Airspace Change Proposal
Stage 2B

Initial Options Appraisal

London Southend Airport FASI(S)

ACP-2018-90

03 October 2024

CPJ-5641-RPT-035 V1.2

www.cyrrus.co.uk

info@cyrrus.co.uk

Version	Date	Description of Changes
Version 1	20/12/2022	
Version 1.1	03/11/2023	All changes and updates from Version 1 are in summarised below. • 1.1 – Overview – updated • 1.9 – Stakeholder updates – updated • 2 – Options for Assessment – new definitions of the Baselines and Options, new maps to show the amended baselines and swathes. • 3.1 – Initial Options Appraisal – updated • 3.2 – Assessment Criteria Summary – updated and includes reference to the DPE • 4 to 7 – Initial Options Appraisals updated, new baseline IOAs included • 8.2 – Discounting – new section • 9 – Results – updated • 9.5 – Preferred Options – noise modelling category amended • Annex A – Feedback from Natural England – new section • Annex B – Tranquillity and Biodiversity Map – new section • Annex C – Population Density Maps – new section • Annex D – Planned Developments – new section
Version 1.2	03/10/2024	Changes and updates from Version 1.1 are summarised below. • 2 - List of Options updated • 3 – Appraisal Methodology updated to include Biodiversity and AMS Realisation • 4-7 All IOAs updated to include Biodiversity and AMS Realisation and checked for consistency • 8 – Discounting methodology – updated • 9 -Results - updated

Executive Summary

The Civil Aviation Authority wrote to 21 airports in the South-East of England (including London Southend Airport) to advise them that it is essential that they participate in a programme of Airspace Modernisation. This programme consists of a coordinated attempt to improve the efficiency of airspace usage across the region, whilst implementing the latest technology. It aims to reduce the environmental impacts associated with aviation.

London Southend Airport passed the Civil Aviation Authority CAP 1616 Stage 1 Gateway in March 2022 and commenced Stage 2 activities. A comprehensive list of options was developed through internal workshops and stakeholder engagement. These options were assessed against the Design Principles developed during Stage 1 of the Airspace Change Proposal process. They are detailed in the Options Development and Design Principle Evaluation document which can be found on the Airspace Change Portal and forms the first part of the Stage 2A submission.

This document is our Stage 2B submission, the Initial Options Appraisal. It is a high-level qualitative appraisal of the Options we developed during Stage 2A. This document covers the Options for assessment, methodology and the Initial Options Appraisal. In the conclusion, we detail the Options not being progressed to Stage 3 of this Future Airspace Implementation South Airspace Change Proposal.

Glossary

Abbreviation	Term	Description
ACOG	Airspace Change Organising Group	
ACP	Airspace Change Proposal	
AMS	Airspace Modernisation Strategy	
ANSP	Air Navigation Service Provider	
AONB	Area of Outstanding Natural Beauty	
AQMA	Air Quality Management Area	
ARINC	Aeronautical Information Regulation and Control	
BADA	Base of Aircraft Data	
CAA	Civil Aviation Authority	
CAS	Controlled Airspace	
CCO	Continuous Climb Operations	
CDA	Continuous Descent Arrival	
DA	Danger Area	
DFT	Department for Transport	
DEFRA	The Department for Environment, Food and Rural Affairs	
DPE	Design Principle Evaluation	
FASI-S	Future Airspace Implementation South	
FREE FLOW		Free flow is a method of departure whereby a tower does not have to coordinate the release of individual aircraft.
GA	General Aviation	
GNSS	Global Navigation Satellite Systems	
ICAO	International Civil Aviation Organisation	
IAP	Instrument Approach Procedures	
IOA	Initial Options Appraisal	
LTMA	London Terminal Manoeuvring Area	
LSA	London Southend Airport	

Abbreviation	Term	Description
NAP	Noise Abatement Procedure	
NERL	NATS En-Route Limited	
NM	Nautical Mile	
NP	National Park	
NTK	Noise and Track Keeping	Taken over a busy period in 2019- pre pandemic.
ONS	Office for National Statistics	
PBN	Performance-Based Navigation	
PWC		
RAG	Red, Amber,Green	
Ramsar		Wetlands of international importance designated under the Ramsar Convention.
RNAV	Area Navigation	
RW	Runway	
SAC	Special Areas of Conservation	
SID	Standard Instrument Departures	
SPA	Special Protection Area	
SSSI	Sites of Special Scientific interest	
STAR	Standard Arrival	
UK	United Kingdom	
VOR	VHF Omni-Directional Radio Range	

References

[1] Commission Implementing Regulation EU 2018/1048, PBN-IR.

[2] Civil Aviation Authority, CAP 1616, 1 March 2021, Version 4.

[3] Civil Aviation Authority, CAP 2312B: UK Airspace Change Masterplan Iteration 02, 11 May 2022, Version 2.2.

[4] CPJ-5641-RPT-017, LSA Options Development and Design Principle Evaluation, 14 November 2022.

[5] CPJ-5641-RPT-020, LSA Design Principle Evaluation, 9 November 2022.

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1. Introduction

1.1. Overview

1.1.1. The London Southend Airport (LSA) Future Airspace project has reached Stage 2 - Develop and Assess of the CAP1616 process. This Stage is made up of 2 components: Step 2A - Option development and Step 2B - Options Appraisal. This report covers Step 2B the Initial Options Appraisal (IOA).

1.1.2. Step 2B requires the Change Sponsor to conduct an IOA on the Options described in Step 2A. This IOA is contained within this report.

1.1.3. This report is a part of a set of documents submitted to the Civil Aviation Authority (CAA) at Gateway 2 of the CAP1616 process. The submitted documents are available on the Airspace Change Portal (ACP) and comprise of:

- ACP Options Development and Design Principle Evaluation (DPE).
- LSA DPE.
- Options Appraisal Stage 2B.

1.1.4. The Report begins by providing an outline of relevant United Kingdom (UK) airspace governance. This is followed by sections that look at the Airspace Modernisation Strategy (AMS), the CAP1616 Airspace Change Process, the Options for Appraisal and the IOA for each option.

