RSP | Manston Airport

Manston Airport Airspace Design and Procedures

Initial Options Appraisal

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Glossary

Acronym	Meaning
ACP	Airspace Change Proposal
AONB	Area of Outstanding Natural Beauty
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATZ	Aerodrome Traffic Zone
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
DCO	Development Consent Order
FASI-S	Future Airspace Strategy Implementation - South
FIR	Flight Information Region
GA	General Aviation
HazID	Hazard Identification
IFP	Instrument Flight Procedure
ILS	Instrument Landing System
MAP	Missed Approach Procedure
NDB	Non-Directional Beacon
RNAV	Area Navigation
RSP	RiverOak Strategic Partners Ltd
SID	Standard Instrument Departure
VFR	Visual Flight Rules

1. Introduction

1.1 Introduction

The Manston Airport Airspace Design and Procedures project is currently at Stage 2 – Develop and Assess – of the Civil Aviation Publication (CAP) 1616 Airspace Design process. Step 2B requires the change sponsor to carry out an 'Initial Options Appraisal' of the impacts of each of the options identified in Step 2A.

This document provides a narrative explanation of steps taken in Step 2B. The full analysis of the options is contained in the Initial Options Appraisal Table Issue 1, that can be found alongside this document on the Civil Aviation Authority (CAA) airspace portal:
https://airspacechange.caa.co.uk/PublicProposalArea?pID=112

The Initial Options Appraisal was carried out on the long list of options and is colour coded to identify the rejected options, the preferred options and the alternative viable options considered during the CAP 1616 Stage 2 – Develop and Assess.

1.2 Background

Manston Airport is a disused airport on the Isle of Thanet in Kent. RiverOak Strategic Partners (RSP) is proposing to secure the future of the airport by redeveloping and reopening it as a successful hub for international air freight which also offers passenger travel, executive travel and aircraft engineering services.

RSP has applied to the Planning Inspectorate for a Development Consent Order

(DCO) to build Manston Airport. In addition, RSP must also secure approval from the CAA, through the CAP 1616 process, for its use of airspace and procedures.

This document relates only to the CAP 1616 process and the proposal to introduce the airspace and Instrument Flight Procedures (IFPs) required to enable safe and efficient operations to and from the airport.

1.3 CAP1616 Airspace Change Process

The implementation of any changes to UK airspace is subject to the guidance contained in CAP 1616. CAP 1616 is a seven-stage process published by the CAA that provides guidance on the process to follow when seeking to change the way airspace is used. The whole Manston Airport CAP 1616 process is envisaged to take up to 3 years. The seven stages of the process are as follows:

- Stage 1 – Define
- Stage 2 – Develop and Assess (current stage)
- Stage 3 – Consultation
- Stage 4 – Update and Submit
- Stage 5 – Decide
- Stage 6 - Implement
- Stage 7 – Post-Implementation Review

The project is currently at Stage 2 which requires the development of options that seek to meet the original Statement of Need. The options are required to align, where practicable, with the Design Principles generated in Stage 1. These options are then assessed to understand the positive/negative impacts before progressing to the Stage 2 Gateway.

1.4 Progress So Far

In November 2018, RSP submitted a Statement of Need to the CAA. This is the formal explanation as to why the Airport wishes to change the airspace. The CAA indicated that an airspace change was an appropriate mechanism to achieve the objectives in RSP's Statement of Need. A copy of the Statement of Need and other associated documentation can be viewed on the CAA airspace portal.

At the end of February 2020, the first stage in the change process was successfully completed when the Airport's submission passed through the Stage 1 Define Gateway.

The work undertaken during Stage 1 established a prioritised shortlist of Design Principles to act as a framework against which Design Options have been drawn up. The prioritised list of Design Principles can be found in the documents uploaded at Stage 1B on the portal.

1.5 Step 2A – Options Development

1.5.1 Introduction

During Step 2A, RSP developed a list of design options for the new procedures. The options took into account the fixed constraints identified during Stage 1A and the Design Principles established in Stage 1B.

