.

¹¹ Public Service Obligation means the route is subsidised by the Scottish Government, as it is not viable otherwise. The obligation is to provide services that would not be performed on a purely commercial basis.

4. Option Assessment

4.1 Summary of CAP1616 requirements

- 4.1.1 HIAL are required to produce an assessment of each proposed option, (a single option is acceptable), with information as to why it is being considered as a potential option.
- 4.1.2 The information should include how the options meet the design principles, as well as qualitative statements on the:
- *Impact on safety*
 - *Environmental impacts*
 - *Economic impact (relevant parts of Stage 2 guidance in CAP1616f)*
 - *Impacts (positive and negative) on airspace users*
 - *Confirmation that the ATM Safety Questionnaire has been reviewed*
 - *Feedback from APDO on design options, that are to be included in engagement materials*
 - *A description of any options that have been considered but are not being proposed and the reasons why they are not being proposed.*
 - *Habitats Regulation assessment early screen criteria form*

4.2 Evaluation Methodology

- 4.2.1 The first phase of the appraisal of the design option is to assess how the options meets the design principles and provide qualitative statements on the criteria laid out in paragraph 4.1.2.
- 4.2.2 HIAL has undertaken that assessment in the form of a Design Principle Evaluation (DPE), similar to that required in a Level 1 ACP, to assess whether the option has Met, Partially Met or Not Met the criteria.
- 4.2.3 The four Design Principles which the option will be evaluated against are:
- *The airspace change proposal must maintain a high standard of safety and should seek to enhance current levels of safety.*
 - *The airspace change proposal should not be inconsistent with relevant legislation, the CAA's airspace modernisation strategy or Secretary of State and CAA's policy and guidance.*
 - *The airspace change proposal should avoid overflight of densely populated areas where possible.*
 - *The proposal should replicate existing design/traffic patterns to the greatest extent possible.*

- 4.2.4 HIAL will apply the following methodology to the DPE:

Design Principle	Met	Partly Met	Not Met
The airspace change proposal must maintain a high standard of safety and should seek to enhance current levels of safety.	Option maintains existing level of safety, or improves on it	Expected to maintain existing level of safety, but further safety work required	Issues identified with could be detrimental to safety

The airspace change proposal should not be inconsistent with relevant legislation, the CAA's airspace modernisation strategy or Secretary of State and CAA's policy and guidance.	Qualitative SME assessment of whether the option is consistent with the relevant legislations.	Qualitative SME assessment of whether the option would require further work to ensure consistency with the relevant legislations.	The option is not consistent with relevant legislations and further work would not resolve this.
The airspace change proposal should avoid overflight of densely populated areas where possible	Qualitative SME assessment of whether the option overflies less people than existing procedures	Qualitative SME assessment of whether the option overflies the same number of people as existing procedures	Qualitative SME assessment of whether the option overflies more populated areas than existing procedures
Should replicate avoid existing design/traffic patterns to the greatest extent possible	Option replicates the existing design/traffic patterns	Option partially replicates the existing design/traffic patterns	Option does not replicate existing design/traffic patterns

Table 5: Design Principle Evaluation Methodology

- 4.2.5 HIAL will also provide qualitative statements on the remaining criteria as laid out in CAP1616H, Appendix A, paragraph A19.