1.2. Background

1.2.1. CAA published its AMS in December 2018. This Strategy was developed in response to the Department for Transport (DFT) tasking the CAA with preparing and maintaining a co-ordinated plan for the use of the UK Airspace up to 2040, including modernisation.

1.2.2. In the Options Development and DPE document (Step 2a) for this ACP, a full description is given of the AMS, including background, strategic objectives and a summary of the role of the Airspace Change Organising Group (ACOG) role in the coordination of the delivery of the AMS. (see sections 1.2 and 1.3).

1.2.3. CAP1711 describes the vision of the AMS as: *Deliver quicker, quieter and cleaner journeys and more capacity for the benefit of those who use and are affected by UK airspace*[1]. A reminder of the objectives is depicted in Figure 1.

[1] See CAP1711a Section 1.1, pg. 4

Figure 1: AMS Objectives

1.2.4. In this document, AMS realisation is assessed for each Option against the Baseline and includes analysis from the DPE (stage 2a).

1.3. Performance-Based Navigation

1.3.1. One of the major aims of the AMS is to optimise future airspace designs to take account of modern aircraft performance and functional capabilities and make them more efficient, saving time and fuel and reducing emissions.

1.3.2. The key to achieving this is through the application of Performance-Based Navigation (PBN). In parallel, the UK navigation infrastructure can also be optimised to take advantage of the lateral navigation accuracy from Global Navigation Satellite Systems (GNSS), while retaining adequate conventional ground-based navigation aids to ensure both resilience and contingency measures.

1.3.3. PBN is being adopted world-wide. Airspace will be modernised through International, Regional and State level initiatives, including regulations. It impacts both the high-level

airways and the lower-level arrival and departure routes into and out of airports and Instrument Flight Procedures (IAPs).

1.3.4. European-wide legislation: Commission Implementing Regulation EU 2018/1048, PBN-IR [1] was developed to drive the deployment of PBN in the European region to meet the international vision laid down by the International Civil Aviation Organisation (ICAO).

1.4. Important Context

1.4.1. LSA has already commenced the modernisation of its airspace having submitted a proposal for the introduction of PBN procedures in the form of Area Navigation (RNAV) IAPs. In addition, the Future Airspace Implementation (South) (FASI)(S) programme may result in more requirements for the Airport to implement new arrival transitions, to enable aircraft to establish on an IAP.

1.4.2. It is possible that, in the development of options for new departure and arrival profiles for the other airports in the region, the existing airspace configuration may also require re-configuration. This will be managed as part of the FASI(S) programme as all of the airports within the cluster progress through the CAP1616 process.

1.5. Civil Aviation Publication 1616 Process

1.5.1. CAA regulations[2] define the ACP process. The ACP is designed to be transparent, comprehensible and proportionate. It is aligned with Government Policy[3] on managing airspace.

1.5.2. The 7-Stage process contains 14 'Steps' and 4 'Gateways'. The Change Sponsor must satisfy the CAA at each of these 'Gateways' that it has fully followed the process. Failure to do so results in the need to conduct further work until such time as the CAA is satisfied.

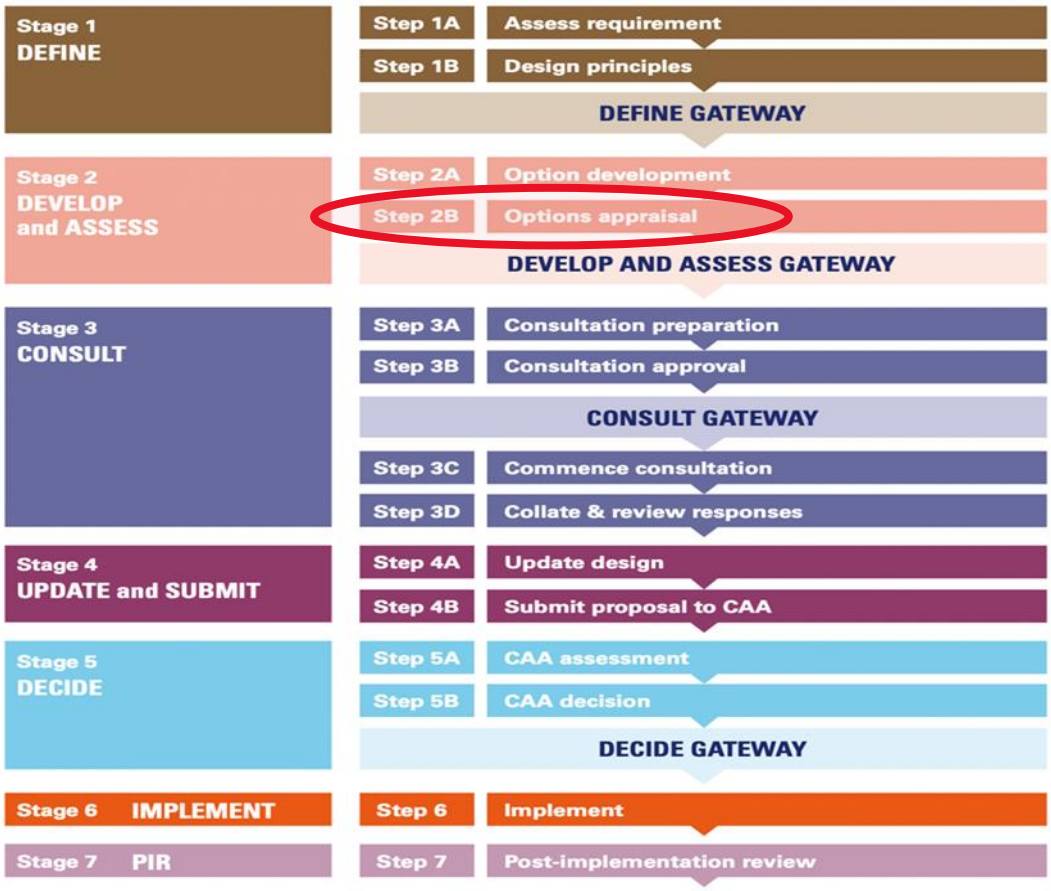


Figure 2: The CAP 1616 Process

1.6. Stage 1

1.6.1. LSA began their ACP in September 2021 and subsequently passed through the Stage 1 Gateway of the CAP 1616 process in March 2022. The Stage 1 documentation can be found on the ACP Portal.