1.5.2 Constraints

Four constraints were identified as being applicable:

- C1: Instrument Flight Procedures must be safe.
- C2: Instrument Flight Procedures must be PANS-OPS 8168 compliant.
- C3: The airspace solution must integrate with Future Airspace Strategy Implementation (South) – FASI-S[1].
- C4: Fixed runway position.

1.5.3 Application of the Constraints to the Options Development

The Instrument Flight Procedures (IFP) must be safe **(C1)** and therefore the designers have to take into account the minimum requirements for separation from terrain and obstacles, and from other procedures/volumes of airspace. Stakeholder input was sought at the beginning of Step 2A from Air Navigation Service Providers (ANSP) and FASI-S co-sponsors to elicit specific details of where possible routes to and from Manston Airport could interact with their procedures and operations. Further details of this engagement can be found in Section 2. The primary means by which it is intended to provide safety assurance to support the options is a Safety Case developed in accordance with CAP 760[2]. Detail on the Safety Assessment is contained in Section 5 of this document.

The requirement for all design options to be PANS-OPS 8168 compliant **(C2)** means that the parameters of the IFPs e.g. shape, accuracy, turn areas and obstacle clearances are predetermined (to a degree) in ICAO document *PANS OPS 8168 Aircraft Operations - Volume 2 Construction of Visual and Instrument Flight Procedures.* This is the international standard for all IFPs, and IFPs must be designed by a CAA Approved Procedure Designer (APD).

Constraints **C3** (Integration with FASI-S) and **C4** (Fixed Runway position) are the necessary starting points for developing the design options to enable full connectivity between Manston Airport and the en-route airways network:

- The runway position is fixed and designated 10/28; this means that the runway orientation is on a bearing of 100° (the 10 direction) and the opposite direction 280° (the 28 direction). The runway direction in use on a given day is selected based on a range of factors including, but not limited to, wind direction. Aircraft generally take-off and land in the same direction i.e. into the wind. Runway direction may change during the day if the wind changes. In favourable wind conditions, it may be possible for aircraft to land on Runway 10 and take off from Runway 28 (aircraft landing from, and taking off to, the west) in order to limit the noise impact on the nearby town of Ramsgate.

[1] FASI-S is the umbrella name for the concept to modernise air traffic services (ATS) in the South East of England. This is a collaborative exercise between 15 airports, and NATS as the UK's en-route air navigation services provider (ANSP).

[2] CAP 760: Guidance on the Conduct of Hazard identification, Risk Assessment and the Production of Safety Cases: For Aerodrome Operators and Air Traffic Service Providers

- Traffic departing from Manston Airport must fly straight ahead on runway heading until achieving 500 feet (ft) above aerodrome level (aal) before any turns are permitted. Aircraft will then follow a series of turns and straight sections known as a Standard Instrument Departure (SID), which finishes at an airway's entry point.
- Traffic arriving at Manston Airport leave the airways at fixed points and fly a Transition route to join an Approach procedure, which ends in a straight section lined up to the runway.

1.5.4 High-Level Design Criteria

In accordance with the requirements in paragraph E18 of CAP 1616, a set of high-level criteria was developed from the Design Principles to support the design process; the application of these criteria to the initial comprehensive list (tested with the stakeholders) generated the longlist of designs to take forward to Design Principle Evaluation. The best practice guidance contained in the government Green Book[3] was used to develop five high-level objectives or criteria. These criteria are listed below along with the quantitative 'measures' used to gauge each option against the objective:

- Ob 1: The option shall be acceptably safe
  - o Obstacle clearance, other procedures/airspace, PANS-OPS 8168
- Ob 2: The option must accord with the Airspace Modernisation Strategy and any associated plans
  - o FASI-S
- Ob 3: Minimise the impact of noise
  - o Numbers overflown
  - o Noise sensitive areas
- Ob 4: Minimise the impact on other airspace users
- Ob 5: Minimise emissions
  - o Facilitates optimum aircraft power to minimise greenhouse gases and air quality effects
  - o Enables continuous climb and descent operations
  - o Minimise track miles

1.6 Step 2A – Design Principle Evaluation

Each of the options developed have been assessed against the prioritised list of Design Principles developed in Stage 1. The Design Principles Evaluation shows to what extent the options meet the Design Principles and can be found at Step 2A on the CAA airspace portal.