4.3 Design Principle Evaluation

4.3.1 The following table evaluates our RNP approach option for each runway against the Design Principles.

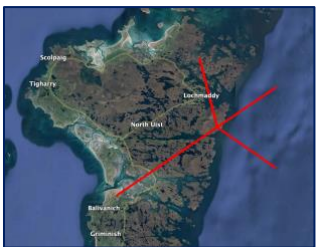



		Design Principles			
		The airspace change proposal must maintain a high standard of safety and should seek to enhance current levels of safety	The airspace change proposal should not be inconsistent with relevant legislation, the CAA's airspace modernisation strategy or Secretary of State and CAA's policy and guidance	The airspace change proposal should avoid overflight of densely populated areas where possible	Should replicate existing design/ traffic patterns to the greatest extent possible
Option	Image				
Runway 24 Option		Option improves the existing level of safety, particularly with the loss of the VOR approach. RNP Approaches improve flight safety over the existing Non-Precision Approaches by reducing the risk of controlled flight into terrain (CFIT). They can also provide better access and lower minima to runways that are not equipped with precision approach and landing systems such as ILS.	Option is being progressed in accordance with CAP1616 and in support of the AMS: "Rationalisation of DVOR conventional ground-based radionavigation aids requires changes to instrument flight procedures to adopt performance-based navigation ¹² ." As can be seen by the other DP assessments, required by policy, the proposals enhance safety and avoid areas of densely populated areas where possible.	Option replicates the existing design/traffic which is over areas of extremely sparse population. The southerly Y Bar is over water and the northerly Y Bar is over water as well as some areas of land. The flight path avoids Lochmaddy, the one community in this region.	Option replicates the existing design/traffic patterns to the greatest extent possible.
Runway 06 Option		Option improves the existing level of safety, particularly with the loss of the VOR approach. RNP Approaches improve flight safety over the existing Non-Precision Approaches by reducing the risk of controlled flight into terrain (CFIT). They can also provide better access and lower minima to runways that are not equipped with precision approach and landing systems such as ILS.	Option is being progressed in accordance with CAP1616 and in support of the AMS: "Rationalisation of DVOR conventional ground-based radionavigation aids requires changes to instrument flight procedures to adopt performance-based navigation ⁹ ." As can be seen by the other DP assessments, required by policy, the proposals enhance safety and avoid areas of densely populated areas where possible.	Option is over the sea with the exception of the last 1.5nm which is over land. This portion replicates the existing design, therefore there is no change in the population overflow.	Option replicates the existing design/traffic patterns to the greatest extent possible.

Table 6: Options Evaluation

¹² CAP1711 2.83

4.4 Options Appraisal

4.4.1 The following table evaluates our RNP approach option for each runway against the safety, environmental and economic impacts, and the impacts on other airspace users, which are required at Stage 2.

	Option	Runway 24 Option	Runway 06 Option
	Image		
Category	Criteria		
Safety	Initial indication of safety implications	Option improves the existing level of safety, particularly with the loss of the VOR approach. RNP Approaches improve flight safety over the existing Non-Precision Approaches by reducing the risk of controlled flight into terrain (CFIT). They can also provide better access and lower minima to runways that are not equipped with precision approach and landing systems such as ILS.	Option improves the existing level of safety, particularly with the loss of the VOR approach. RNP Approaches improve flight safety over the existing Non-Precision Approaches by reducing the risk of controlled flight into terrain (CFIT). They can also provide better access and lower minima to runways that are not equipped with precision approach and landing systems such as ILS.
Environmental	Environmental Impact (e.g design of the track over the ground or restrictions on the number of ac that can use the procedures on a given day)	The design of the option is as close as possible to the existing approaches; therefore, no new environmental impacts are expected.	The design of the option is as close as possible to the existing approaches; therefore, no new environmental impacts are expected.
	Anticipated change in the number of aircraft	The anticipated number of aircraft using the aerodrome remains the same.	The anticipated number of aircraft using the aerodrome remains the same.
	Anticipated change in type of aircraft	The anticipated type of aircraft using the aerodrome remains the same.	The anticipated type of aircraft using the aerodrome remains the same.

	Changes to the altitude of aircraft using the procedure	The procedures will continue to be flown in a procedural environment where the MSAs will not change	The procedures will continue to be flown in a procedural environment where the MSAs will not change
	Change to areas overflown	<p>The design of the option is as close as possible to the existing approaches; therefore, there are only minor changes to the areas overflown.</p> <p>Option replicates the existing design/traffic which is over areas of extremely sparse population. The southerly Y Bar is over water and the northerly Y Bar is over water as well as some areas of land. The flight path avoids Lochmaddy, the one community in this region.</p>	Option is over the sea with the exception of the last 1.5nm which is over land. This portion replicates the existing design, therefore there is no change in the population overflown.
Economic – Communities	Noise impact on health & quality of life Air Quality	No anticipated changes.	No anticipated changes.
Economic – Wider Society	Greenhouse gas impact Tranquillity Biodiversity Capacity/Resilience	<p>Introduction of an RNP Approach will increase resilience by allowing access to the airport in more limiting visual conditions than the existing approaches. The loss of the VOR approach will result in only the NDB procedures remaining.</p> <p>Should there be just an NDB approach remaining, we could expect to see more Missed Approaches and resultant diversions, increasing CO₂ emissions.</p> <p>An RNP APCH will enable continuation of life-line services to the island community.</p> <p>The northerly Y Bar approach suggests new overflight in the vicinity of Lochmaddy, of the South Lewis, Harris, and North Uist National Scenic Area (NSA). However, although infrequent, arrivals from the north today could already be self-positioning towards Benbecula in this region, typically above 3000ft and therefore not a new impact.</p>	<p>Introduction of an RNP Approach will increase resilience by allowing access to the airport in more limiting visual conditions than the existing approaches. The loss of the VOR approach will result in only the NDB procedures remaining.</p> <p>Should there be just an NDB approach remaining, we could expect to see more Missed Approaches and resultant diversions, increasing CO₂ emissions.</p> <p>An RNP APCH will enable continuation of life-line services to the island community.</p> <p>There is no expected overflight of any NSAs.</p> <p>For an assessment of Biodiversity please see section on Habitats Screening Assessment.</p>