1.7. Stage 2A

1.7.1. Stage 2A requires change sponsors to develop and assess options for the Airspace Change. LSAs Stage 2A documentation is on the Airspace Change Portal and details the list of options[4] that were developed for this ACP, and the associated Design Principle Evaluation[5].

1.8. Stage 2B

1.8.1. Stage 2B requires change sponsors to undertake an IOA on the Options developed during Stage 2A. This document contains the IOA for the individual options assessed in Stage 2A.

2. Viable Options for Assessment

This section describes the departure and arrivals for both Runways (RWYs). Each section begins with a description of the Baseline for each direction[2], or suite of options. This is followed by a comprehensive list of viable options, including the Baselines.

Images in this section depict the Options as swathes (more information can be found in the 'Options Development and DPE' document on the ACP Portal), and danger and restricted areas are also shown in red. This helps to evaluate safety concerns of options.

[2] Further details on the Do-Nothing Baseline and the Do-Minimum Option can be found in the 'Options Development and Design Principle Evaluation' document on the ACP Portal

2.1. Departures runway 05 – Northeast

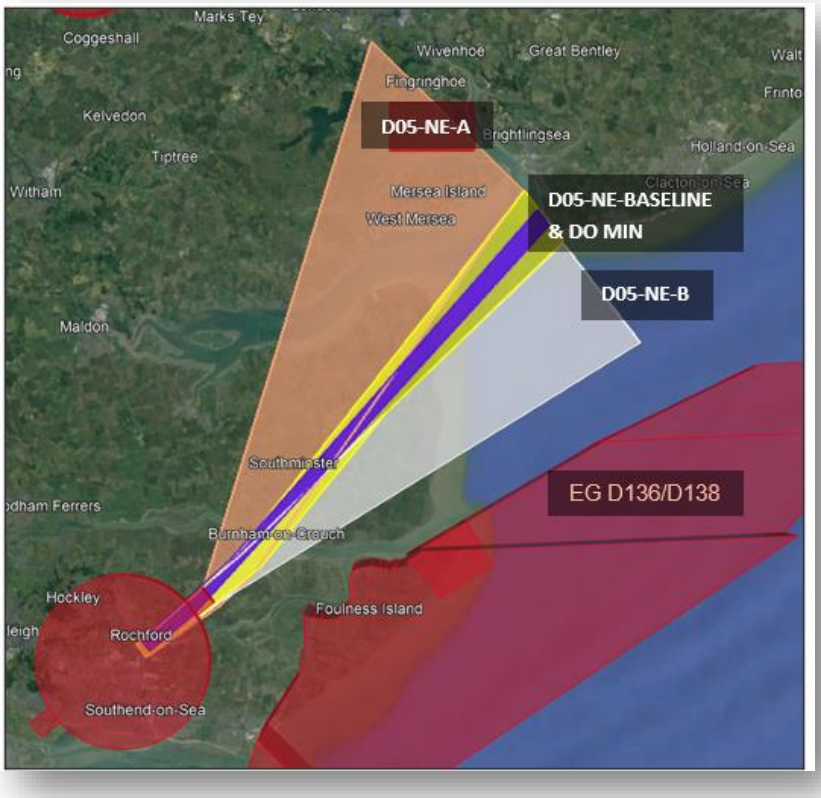


Figure 3: Departures Runway 05 - Northeast

Baseline

Departures to the Northeast off Runway 05 typically route straight ahead with a slight deviation to the left of track. Our Do-Nothing baseline is defined as: Option D05-NE-BASELINE and is depicted as the yellow swathe. This has been established from the Noise and Track Keeping (NTK) data, current procedures, and operational expertise. Our Do Minimum Option is a refinement of the Baseline and defined as: Option D05-NE-DO MIN and is depicted as the dark blue swathe. (For more information on the Baselines please see the document titled 'ACP Options Development and DPE' which is available on the ACP Portal).

Options

- D05-NE-BASELINE.
- D05-NE-DO MINIMUM.
- D05-NE-A.
- D05-NE-B.

2.2. Departure Runway 05 – Northwest

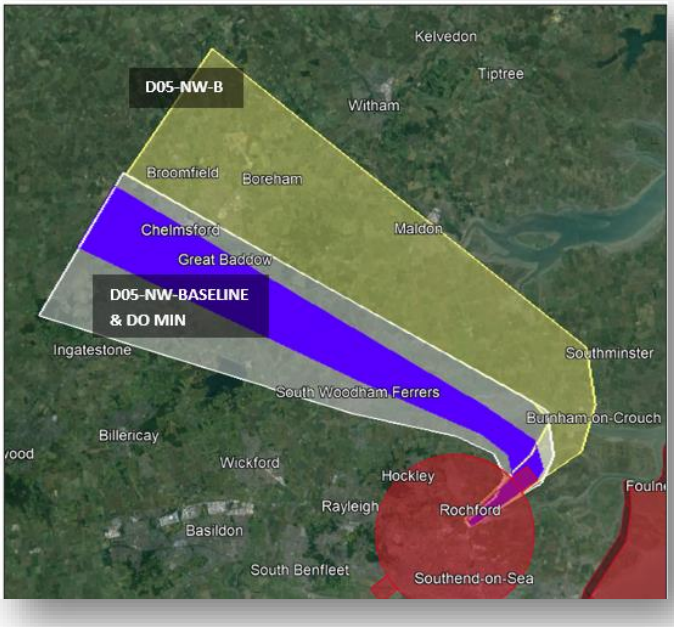


Figure 4: Departures Runway 05 - Northwest

Baseline

Departures to the Northwest off Runway 05, turn after adherence to the Noise Abatement Procedures (NAP) directly to the Northwest, these tracks disperse quite broadly once North-abeam the Airport. Our baseline is defined as: Option D05-NW-BASELINE and is depicted by the light grey swathe. This has been established from the NTK data, current procedures, and operational expertise. Our Do Minimum Option is a refinement of the Baseline, defined as: Option D05-NW-DO MIN and is depicted as the dark blue swathe. (For more information on the Baselines please see the document titled 'ACP Options Development and DPE' which is available on the ACP Portal).

