

The background of the slide is a photograph of an air traffic control tower. The tower is a tall, cylindrical structure with a glass-enclosed observation deck at the top. The sky is blue with some light clouds. In the foreground, there is a blue fence. A semi-transparent teal box covers the right side of the image, containing the title and other text. A faint image of an aircraft is visible in the background behind the teal box.

# CAP 1616 STEP 2A – AIRSPACE CHANGE DESIGN OPTIONS EVALUATION

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# INTRODUCTION

- Bournemouth Airport has initiated a CAA CAP1616 Airspace Change Process (ACP) in 2018.
- The Bournemouth Airspace Change Proposal successfully passed the ACP Stage 1 Define Gateway on Friday 26 April.
- These slides form our submission for CAP1616 Step 2A Design Principle Evaluation.

# CONTEXT FOR THE CHANGE

1. Bournemouth Airport currently has ILS on both RWY ends
  - 08 (Cat I) – 25% of landings
  - 26 (Cat III) – 75% of landings
2. RWY 08 ILS is obsolete
  - Installed second hand in 1984/5
  - Maintenance support at end of life
  - Irrecoverable failure will have serious operational consequences
3. There is a legal requirement to implement RNP approaches by 2024
  - Could provide 3D capability to both RWYs
  - Could improve resilience to Runway 26 operations.

# DESIGN OPTIONS EVALUATION

# CURRENT STATEMENT OF NEED

*Bournemouth Airport has RWY 08 and RWY 26, both providing precision approach capabilities via ILS. The preferential runway is RWY 26 handling 75% of all arrivals with the remainder utilising RWY 08. The ILS on RWY 26 is CAT III.*

*The ILS (CAT I) serving RWY 08 is obsolete and needs to be replaced. The ILS was installed second hand in 1984/85 and the equipment and maintenance support is at end of life. Unrecoverable failure of the ILS on RWY 08 will have serious operational consequences denying easterly Precision Approaches and increasing dependence on RWY 26. In addition, the publication of EU Implementing Rule (IR) 2018/1048 stipulates the implementation of PBN approach procedures to both RWY 08 and RWY 26 by 2024. By 2030 the IR emphasises the preference for PBN over conventional ILS CAT I.*

# DESIGN PRINCIPLES

## Design Principles

1. The new procedures should not increase the number of people overflown by aircraft participating in the approach
2. The new procedures should not increase the noise footprint of the existing airport operation, for similar aircraft types and traffic levels, as detailed in the LAeq 16 Hr map in the current Noise Action Plan.
3. Implementation should minimise disturbance to the Moors River System Site of Special Scientific Interest (SSSI).
4. The new approaches shall be standardised by ICAO and acceptable to EASA and CAA and the implementation shall be in compliance with all applicable legislation and regulations
5. The design shall be fully compliant with the design criteria stated in ICAO Doc 8168 (PANS OPS) and be flyable by all aircraft types in approach Speed Categories A through D.
6. The approach procedures shall be of a type for which the majority of Bournemouth aircraft operators are equipped and authorised to fly.
7. The designs shall seamlessly integrate with extant instrument approach procedures at Bournemouth International Airport
8. The procedures should address the needs of flight training operators at Bournemouth
9. The design shall support continued use of existing radar vectored arrival procedures provided by Solent Radar.
10. The new procedures shall be implemented in a cost-effective manner.

# IDENTIFIED OPTIONS

The following table contains all identified Options at Stage 2A:

Options	
<b>Option 1</b>	Do Nothing
<b>Option 2</b>	Install new CAT I ILS on RWY 08
<b>Option 3</b>	RNP IAP Missed Approach conventional or RNAV to be confirmed during ACP Stage 3
<b>a)</b>	Full T-bar comprising Initial, Intermediate and Final Approach Fixes
<b>b)</b>	Limited T-bar with 1 Initial, Intermediate and Final Approach Fixes
<b>c)</b>	Straight-in with combined Initial/Intermediate and Final Approach Fixes