Regardless of how the individual options have responded to the Design Principles, if an option is assessed to meet the high-level criteria developed from the Design Principles, it was considered to be a viable option and was accepted to go forward to the Initial Options Appraisal.

1.7 Step 2B – Initial Options Appraisal

At Step 2B, the longlist of options was tested against the criteria contained in CAP 1616, Appendix E, Table E2, with the addition of a Qualitative Safety Assessment and a Qualitative Noise Assessment as required for a Level 1 change at this stage.

The methodology used for the Initial Options Appraisal is discussed in Section 3.

The Initial Options Appraisal is summarised in Section 4 and it resulted in a shortlist of options to be taken forward to Stage 3 for detailed technical design and consultation. The Shortlist is contained in Section 6.

[3] The Green Book: appraisal and evaluation in central government:
https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

2. Guidance and Methodology for Options Appraisal

2.1 CAP 1616 Options Appraisal Requirements

The Options Appraisal process was carried out in accordance with the guidance in CAP 1616, and in conjunction with The Green Book[4] and the Department of Transport's WebTAG[5], which constitute best practice in options appraisal.

Options Appraisal is used as an iterative tool throughout the CAP 1616 process to help refine the options from an initial longlist, down to a short list and a final set of preferred options.

The appraisal process typically consists of the following elements:

- High-level objective and assessment criteria.
- Baseline definition – current operations.
- Longlist of options (including a do-nothing/minimum option).
- Shortlist of options.
- Preferred or final option(s).

The Options Appraisal requirement of CAP 1616 evolves through three iterations with the CAA reviewing at each phase as follows:

1. 'Initial' appraisal at Step 2B with the CAA review at the Stage 2 – Develop and Assess gateway;
2. 'Full' appraisal at Step 3A with the CAA review at Step 3B and the subsequent Consult gateway;
3. 'Final' appraisal at Step 4A, with the CAA review after the formal submission of the Airspace Change Proposal at the end of Stage 4.

Iteration 1, Initial Options Appraisal, is the subject of this document to be submitted to the CAA as part of Step 2B. The remainder of this section of the document focusses on the definition of the 'high-level objective and assessment criteria' and the assessment method.

[4] The Green Book: Appraisal and Evaluation in Central Government; https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government

[5] DfT transport analysis guidance WebTAG: https://www.gov.uk/guidance/transport-analysis-guidance-webtag

2.2 High Level Objectives and Assessment Criteria

For a Level 1 Airspace Change, the Criteria against which the appraisal options must be assessed are contained in Table E2 of CAP 1616. Table 1 below describes these with the addition of the Safety Assessment Criteria at the bottom.

Affected Group	Impact	Description
Communities	Noise impact on health and quality of life	Requires consideration of noise impact on communities including residents, schools, hospitals, parks and other sensitive areas
Communities	Air Quality	Any change in air quality is to be considered
Wider Society	Greenhouse Gas impact	Assessment of changes in greenhouse gas levels in accordance with WebTAG is required
Wider Society	Capacity and resilience	A qualitative assessment of the impact on overall UK airspace structure
General Aviation	Access	A qualitative assessment of the effect of the proposal on the access to airspace for GA users
General Aviation / commercial airlines	Economic impact from increased effective capacity	Forecast increase in air transport movements and estimated passenger numbers or cargo tonnage carried
General Aviation / commercial airlines	Fuel burn	The change sponsor must assess fuel costs based on its assumptions of the fleets in operation
Commercial airlines	Training costs	An assessment of the need for training associated with the proposal
Commercial airlines	Other costs	Where there are likely to be other costs imposed on commercial aviation, these should be described
Airport / Air navigation service provider	Infrastructure costs	Where a proposal requires a change in infrastructure, the associated costs should be assessed
Airport / Air navigation service provider	Operational costs	Where a proposal would lead to a change in operational costs, these should be assessed
Airport / Air navigation service provider	Deployment costs	Where a proposal would lead to a requirement for retraining and other deployment, the costs of these should be assessed
Safety Assessment	Safety Assessment	CAP 1616 requires a safety assessment of the proposal to be undertaken in accordance with CAP 760