Options

- D05-NW-BASELINE.
- D05-NW-DO MINIMUM.
- D05-NW-B.

2.3. Departure Runway 05 – South/Southeast

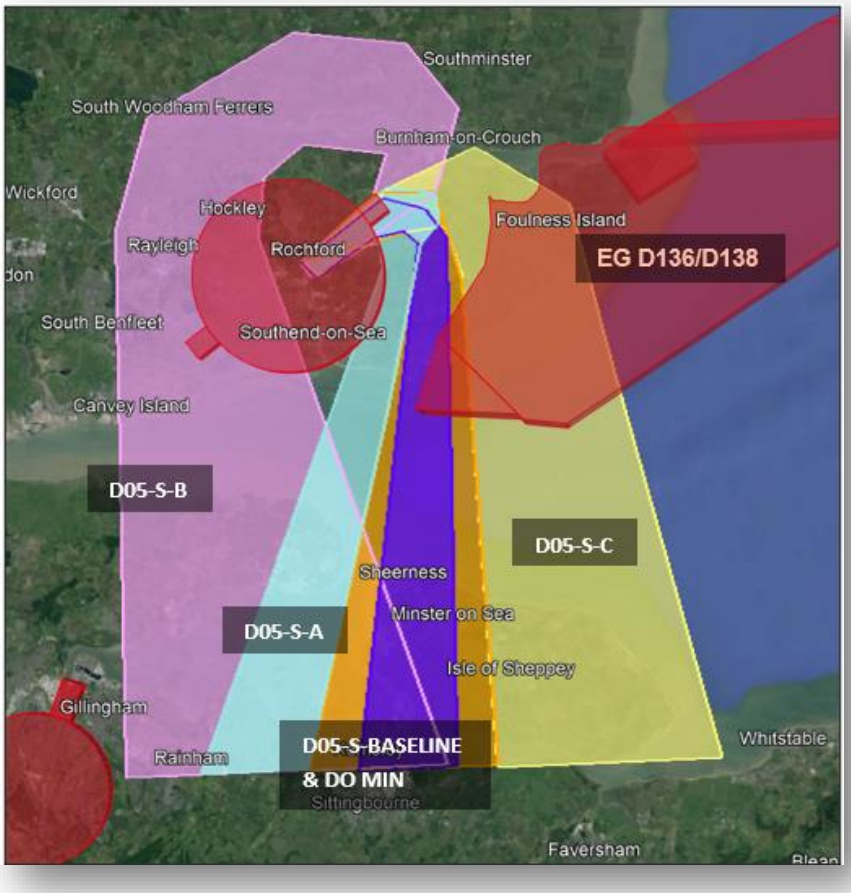


Figure 5: Departures Runway 05 - South/Southeast

Baseline

The Departures to the South off Runway 05 turn once they have adhered to the NAP and route directly to the South. Our baseline is defined as: Option D05-S-BASELINE and is depicted by the orange swathe. This has been established from the NTK data, current procedures, and operational expertise. Our Do Minimum Option is a refinement of the Baseline, defined as: Option D05-S-DO MIN and is depicted as the dark blue swathe. (For more information on the Baselines please see the document titled 'ACP Options Development and DPE' which is available on the ACP Portal).

Options

- D05-S-BASELINE.
- D05-S-DO MINIMUM.
- D05-S-A.
- D05-S-B.
- D05-S-C.

2.4. Departures Runway 23- Northeast

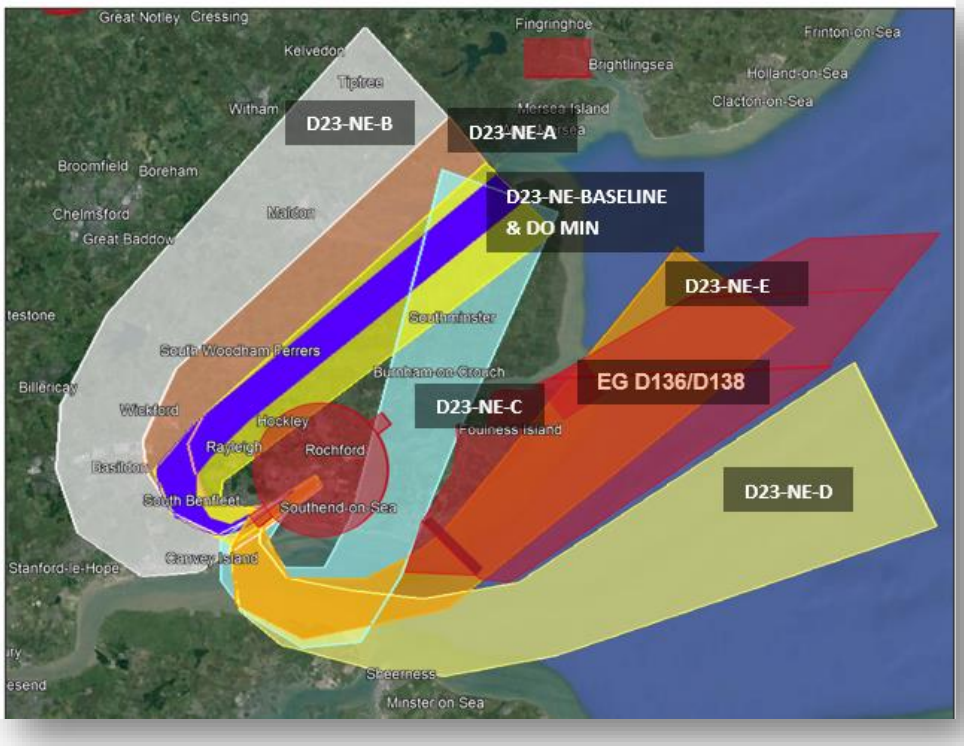


Figure 6: Departures Runway 23 - Northeast

Baseline

Departures bound for the Northeast off Runway 23 turn to comply with the NAP and remain in a tight and direct Northeasterly swathe. Our baseline is defined as: Option D23-NE-BASELINE and is depicted by the yellow swathe. This has been established from the NTK data, current procedures, and operational expertise. Our Do Minimum Option is a refinement of the Baseline, defined as Option D23-NE-DO MIN and is depicted as the dark blue swathe. (For more information on the Baselines please see the document titled 'ACP Options Development and DPE' which is available on the ACP Portal).