# DESIGN OPTION EVALUATION – OPTION 1: DO NOTHING

<b>Design Principle Evaluation</b>	<b>OPTION NO: 1</b>
<i>Option Name:</i> <b>Do Nothing</b>	<b>REJECT</b>
<p><b>Description of Option:</b>          The 08 ILS is obsolete and well beyond its economic lifetime and at some stage it will fail and will be unrepairable, most likely preceded by reduced availability. With failed ILS, RWY 08 operations will revert to the existing non-precision 2D NDB and SRA procedures, which are less precise procedures, have higher aircraft minima, do not provide vertical guidance, will increase rates for Go-Arounds and diversion and require aircraft to operate with higher levels of engine thrust and increased engine noise on approach.</p>	
<p><b>Design principle:</b>          1. The new procedures should not increase the number of people overflown by aircraft participating in the approach</p>	<b>NOT MET</b>
<p><b>Summary of qualitative assessment:</b>          The conventional non-precision 2D NDB and SRA procedures provide less precise guidance spreading flights over a greater area and affecting more people than 3D precision approaches.</p>	
<p><b>Design principle:</b>          2. The new procedures should not increase the noise footprint of the existing airport operation, for similar aircraft types and traffic levels, as detailed in the LAeq 16 Hr map in the current Noise Action Plan.</p>	<b>NOT MET</b>
<p><b>Summary of qualitative assessment:</b>          Non-precision 2D NDB and SRA procedures do not provide vertical guidance requiring aircraft to operate with higher levels of engine thrust and increased engine noise on approach. The increased operating minima of the Non-Precision approaches are likely to result in a higher number of missed approaches, resulting in increased aircraft noise from high thrust settings on the missed approach climb-out.</p>	



# DESIGN OPTION EVALUATION – OPTION 1: DO NOTHING

<b>Design Principle Evaluation</b>	<b>OPTION NO: 1</b>
<i>Option Name: <b>Do Nothing</b></i>	<b>REJECT</b>
<b>Design principle:</b> 3. Implementation should minimise disturbance to the Moors River System Site of Special Scientific Interest (SSSI).	MET
<b>Summary of qualitative assessment:</b> There will be only minor impact to the SSSI related to ILS Localiser decommissioning, which is located in this site.	
<b>Design principle:</b> 4. The new approaches shall be standardised by ICAO and acceptable to EASA and CAA and the implementation shall be in compliance with all applicable legislation and regulations	NOT MET
<b>Summary of qualitative assessment:</b> This option does not meet the requirements of PBN Implementing Rule (IR) 2018/1048 for PBN Approaches with Vertical Guidance with 3 lines of minima by January 2024. If ILS on RWY 08 becomes unsupportable before 2020, the PBN IR compliance date will become Dec 2020.	
<b>Design principle:</b> 5. The design shall be fully compliant with the design criteria stated in ICAO Doc 8168 (PANS OPS) and be flyable by all aircraft types in approach Speed Categories A through D.	MET
<b>Summary of qualitative assessment:</b> RWY 08 operations will revert to the existing non-precision 2D NDB and SRA once ILS will fail. NDB approaches and SRA are fully compliant with the design criteria stated in ICAO Doc 8168 (PANS-OPS).	

# DESIGN OPTION EVALUATION – OPTION 1: DO NOTHING

Design Principle Evaluation	OPTION NO: 1
<i>Option Name: <b>Do Nothing</b></i>	<b>REJECT</b>
<p><b>Design principle:</b> 6. The approach procedures shall be of a type for which the majority of Bournemouth aircraft operators are equipped and authorised to fly.</p>	MET
<p><b>Summary of qualitative assessment:</b> NDB approaches and SRA are flown today and all aircraft operators are equipped and authorized to fly these procedures.</p>	
<p><b>Design principle:</b> 7. The designs shall seamlessly integrate with extant instrument approach procedures at Bournemouth International Airport</p>	MET
<p><b>Summary of qualitative assessment:</b> NDB approaches and SRA procedures already exist at BIA.</p>	
<p><b>Design principle:</b> 8. The procedures should address the needs of flight training operators at Bournemouth</p>	PARTIAL
<p><b>Summary of qualitative assessment:</b> Flight training operators will be able to perform conventional training at BIA but PBN Training will not be supported, noting that BIA is one of the few airports with the infrastructure and capacity to support training operations.</p>	

# DESIGN OPTION EVALUATION – OPTION 1: DO NOTHING

Design Principle Evaluation	OPTION NO: 1
<i>Option Name:</i> <b>Do Nothing</b>	<b>REJECT</b>
<b>Design principle:</b> 9. The design shall support continued use of existing radar vectored arrival procedures provided by Solent Radar.	MET
<b>Summary of qualitative assessment:</b> The existing radar vectoring procedures for arrival on RWY 08 would not change with unavailability of ILS.	
<b>Design principle:</b> 10. The new procedures shall be implemented in a cost-effective manner.	MET
<b>Summary of qualitative assessment:</b> As the NDB approaches and SRA already exist, no additional costs are required.	