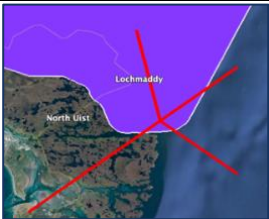
		 <p>For an assessment of Biodiversity please see section on Habitats Screening Assessment.</p>	
Economic – General Aviation	Access	No changes to airspace boundaries or classifications however the introduction of an RNP Approach will improve access to the airport for all airspace users capable of flying them.	No changes to airspace boundaries or classifications however the introduction of an RNP Approach will improve access to the airport for all airspace users capable of flying them.
Economic – General Aviation/Commercial Airlines	Economic impact from increased effective capacity Fuel Burn	<p>Introduction of an RNP Approach will increase resilience by allowing access to the airport in more limiting visual conditions than the existing approaches. The loss of the VOR approach will result in only the NDB procedures remaining.</p> <p>Should there be just an NDB approach remaining, we could expect to see more Missed Approaches and resultant diversions, increasing fuel burn and other costs associated with diversions.</p>	<p>Introduction of an RNP Approach will increase resilience by allowing access to the airport in more limiting visual conditions than the existing approaches. The loss of the VOR approach will result in only the NDB procedures remaining.</p> <p>Should there be just an NDB approach remaining, we could expect to see more Missed Approaches and resultant diversions, increasing fuel burn and other costs associated with diversions.</p>
Economic – Commercial Airlines	Training Costs Other Costs	No additional training costs expected.	No additional training costs expected.
Economic Airport/ANSP	Infrastructure Costs Operational Costs Deployment Costs	There is no additional infrastructure required for the RNP APCHs. ATC staff will require training although this is expected to be covered within normal operating costs.	There is no additional infrastructure required for the RNP APCHs. ATC staff will require training although this is expected to be covered within normal operating costs.
Airspace Users	Positive/negative impacts	No impact on GA users in the area not using the airport. The benefits to GA are already articulated above.	No impact on GA users in the area not using the airport. The benefits to GA are already articulated above.

Table 7: Options Appraisal

4.4.2 According to CAP1616H, Appendix A paragraph A14, no further environmental assessment will be necessary if:

- *The sponsor can reasonably demonstrate that the introduction of RNP IAP is not expected to increase the total number of aircraft movements at the aerodrome in the first two years after introduction, by 10% or more (by at least a minimum of 3,6540 movements per year), and;*
- *The proposal does not change the normal final approach path of aircraft within 1nm of the runway, and;*
- *The proposal will not change the environmental impact of aircraft utilising other aerodromes.*

4.4.3 The proposed design options do not expect to increase the total number of movements at the airport, does not change the final approach path of aircraft to the runway within 1nm from the runway end and the proposal will not change the environmental impact of aircraft utilising other aerodromes. The nearest aerodrome is Stornoway, also operated by HIAL and HIAL have confirmed there will be no impact on it as a result of these PBN arrivals.

4.5 ATM Safety Questionnaire

4.5.1 The ATM Safety Questionnaire has been submitted to the CAA as part of the Benbecula Airport Stage 2 documents.

4.6 APDO Feedback

4.6.1 Cyrrus, an APDO have been involved in the design process since 2012, designing 3 iterations of the designs to full CAA IFP submission package standard. Therefore, we will have detailed, draft IFP charts to use for stakeholder engagement in Stage 3.

4.7 Habitats Regulation Assessment – Early Screening Criteria

4.7.1 The HRA questions in [CAP1616i](#), page 33 are as follows:

Q1. Are there any changes to air traffic patterns or number of movements expected below 3,000ft due to the airspace change proposal.

Q2A. Are there any European sites within a radius of 18km of each runway end?