Options

- D23-NE-BASELINE.
- D23-NE-DO MINIMUM.
- D23-NE-A.
- D23-NE-B.
- D23-NE-C.
- D23-NE-D.
- D23-NE-E.

2.5. Departures Runway 23 – Northwest

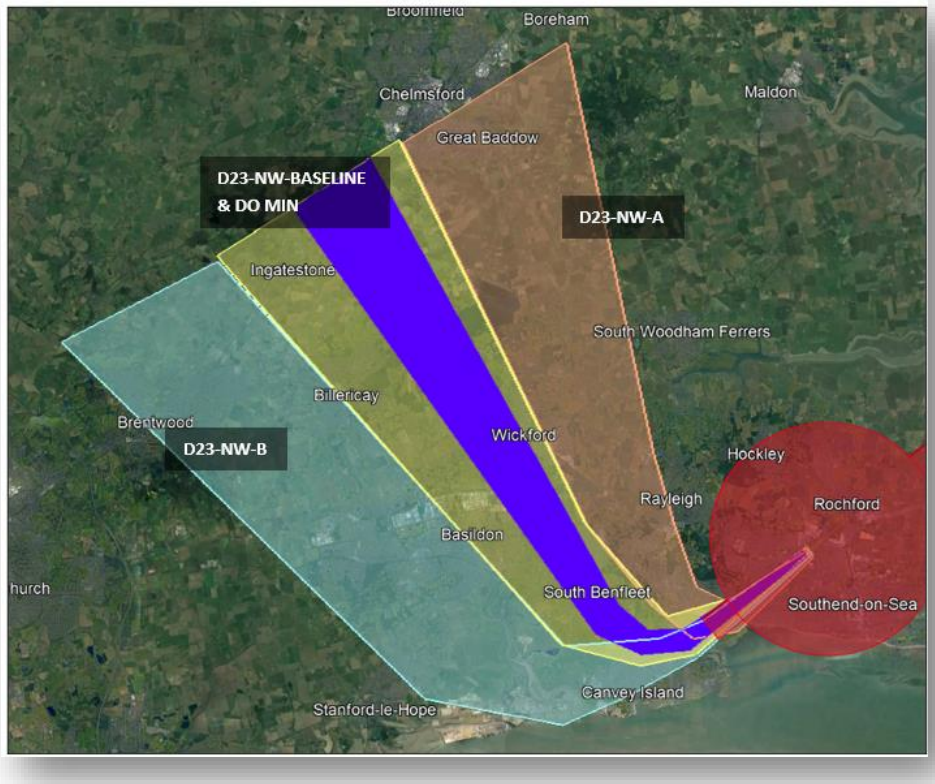


Figure 7: Departures Runway 23 - Northwest

Baseline

Departures to the Northwest off Runway 23 turn to comply with the NAP and do not fan out broadly until aircraft are 15-20nm Northwest of LSA. Our baseline is defined as: Option D23-NW-BASELINE and is depicted by the yellow swathe. This has been established from the NTK data, current procedures, and operational expertise. Our Do Minimum Option is a refinement of the Baseline, defined as: Option D23-NW-DO MIN and is depicted as the dark blue swathe. (For more information on the Baselines please see the document titled 'ACP Options Development and DPE' which is available on the ACP Portal).

Options

- D23-NW-BASELINE.
- D23-NW-DO MINIMUM.
- D23-NW-A.
- D23-NW-B.