Table 1 - Assessment Criteria for Level 1 Change

2.3 Method

2.3.1 Overview

The Initial Options Appraisal was carried out by comparing all of the options side by side against the CAP 1616 criteria in tabular form. The Appraisal also included the results of a Qualitative Safety Assessment as described in Section 5, and the noise impact for communities was supported by a qualitative noise assessment as described in Appendix A1. The full analysis of all the options is described in Appendix A2 and included as a separate MS Excel spreadsheet.

The Options Appraisal also compared the implementation of each of the proposed procedures against the 'Do Minimum' Option, defined in Section 3, which represents the introduction of procedures that would rely on ATC vectoring.

2.3.2 Shortlisting

Once all the options had been assessed against the criteria, the list of options was refined to identify the shortlist to be taken forward to Stage 3. The shortlist is contained in Section 6.

3. Manston Airport Baseline Definition

3.1 Baseline Definition

In accordance with CAP 1616, a baseline will be required for all environmental assessments. This will allow the change sponsor to conduct an assessment to understand the current impacts so that a comparison can be made with the impacts of the options. In most cases, the baseline will be the 'Do Nothing' option and will largely reflect the current-day scenario. In certain cases, doing nothing is not a feasible option and in such cases, the change sponsor must set out its informed view of the future and the minimum changes required to address the issues identified – a 'Do Minimum' option.

3.2 The Do Nothing Option

Prior to closure, the aerodrome at Manston had conventional flight procedures and an Aerodrome Traffic Zone (ATZ) to offer protection to aircraft in the critical stages of flight. All such measure were removed when the aerodrome closed.

The Do Nothing option represents the current situation where there is no airport at Manston, and no air traffic. There is no environmental impact associated with this option and therefore no measurable comparative baseline against which to assess the options. Consent has been granted for the airport development and therefore it is not reasonable to assess a scenario where the airport does not exist. An assumption is made that the airport consent leads to an introduction of a level of air traffic into the environment for which we must identify at least minimal safe operational procedures. Therefore, the Do Nothing option is not a feasible option.

3.3 The Do Minimum Option

The Do Minimum option represents the introduction of procedures that can only be flown under Visual Flight Rules[6] (VFR) for the commercial air traffic that will operate at Manston Airport. Assessing the proposed options against this Do Minimum option will allow a comparison to be made to understand the impacts of each option.

Under VFR-only operations, departing and arriving aircraft would rely on tactical vectoring under a full Deconfliction Service[7] from Air Traffic Control (ATC) for positioning to and from the runway and the airways joining points. Aircraft arriving at the airport would be required to fly a visual approach, where the pilot proceeds by visual reference to the terrain and remains clear of clouds on approach to the airport.

[6] Visual Flight Rules – the set of regulations under which a pilot operates an aircraft under conditions of good visibility

[7] Deconfliction Service - a Deconfliction Service provides the pilot with traffic information and deconfliction advice on conflicting aircraft. However, the avoidance of other aircraft is ultimately the pilot's responsibility

4. Initial Options Appraisal Results

4.1 Introduction

This section of the report summarises the full long list of options and presents a summary of the results extracted from Appendix A2. Section 6 describes the shortlist of options that will be taken forward to Stage 3. The complete analysis is contained in Appendix A2 to this report 'Initial Options Appraisal Tables' (included as a separate document).

4.2 Long List of Options

4.2.1 Proposed New Procedures

The proposed new procedures include the following:

- SIDs from each runway allowing onward routing to the north, south east and west
- Transitions to both runway directions
- ILS and RNAV Approaches to Runway 10 and Runway 28

4.2.2 Longlist of Options

Table 2 presents a summary of the procedures and the longlist of options under consideration. For each proposed procedure, the 'Do Minimum' procedure against which all the options are compared, is identified in row 1.