Q2B. Are there any European sites identified in Q2A overflown (i.e. plane passing directly overhead or within 2,655ft of the boundary of European site at 3,000ft or below) by the proposed flight routes?

Q3A. Will the airspace change proposal reduce the number of movements overflying one or more European sites, while not increasing them over another?

Q3B. Will the airspace change proposal increase the altitude of aircraft overflying one or more European sites, whilst not decreasing altitude over another?

4.7.2 HIAL have carried out an assessment of the existing European sites surrounding Benbecula Airport.

- 4.7.3 HIAL have identified the following European Environmental sites (RAMSAR, Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) & Special Areas of Conservation (SAC)¹³ in the vicinity of the approaches.
- 4.7.4 The images below show the sites overlaid with the existing approaches for Runway 24.

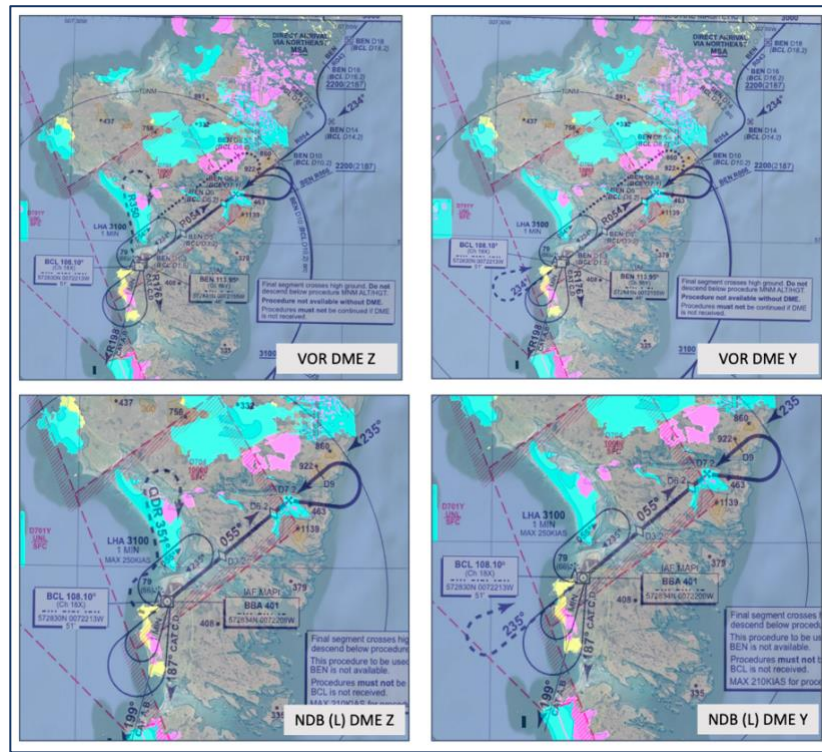


Figure 7: RAMSAR/SSSI/SPA/SAC sites and existing RWY24 procedures

- 4.7.5 The images below show the sites overlaid with the existing approaches for Runway 06.