2.6. Departures Runway 23 – South/Southeast

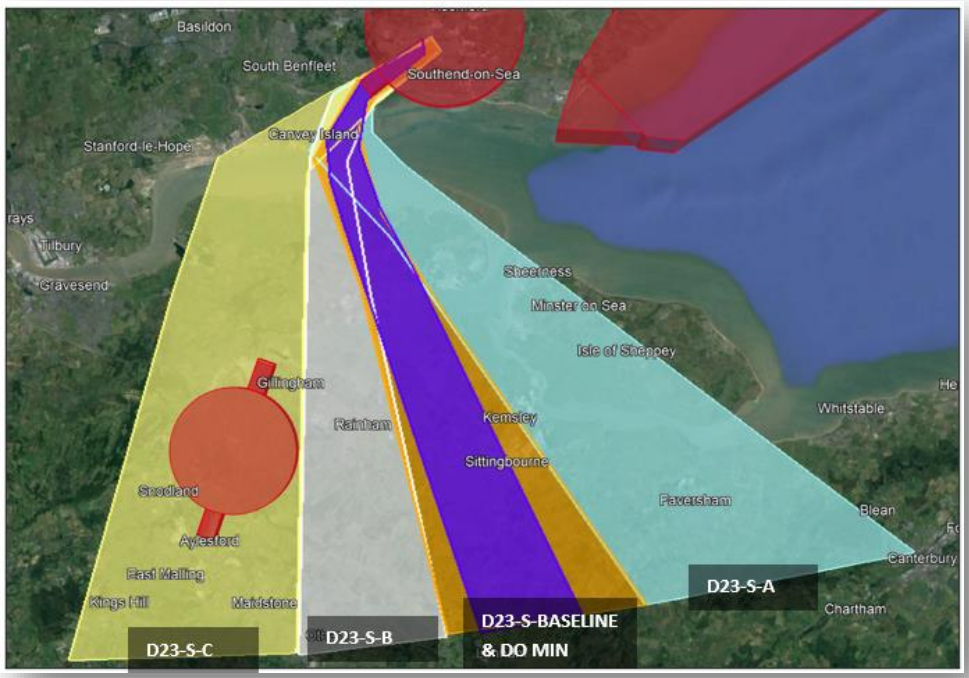


Figure 8: Departures Runway 23 - South/Southeast

Baseline

Departures to the South off Runway 23 turn South upon adherence to the NAP and start to fan out approximately 10-15nm from take-off. Our baseline is defined as: Option D23-S-BASELINE and is depicted by the orange swathe. This has been established from the NTK data, current procedures, and operational expertise.[3] Our Do Minimum Option is a refinement of the Baseline, defined as: Option D23-S-DO MIN and is depicted as the dark blue swathe. (For more information on the Baselines please see the document titled 'ACP Options Development and DPE' which is available on the ACP Portal).

Options

- D23-S-BASELINE.
- D23-S-DO MINIMUM.
- D23-S-A.
- D23-S-B.
- D23-S-C.

[3] Originally the Baseline was contained within Option D23-S-B.

2.7. Arrivals Runway 05 – Northwest

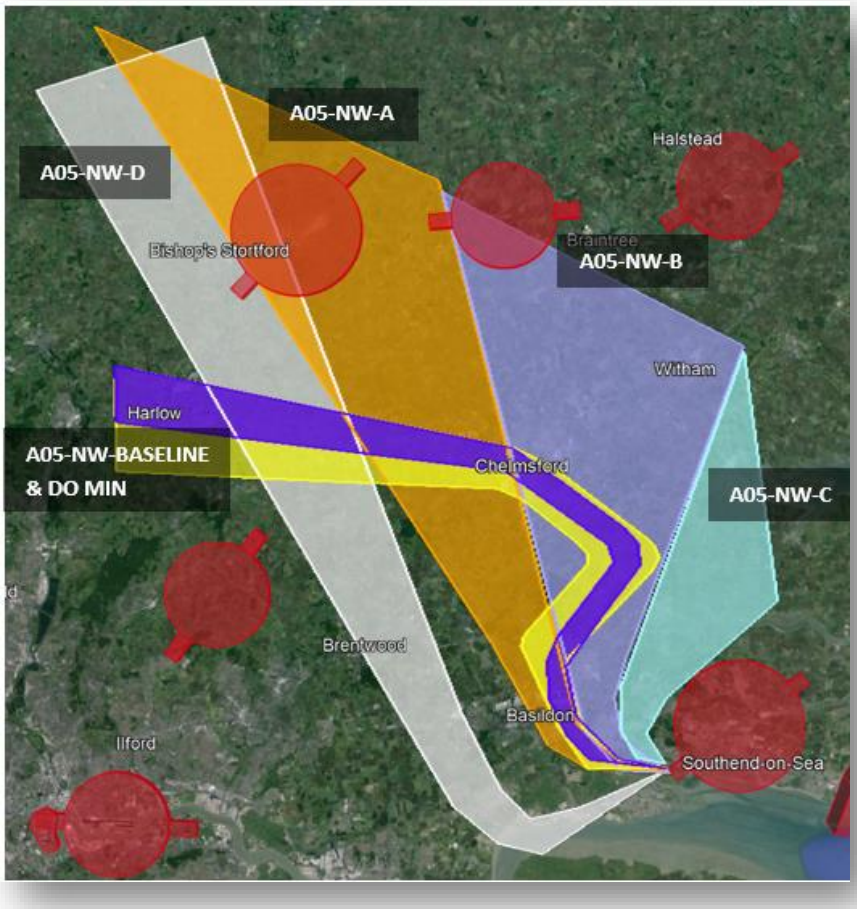


Figure 9: Arrivals Runway 05 - Northwest

Baseline

Aircraft generally follow the existing Standard Arrival (STAR) initially, then turn early to the South to join the final approach. Our baseline is defined as: Option A05-NW-BASELINE and is depicted by the yellow swathe. This has been established from the NTK data, current procedures, and operational expertise. Our Do Minimum Option is a refinement of the Baseline, defined as: Option A05-NW-DO MIN and is depicted as the dark blue swathe. (For more information on the Baselines please see the document titled 'ACP Options Development and DPE' which is available on the ACP Portal).

Options

- A05-NW-BASELINE.
- A05-NW-DO MINIMUM.
- A05-NW-A.
- A05-NW-B.
- A05-NW-C.
- A05-NW-D.