Procedure	Number of Options	Basic Description
Do Minimum Option		Prior to closure the aerodrome at Manston had conventional flight and an Aerodrome Traffic Zone (ATZ) to offer protection to aircraft in the critical stages of flight. All such measure were removed when the aerodrome closed. This option represents the introduction of VFR-only procedures which would rely on tactical vectoring from ATC for positioning to and from the runway and airways joining points.
Runway 28 departures to the south	3	All options include a left-hand turn after take-off, followed by 3 different overland routes towards DOVER (DVR) to join the en-route network.
Runway 28 departures to the north	9	All options include a right-hand turn after take-off, with 3 different overland routes followed by 3 different oversea alternates.
Runway 10 departures	3	All options go straight ahead until over the sea, followed by either a left-hand turn onto north or a right-hand turn onto south. The southern option then splits either east (towards FIR boundary) or west (towards DVR).
Runway 28 Transitions	5	Five separate routes from the en-route network to join the approach procedure.
Runway 10 Transitions	6	Three options for each of the different approach options. One option from the north utilising the existing London City Point Merge arrival procedure, and 2 southern options leaving the en-route network to join the approach procedure.
Runway 28 Approach	6	An ILS and an RNAV straight-in approach, each with 3 options (2 north and one south) for the Missed Approach Procedure.
Runway 10 Approach	8	Two ILS and 2 RNAV straight-in approaches; one of each from a 2,500 ft final descent and one of each from a 3,000 ft final descent. Each approach has 2 options (one north and one south) for the Missed Approach Procedure.
NDB Hold	3	Standard one-minute racetrack based on the NDB position, only for light GA aircraft.
Regulated Airspace	1	Aerodrome Traffic Zone (ATZ) to protect aircraft during the final critical stages of flight.

Table 2 - Long List of Design Options

The full list of options, including map overlays is published on the CAA airspace portal at Step 2A.

4.3 Results Summary

The table containing the full analysis carried out at the Initial Options Appraisal stage is delivered as a separate Appendix to this document – see Appendix A2 for details.

Table 3 below summarises the Initial Options Appraisal.

Colour Key	
Carry Forward	Meets objectives, insignificant impact, and is the Preferred Option for this procedure
Carry Forward	Meets objectives or has an insignificant impact but is less attractive
Reject	Fails to meet one or more objectives or has a significant impact that cannot be effectively mitigated

Procedure								
	Runway 28 SID	**Runway 10 SID**	**Runway 28 Transitions**	**Runway 10 Transitions**	**Runway 28 Approach**	**Runway 10 Approach**	**NDB Hold**	**Regulated Airspace**
Do Minimum								
Proposed Option	East to North	North	North	North to 2,500 ft Approach	Approach MAP north east	2,500 ft Approach MAP north	North east	ATZ
Proposed Option	Central to North	South to East	North east	South east to 2,500 ft Approach	Approach MAP north west	2,500 ft Approach MAP south	North west	
Proposed Option	West to North	South to West	East	South west to 2,500 ft Approach	Approach MAP south	3,000 ft Approach MAP north	South west	
Proposed Option	East to South		South East	North to 3,000 ft Approach		3,000 ft Approach MAP north		
Proposed Option	Central to South		South	South east to 3,000 ft Approach				
Proposed Option	West to South			South west to 3,000 ft Approach				
Proposed Option	East to East							
Proposed Option	Central to East							
Proposed Option	West to East							

Table 3 - Initial Options Appraisal Results Summary

5. Qualitative Safety Assessment

5.1 Safety Assessment Activities Required by CAP 1616

A qualitative Safety Assessment is required for all options identified during Step 2B, and a detailed final safety assessment must be completed by the change sponsor prior to submission in Step 4B. RSP is carrying out the safety assessment activities in accordance with CAP 760, the separate guidance provided by the CAA for safety assessment.