# DESIGN OPTION EVALUATION – OPTION 2: INSTALL NEW CAT I ILS ON RWY 08

<b>Design Principle Evaluation</b>	<b>OPTION NO: 2</b>
<i>Option Name:</i> <b>Install new CAT I ILS on RWY 08</b>	<b>REJECT</b>
<b>Description of Option:</b> With new ILS on RWY 08, operations and aircraft minima will be the same as currently achieved.	
<b>Design principle:</b> 1. The new procedures should not increase the number of people overflown by aircraft participating in the approach	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option meets this design principle as the operations will remain the same and flight paths will not be affected.	
<b>Design principle:</b> 2. The new procedures should not increase the noise footprint of the existing airport operation, for similar aircraft types and traffic levels, as detailed in the LAeq 16 Hr map in the current Noise Action Plan.	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option meets this design principle as the operations will remain the same and the noise footprint will not be affected.	
<b>Design principle:</b> 3. Implementation should minimise disturbance to the Moors River System Site of Special Scientific Interest (SSSI).	<b>NOT MET</b>
<b>Summary of qualitative assessment:</b> The RWY 08 ILS localiser is located in a Site of Special Scientific Interest (SSSI) and replacement construction works would involve significant disruption of flora and fauna and create planning difficulties.	

# DESIGN OPTION EVALUATION – OPTION 2 : INSTALL NEW CAT I ILS ON RWY 08

<b>Design Principle Evaluation</b>	<b>OPTION NO: 2</b>
<i>Option Name: <b>Install new CAT I ILS on RWY 08</b></i>	<b>REJECT</b>
<b>Design principle:</b> 4. The new approaches shall be standardised by ICAO and acceptable to EASA and CAA and the implementation shall be in compliance with all applicable legislation and regulations	<b>NOT MET</b>
<b>Summary of qualitative assessment:</b> This Option does not meet the requirements of PBN Implementing Rule (IR) 2018/1048 for PBN Approaches with Vertical Guidance with 3 lines of minima by January 2024.	
<b>Design principle:</b> 5. The design shall be fully compliant with the design criteria stated in ICAO Doc 8168 (PANS OPS) and be flyable by all aircraft types in approach Speed Categories A through D.	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option meets this design principle as the operations will remain the same and therefore design will continue to meet criteria stated in ICAO Doc 8168 (PANS OPS) and be flyable by all aircraft types in approach Speed Categories A through D.	
<b>Design principle:</b> 6. The approach procedures shall be of a type for which the majority of Bournemouth aircraft operators are equipped and authorised to fly.	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option meets this design principle as the operations will remain the same.	

# DESIGN OPTION EVALUATION – OPTION 2 : INSTALL NEW CAT I ILS ON RWY 08

<b>Design Principle Evaluation</b>	<b>OPTION NO: 2</b>
<i>Option Name: <b>Install new CAT I ILS on RWY 08</b></i>	<b>REJECT</b>
<b>Design principle:</b> 7. The designs shall seamlessly integrate with extant instrument approach procedures at Bournemouth International Airport	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option meets this design principle as the operations will remain the same.	
<b>Design principle:</b> 8. The procedures should address the needs of flight training operators at Bournemouth	<b>PARTIAL</b>
<b>Summary of qualitative assessment:</b> Flight training operators will be able to perform conventional training at BIA. In case of PBN training they will have to carry out the training at surrounding airport with PBN IAPs.	
<b>Design principle:</b> 9. The design shall support continued use of existing radar vectored arrival procedures provided by Solent Radar.	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option meets this design principle as the operations will remain the same.	
<b>Design principle:</b> 10. The new procedures shall be implemented in a cost-effective manner.	<b>NOT MET</b>
<b>Summary of qualitative assessment:</b> High capital investment >£1.5M + ongoing running costs >£25k pa. PBN Implementing Rule (IR) 2018/1048 foresees RNP approaches in preference to CAT I operations after 2030, thereby negating a positive business case for replacement of RWY 08 ILS.	

# DESIGN OPTION EVALUATION – OPTION 3: RNP IAPS

<b>Design Principle Evaluation</b>	<b>OPTION NO: 3</b>
<i>Option Name:</i> <b>RNP IAPs</b>	<b>ACCEPT</b>
<b>Description of Option:</b> This option provides 3D approaches to RWY 08 and RWY 26: LNAV, LNAV/VNAV and LPV.	
<b>Design principle:</b> 1. The new procedures should not increase the number of people overflown by aircraft participating in the approach	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option RNP IAP meets this design principle as the new RNP s will replicate existing aircraft tracks as much as possible and do not overfly new areas .	
<b>Design principle:</b> 2. The new procedures should not increase the noise footprint of the existing airport operation, for similar aircraft types and traffic levels, as detailed in the LAeq 16 Hr map in the current Noise Action Plan.	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option RNP IAP meets this design principle as the new RNP s will replicate existing aircraft tracks as much as possible to remain within existing noise footprint.	
<b>Design principle:</b> 3. Implementation should minimise disturbance to the Moors River System Site of Special Scientific Interest (SSSI).	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option RNP IAP meets this design principle as there is no ground equipment required for provision of RNP IAPs and therefore no construction activities will take place. There will be only minor impact to the SSSI related to ILS Localiser decommissioning, which is located in this site.	