2.8. Arrivals Runway 05 –South and East

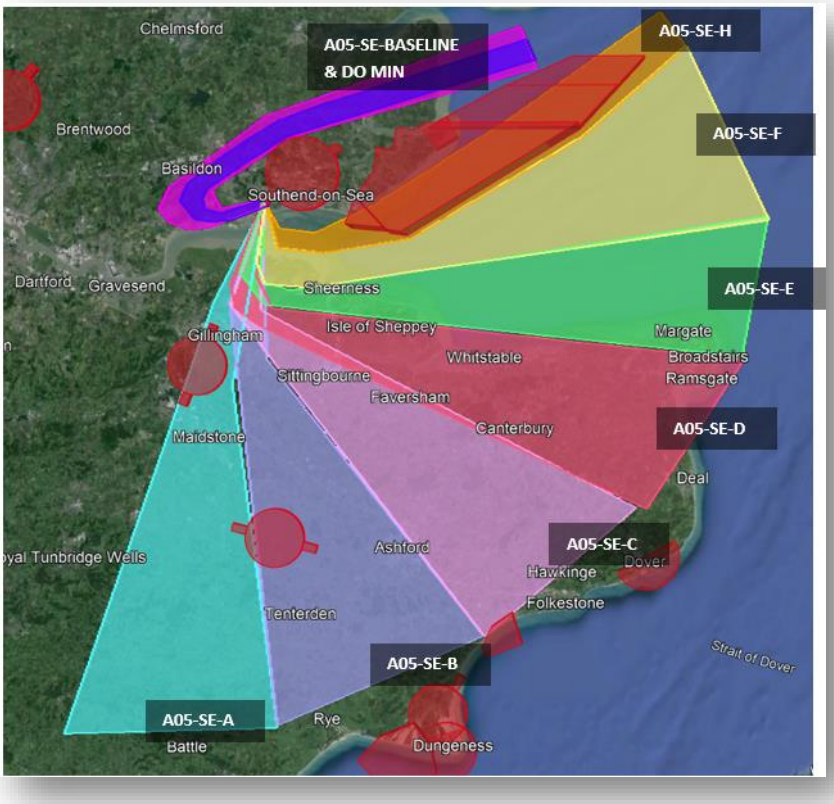


Figure 10: Arrival Runway 05 – South and East

Baseline

The existing STAR from the South and the East routes to ADVAS[4] and then the hold at GEGMU[4]. Our baseline is defined as: Option A05-SE-BASELINE and is depicted by the purple swathe. This has been established from the NTK data, current procedures, and operational expertise. Our Do Minimum Option is a refinement of the Baseline, defined as: Option A05-SE-DO MIN and is depicted as the dark blue swathe. (For more information on the Baselines please see the document titled 'ACP Options Development and DPE' which is available on the ACP Portal).

Options

- A05-SE-BASELINE.
- A05-SE-DO MINIMUM.
- A05-SE-A.
- A05-SE-B.
- A05-SE-C.
- A05-SE-D.
- A05-SE-E.

[4] ADVAS and GEGMU refer to specific points or fixes used in air traffic control and navigation; these are called waypoints.

- A05-SE-F.
- A05-SE-H.

2.9. Arrivals Runway 23 – Northwest

Figure 11: Arrivals Runway 23 - Northwest

Baseline

The Arrival Options to Runway 23 from the Northwest largely follow the existing track of the STAR although displaced slightly to the South. Our baseline is defined as: Option A23-NW-BASELINE and is depicted by the yellow swathe. This has been established from the NTK data, current procedures, and operational expertise. Our Do Minimum Option is a refinement of the Baseline, defined as: Option A23-NW-DO MIN and is depicted as the dark blue swathe. (For more information on the Baselines please see the document titled 'ACP Options Development and DPE' which is available on the ACP Portal).

Options

- A23-NW-BASELINE.
- A23-NW-DO MINIMUM.
- A23-NW-A.
- A23-NW-B.

2.10. Arrivals Runway 23 – South and East

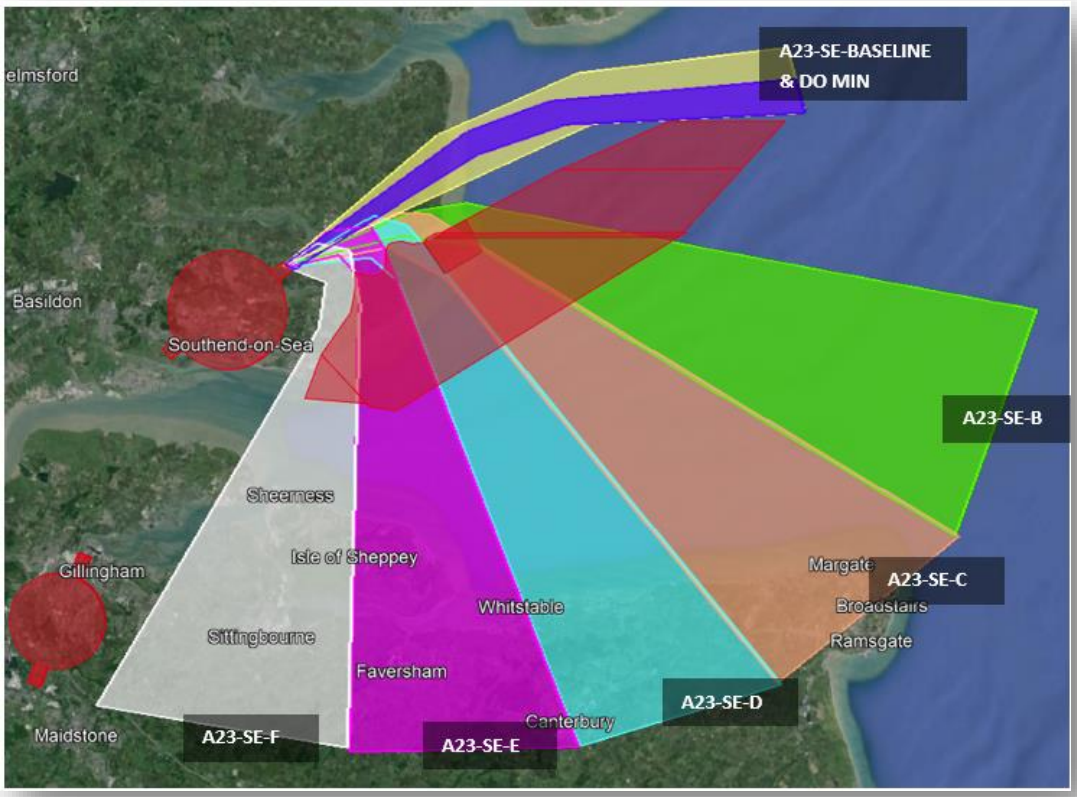


Figure 12: Arrivals Runway 23 - South and East

Baseline

The existing STAR from the South and the East, routes to ADVAS and then the hold at GEGMU. Our baseline is defined as: Option A23-SE-BASELINE and is depicted by the yellow swathe. This has been established from the NTK data, current procedures, and operational expertise. Our Do Minimum Option is a refinement of the Baseline, defined as Option A23-SE-DO MIN and is depicted as the dark blue swathe. (For more information on the Baselines please see the document titled 'ACP Options Development and DPE' which is available on the ACP Portal).

Options

- A23-SE-BASELINE.
- A23-SE-DO MINIMUM.
- A23-SE-B.
- A23-SE-C.
- A23-SE-D.
- A23-SE-E.
- A23-SE-F.