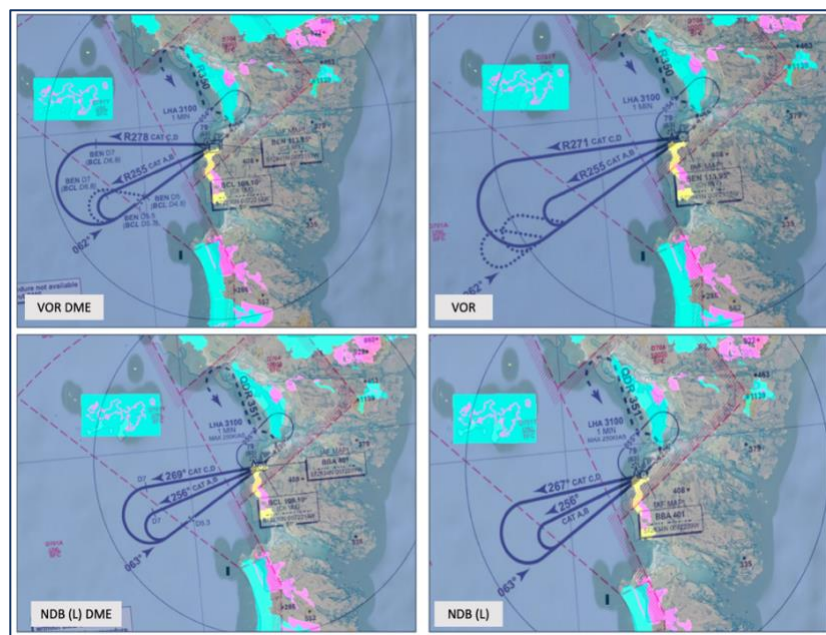


Figure 8: RAMSAR/SSSI/SPA/SAC sites and existing RWY06 procedures

¹³ Ramsar = green, SSSI = pink, SPA = yellow, SAC = turquoise

- 4.7.6 The proposed RNP approaches have been designed to replicate existing approaches as much as possible. However, there could be some minor changes to areas overflown with the approach to Runway 24.
- 4.7.7 The following image shows the sites overlaid with the proposed RNP approaches. The northerly Y Bar for the Runway 24 approach suggests new overflight in the vicinity of Lochmaddy, purely due to the absence of an existing, published Direct Arrival from the North. However, although infrequent, arrivals from the north today could already be self-positioning towards Benbecula in this region, typically above 3000ft. The RNP APCHs would not expect to see any increase in the numbers of arrivals from the north (Stornoway).
- 4.7.8 The majority of arrivals to Runway 24 are, and will continue to be, from the east and south of the airport.

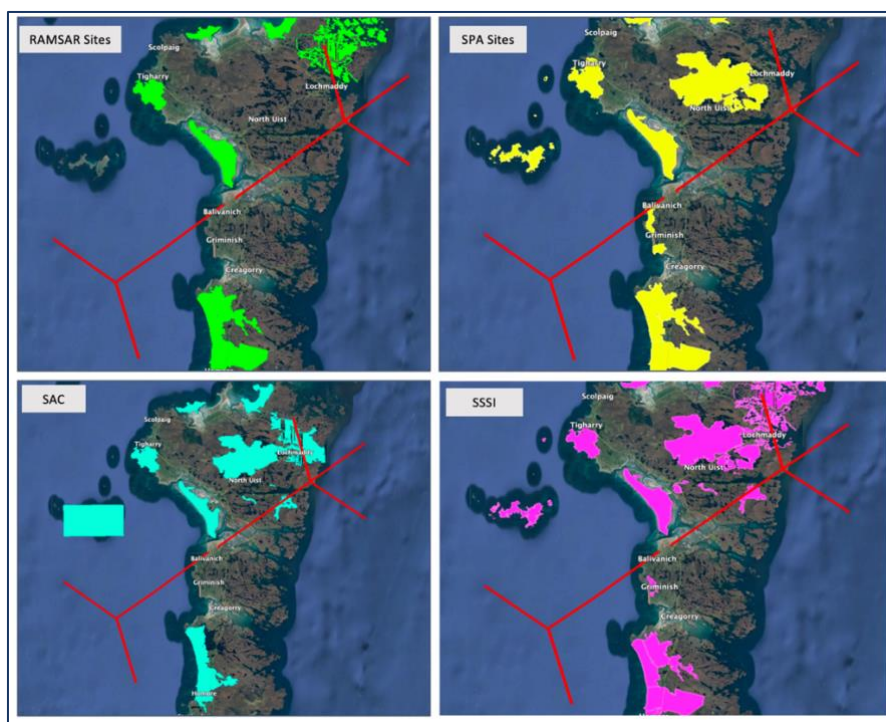


Figure 9: RAMSAR/SSSI/SPA/SAC sites ivo Benbecula Airport

- 4.7.9 Therefore, the answers to the HRA questions are as follows:

Q1. Are there any changes to air traffic patterns or number of movements expected below 3,000ft due to the airspace change proposal.

A1. Yes, minor.

Q2A. Are there any European sites within a radius of 18km of each runway end?

A2A. Yes

Q2B. Are there any European sites identified in Q2A overflown (i.e. plane passing directly overhead or within 2,655ft of the boundary of European site at 3,000ft or below) by the proposed flight routes?

A2B. Yes, although they are already overflown today at the same altitude.

Q3A. Will the airspace change proposal reduce the number of movements overflying one or more European sites, while not increasing them over another?

A3A. No

Q3B. Will the airspace change proposal increase the altitude of aircraft overflying one or more European sites, whilst not decreasing altitude over another?

A3B. No

5. Conclusion

- 5.1.1 Benbecula Airport are requesting permission from the CAA to move into Stage 3 of the Level 3 airspace change process.