# DESIGN OPTION EVALUATION – OPTION 3: RNP IAPS

<b>Design Principle Evaluation</b>	<b>OPTION NO: 3</b>
<i>Option Name: RNP IAPs</i>	<b>ACCEPT</b>
<p><b>Design principle:</b> 4. The new approaches shall be standardised by ICAO and acceptable to EASA and CAA and the implementation shall be in compliance with all applicable legislation and regulations</p>	<b>MET</b>
<p><b>Summary of qualitative assessment:</b> The Option meets this design principle as the RNP IAPs are standardised by ICAO and acceptable to EASA and CAA .</p>	
<p><b>Design principle:</b> 5. The design shall be fully compliant with the design criteria stated in ICAO Doc 8168 (PANS OPS) and be flyable by all aircraft types in approach Speed Categories A through D.</p>	<b>MET</b>
<p><b>Summary of qualitative assessment:</b> The Option meets this design principle as the RNP IAPs are fully compliant with the design criteria stated in ICAO Doc 8168 (PANS OPS) and will be designed for aircraft types in approach Speed Categories A through D.</p>	
<p><b>Design principle:</b> 6. The approach procedures shall be of a type for which the majority of Bournemouth aircraft operators are equipped and authorised to fly.</p>	<b>MET</b>
<p><b>Summary of qualitative assessment:</b> The Option meets this design principle as the majority of Bournemouth aircraft operators are equipped and authorized to fly RNP IAPs.</p>	



# DESIGN OPTION EVALUATION – OPTION 3: RNP IAPS

<b>Design Principle Evaluation</b>	<b>OPTION NO: 3</b>
<i>Option Name: RNP IAPs</i>	<b>ACCEPT</b>
<b>Design principle:</b> 7. The designs shall seamlessly integrate with extant instrument approach procedures at Bournemouth International Airport	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option meets this design principle as the new RNP procedures will replicate existing aircraft tracks as much as possible.	
<b>Design principle:</b> 8. The procedures should address the needs of flight training operators at Bournemouth	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option meets this design principle as the flight training operators will be able to perform both conventional and PBN training at Bournemouth airport.	
<b>Design principle:</b> 9. The design shall support continued use of existing radar vectored arrival procedures provided by Solent Radar.	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option meets this design principle as the Concept of Operation for the RNP approaches will be to maintain the existing operations as defined in the LoA with Solent Radar.	

# DESIGN OPTION EVALUATION – OPTION 3: RNP IAPS

<b>Design Principle Evaluation</b>	<b>OPTION NO: 3</b>
<i>Option Name: RNP IAPs</i>	<b>ACCEPT</b>
<b>Design principle:</b> 10. The new procedures shall be implemented in a cost-effective manner.	<b>MET</b>
<b>Summary of qualitative assessment:</b> The Option meets this design principle as this Option is cost effective with implementation cost circa £100k, with no annual operating costs and no cost regarding airport infrastructure.	

# SUMMARY OF DESIGN OPTIONS EVALUATION

# SUMMARY OF DESIGN OPTIONS EVALUATION

- It was agreed during stakeholder engagement that Option 1 and Option 2 do not deliver against the Statement of Need and they are not align with the Design Principles. This claim was also confirmed by evaluation against design principles. On the previous slides.

# LIST OF OPTIONS AFTER STAKEHOLDERS ENGAGEMENT AND EVALUATION AGAINST DESIGN PRINCIPLES

The following table presents the retained Option 3 following stakeholder engagement and evaluation against design principles. This Option remains equally valid for RWY 08 and RWY 26. It is expected that different Option 3 sub-options may be proposed on RWY 08 and RWY 26 respectively for consultation during Stage 3.

Options	
<b>Option 3</b>	RNP IAP Missed Approach conventional or RNAV to be confirmed during ACP Stage 3
<b>a)</b>	Full T-bar comprising Initial, Intermediate and Final Approach Fixes
<b>b)</b>	Limited T-bar with 1 Initial, Intermediate and Final Approach Fixes
<b>c)</b>	Straight-in with combined Initial/Intermediate and Final Approach Fixes