RSP is developing a full four-part Safety Case iteratively throughout the CAP 1616 process which will be submitted to the CAA at Step 4B.

5.2 Assessment Method

The Qualitative Safety Assessment uses the results of a formal Hazard Identification (HazID) workshop held on 30th September 2020 during which the hazards, causes and consequences relating to each of the longlist of options were identified.

5.3 Safety Assessment Results – Non-Technical Summary

The HazID identified a number of dependencies and/or influencing factors that were common to all the IFP options e.g. Loss of surveillance, loss of GNSS signal in space.

The findings of the qualitative safety assessment of the individual options are summarised as:

- A number of options, or individual aspects of the options, have significant safety implications resulting from conflict with gliders operating under VFR conditions. These IFP options were rejected during the Initial Options Appraisal stage.
- No other significant safety implications have been identified with the IFP options however there are some safety issues which need to be managed:
  - o Aircraft operating in Class G airspace will require a deconfliction service provided by Manston ATC for separation with other traffic operating in the area.
  - o A number of the proposed IFPs have the potential to conflict with arrival routes for other London airports. Altitude restrictions on the Manston procedures would provide deconfliction.
  - o The potential loss of aircraft identification in Windfarm clutter, requiring implementation of technical or operational mitigation for the impact of wind turbine generators on Primary Surveillance Radar.
  - o Some aspects of the IFPs route close to existing airspace restrictions e.g. the current and proposed Southend Control Areas and Shoeburyness Danger Area. Amendments can be made to the procedure designs to ensure safety compliance.
  - o The NDB holds may conflict with commercial aircraft executing a missed approach. The NDB hold will only be used by GA aircraft when there are no aircraft inbound on an approach procedure.

Except for the options which conflict with glider operations, the safety implications for all options are not considered to be significant at this stage. Notwithstanding this, those options that are taken forward to shortlist are subject to a full risk assessment as an element of developing the four-part Safety Case prior to submission of the ACP proposal at Step 4B.

6. Design Options Shortlist

6.1 Shortlist of Options Taken Forward

Table 4 presents the shortlist of options carried forward to Stage 3 along with a summary of the Initial Appraisal Outcome for that option. The original options were reduced to fifteen preferred options and four less attractive but viable options.

Shortlist Option	Initial Appraisal Outcome
Runway 28 SID – eastern option routing east	Preferred Option Shortest overland route, minimising noise impact. Greater track miles for some route directions but best climb profile, minimising fuel burn and emissions. Best option for network integration.
Runway 10 SID – routing north	Preferred Option Shortest route with optimum climb profile, minimising track miles, noise, fuel burn and emissions.
Runway 10 SID – routing south to east	Preferred Option Optimum climb profile minimising fuel burn and emissions. Opportunity for more direct routing, minimising track miles, fuel burn and emissions.
Runway 10 SID – routing south to west	Preferred Option Opportunity to amend route to avoid conflict with other arrival routes would optimise climb profile, reducing noise impact, fuel burn and emissions.
Runway 28 Transition from north	Preferred Option Only one practical option for most expeditious route, minimising environmental impacts.
Runway 28 Transition from north east	Preferred Option Only one practical option for most expeditious route, minimising environmental impacts.
Runway 28 Transition from east	Preferred Option Only one practical option for most expeditious route, minimising environmental impacts.
Runway 28 Transition from south east	Preferred Option Only one practical option for most expeditious route, minimising environmental impacts.
Runway 28 Transition from south	Preferred Option Only one practical option for most expeditious route, minimising environmental impacts.

Shortlist Option	Initial Appraisal Outcome
Runway 10 Transition from north to 2,500 ft approach	Preferred Option Direct track and oversea, minimising noise and environmental impacts. Further track miles to join the procedure for aircraft arriving from the west and south, but aircraft will be above 7,000 ft.
Runway 10 Transition from south west to 2,500 ft approach	Preferred Option Most direct track for aircraft arriving from the west, minimising track miles, fuel burn and emissions. Greater noise impact for aircraft arriving from the west and south. Requires network traffic density to be low to use to avoid conflict with outbound London TMA traffic.
Runway 10 Transition from north to 3,000 ft approach	Viable Alternative Option Direct track and oversea, minimising noise and environmental impacts. Further track miles to join the procedure for aircraft arriving from the west and south, but aircraft will be above 7,000 ft.
Runway 10 Transition from south west to 3,000 ft approach	Viable Alternative Option Most direct track for aircraft arriving from the west, minimising track miles, fuel burn and emissions. Greater noise impact for aircraft arriving from the west and south. Requires network traffic density to be low to use to avoid conflict with outbound London TMA traffic.
Runway 28 Approach MAP north east option	Preferred Option Offers fewest practical track miles whilst minimising exposure to noise and numbers overflown.
Runway 10 2,500 ft Approach MAP north	Preferred Option Offers fewest practical track miles whilst minimising exposure to noise and numbers overflown. South eastern Initial Approach Segment removed due to significant safety impact with gliders.
Runway 10 3,000 ft Approach MAP north	Viable Alternative Option Approach slightly longer than previous option due to higher approach height but still offers fewest practical track miles for approach from 3,000 ft whilst minimising exposure to noise and numbers overflown. South eastern Initial Approach Segment removed due to significant safety impact with gliders.
NDB Hold Do Nothing	Viable Alternative Option Should the airport decide not to install an NDB, aircraft will be required to hold VFR away from the airport which will potentially increase the noise impact in the local area.
NDB Hold south west	Preferred Option Situated over sparsely populated area minimising noise impact. Aircraft will hold for the minimum amount of time, minimising fuel burn and emissions.
ATZ	Preferred Option Minimum requirement for the protection of aircraft in the vicinity of the airport.

Table 4 - Shortlist of options carried forward to Stage 3

A1. Qualitative Noise Assessment

A1.1 Qualitative Noise Assessment

In order to support the assessment of the noise related criteria in Section 4, RSP carried out a qualitative assessment of the likely noise impacts of each option on people on the ground. A comparative assessment was made amongst the options for each procedure taking into account the following contributors to noise exposure:

- length of track overpopulated areas/qualitative assessment of numbers overflown;
- overflight of sensitive areas and communities below 7,000 ft e.g. schools, hospitals, care homes;
- overflight of national parks, Areas of Outstanding Natural Beauty (AONB), parkland, habitats;
- comparative power setting of aircraft engines required to execute the procedure;
- continuous ascent/descent profile of procedure;

Three Design Principles are applicable to the assessment of noise.

- **Design Principle 3:**
  Procedures should be designed to minimise the impact of noise below 7,000 feet.
- **Design Principle 4:**
  Where practicable, designs should seek to minimise the impact of noise on particularly sensitive areas.
- **Design Principle 7:**
  Designs should make provision for multiple routes that can be used to spread the noise burden more equitably.

The qualitative noise assessment[8] of the options was supported by analysis of whether each option met the above stated design principles.

A2. Initial Options Appraisal (Full Table Analysis)

A2.1 Initial Options Appraisal Table

This Appendix is delivered as a separate MS Excel based file with the format as in the extract below. The Appendix contains the full analysis carried out on the longlist of Options considered during CAP 1616 Stage 2 – Develop and Assess. The full analysis of the options is contained in the Initial Options Appraisal Table Issue 1, that can be found in PDF format alongside this document on the CAA airspace portal.

INITIAL OPTIONS APPRAISAL			Issue 1				
		Summary of Analysis	The Do Nothing option represents the current situation where there is no airport at Manston, and no air traffic. Consent has been granted for the airport development and the consequent introduction of a level of air traffic into the environment, hence this option is rejected.	The introduction of VFR-only procedures for the anticipated heavy freight air traffic does not meet key outcomes of the Airspace Modernisation Strategy, specifically reducing emissions and better noise management. Reliance on tactical vectoring from ATC would have a negative impact on both noise and emissions, specifically for overland routes.	Rejected - The shortest of the southern options, but with a greater noise impact than any of the options routing north after take-off due to overflight of more communities. Increased fuel burn and emissions due to restricted height profile to remain clear of other airports arrival routes. Significant safety impact with gliders. Rejected on safety grounds.	Rejected - This option is slightly longer and assessed to expose more communities and sensitive areas to noise than the previous option. Also has a greater noise impact than any of the options routing north after take-off. Increased fuel burn and emissions due to restricted height profile to remain clear of other airports arrival routes. Significant safety impact with gliders. Rejected on safety grounds.	Rejected - This option is longest of the southern options and is assessed to expose more communities and sensitiv areas to noise than the previous options. Also has a greater noise impact than any of the options routing nort after take-off. Increased fuel burn and emissions due to restricted height profile to remain clear of other airports arrival routes. Significant safety impact with gliders. Rejected on safety grounds.
Group	Impact	Level of Analysis	Do Nothing Baseline	SID Baseline (Do Minimum)	SID RWY 28 South (Eastern)	SID RWY 28 South (Central)	SID RWY 28 South (Western)
Communities	Noise impact on health and quality of life	Initial Options Appraisal: Qualitative	There is no change to the noise impact on health and the quality of life with the Do Nothing option.	In relation to noise management (below 7,000ft), this option provides little or no consistency of traffic distribution. As a result, aircraft routing will vary depending on the position of airway joining points meaning that there is no consistent approach to mitigate against the noise impact on local communities.	Although this option avoids large built-up areas, there are various rural villages and hamlets (e.g. Ash, Easterly and East Studdal) that would still be overflown below 7,000ft. Aircraft would likely have to remain at 7,000ft or below to avoid conflicting with traffic inbound to some of the London airports. This may have a knock-on effect in terms of noise to other areas of the south coast such as Dover and Folkestone. Noise impact likely to be similar to the Do Minimum option although more concentrated due to the predictability of routing.	Although this option avoids large built-up areas, there are various rural villages and hamlets (e.g. Preston, Wingham and Staple) that would still be overflown below 7,000ft. Aircraft would likely have to remain at 7,000ft or below to avoid conflicting with traffic inbound to some of the London airports. This may have a knock-on effect in terms of noise to other areas of the south coast such as Dover and Folkestone. This option also overflies a number of tourist attractions. Noise impact likely to be similar to the Do Minimum option although more concentrated due to the predictability of routing.	Although this option avoids large built-up areas, there are various rural villages and hamlets (e.g. Chilenden) that would still be overflown below 7,000ft. Aircraft would likely have to remain at 7,000ft or below to avoid conflicting with traffic inbound to some of the London airports. This may have a knock-on effect in terms of noi to other areas of the south coast such as Dover and Folkestone. This option also overflies a number of tourist attractions. Noise impact likely to be similar to the Do Minimum option although more concentrated due to the predictability of routing.
Communities	Air Quality	Initial Options Appraisal: Qualitative	There is no change to the impact on Local Air Quality with the Do Nothing option.	Local Air Quality is likely to be affected by departing aircraft within 3 nautical miles of the airfield until above 1,000 ft. Aircraft are likely to be dispersed over a large area until above 1,000 ft, with the potential to impact on populated areas.	Local Air Quality is likely to be affected by departing aircraft within 3 nautical miles of the airfield until above 1,000 ft. Aircraft will be over sparsely populated areas until above 1,000 ft. Impact likely to be more concentrated than the Do Minimum option but affecting fewer people.	Local Air Quality is likely to be affected by departing aircraft within 3 nautical miles of the airfield until above 1,000 ft. Aircraft will be over sparsely populated areas until above 1,000 ft. Impact likely to be more concentrated than the Do Minimum option but affecting fewer people.	Local Air Quality is likely to be affected by departing aircraft within 3 nautical miles of the airfield until above 1,000 ft. Aircraft will be over sparsely populated areas until above 1,000 ft. Impact likely to be more concentrate than the Do Minimum option but affecting fewer people.

[8] See assessment against 'Communities, Noise Impact on health and Quality of life' criteria in Appendix A2

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