3. Appraisal Methodology

3.1. Initial Options Appraisal

3.1.1. This IOA is the first of three appraisals that will be conducted during the CAP1616 process. It is a high-level qualitative assessment of the options, defined in Stage 2A, against pre-defined criteria laid down in **CAP1616 Appendix E** and includes a safety assessment and assessment against the AMS.

3.1.2. The purpose of this appraisal is to show the positives, negatives, benefits and costs of each option based on high level qualitative assessment conducted by subject matter experts.

3.1.3. Each option is assessed in isolation. Interdependencies between options will be explored at Stage 3 in collaboration with neighbouring airports and the en-route network.

3.1.4. These options are assessed based on the present day; we have not taken external changes into account at this stage. Future planned housing and industrial developments will be considered for each option taken forward to Stage 3 at the Second options appraisal. These have been collated and are contained within Annex D.

3.1.5. This qualitative IOA does not consider traffic forecasts. Future traffic forecast are provided in the document titled 'Options Development and DPE' in section 1.14 (available on the ACP Portal) and will be utilised during the Stage 3 Options appraisal.

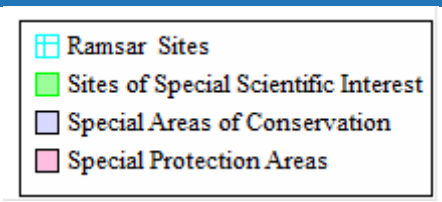
3.1.6. Two other documents have been submitted to support this Options Appraisal, LSA Options Development and DPE [4] and LSA DPE [5] these can be found on the Airspace Change (ACP) Portal.

3.2. Assessment Criteria Summary

3.2.1. The table below details the IOA methodology that has been followed to undertake an initial assessment of our options.

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	A qualitative assessment of changes to the noise impact for each option when compared to the Baseline option. This has been done using high level overflight assessments of each Option and the analysis from the DPE - DP2 Overflight and DP3 Noise Footprint. **Annex C** contains Population Density maps which assisted in the assessment for each Option.
	Air Quality	A qualitative assessment of changes to the Local Air Quality for each option when compared to the Baseline option. This has been done using high level overflight assessments of each option in relation to local air quality specifically below 1000ft as per guidelines[5]. **Annex C** contains population density maps which assisted in the assessment for each option. Including analysis from the DPE – DP5 Emissions and Air Quality
Wider society	Greenhouse gas impact	A qualitative assessment of changes to the greenhouse gas impact for each option when compared to the Baseline. This has been done by considering the difference in track miles to give an indication of the overall impact and using the analysis from the DPE – DP5 Emissions and Air Quality.
	Capacity/ resilience	A qualitative assessment of changes to airspace capacity and resilience for each option when compared to the Baseline option. This includes our analysis from the DPE – DP8 Airspace Complexity and DP10 - Systemisation[6].
	Tranquillity	A qualitative assessment of changes to the tranquillity impact for each option when compared to the Baseline option including analysis from the DPE – DP4 Tranquillity, AONBs and National Parks overflown by the Option.
	Biodiversity	A qualitative assessment of changes to the Biodiversity impact for each option when compared to the Baseline option. It is not always possible to qualitatively assess if an option is 'better' or 'worse' than the Baseline, however where possible an option may be assessed as overflying more or less European sites. Data retrieved from The Department for Environment, Food and Rural Affairs (DEFRA) Magic maps is used to identify areas of Biodiversity significance, such as Special Areas of Conservation (SAC), Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) and Ramsar sites. Additionally potential SACs were investigated. **Annex B** contains a tranquillity and biodiversity map which assisted in the assessment for each option. Please refer to **Annexe E** for maps of European sites and colour keys. The key is copied here:

[5] Analysis from the DPE – DP5 Emissions and Air Quality - has not been referenced in this section. The IOA Air Quality assessment relates to local air quality only whereas DP5 is more generic for the entire swathe and is captured better in other sections of the IOA.
[6] Possible interactions and conflicts between arrival and departure swathes have not been considered at this stage as it is these will be assessed in Stage 3 when the swathes are refined.

Group	Impact	Qualitative Assessment
		
General aviation	Access	A qualitative assessment of changes to the General Aviation (GA) access to airspace for each option when compared to the Baseline option. This includes our analysis from the DPE – DP7 Airspace Dimensions.
General aviation/ commercial airlines	Economic impact from increased effective capacity	A qualitative assessment of the economic impact for GA and commercial airlines from changes to capacity for each option when compared to the Baseline option.
	Fuel burn	A qualitative assessment of changes to the impact to fuel burn for GA and commercial airlines for each option when compared to the Baseline option. This has been done by considering the difference in track miles to give an indication of the overall impact and uses analysis from the DPE – DP5 Emissions and Air Quality and DP11 Operational Cost[7].
Commercial airlines	Training costs	A qualitative assessment of changes to commercial airline training costs for each option when compared to the Baseline option.
	Other costs	A qualitative assessment of changes to additional commercial airline costs for each option when compared to the Baseline option.
Airport/ Air navigation service provider	Infrastructure costs	A qualitative assessment of changes to infrastructure costs for the Airport and/or ANSP for each option when compared to the Baseline option.
	Operational costs	A qualitative assessment of changes to operational costs for the Airport and/or ANSP for each option when compared to the Baseline option.
	Deployment costs	A qualitative assessment of deployment costs for the Airport and/or ANSP for each option when compared to the Baseline option, although it is acknowledged that there will be costs associated with the development of any routes for this ACP.
All	Safety	A qualitative safety assessment for each option when compared to the Baseline option including analysis from the DPE - DP1 Safety.

[7] Definition of DP11 Operational Cost - Provided it does not have an adverse impact of community disturbance, procedures should be designed to optimise fuel efficiency.

Group	Impact	Qualitative Assessment
	AMS Realisation	A qualitative assessment of whether the Option meets the AMS objectives of safety, integration, simplification and environmental sustainability compared with the do-nothing baseline. Includes analysis from the DPE – DP12 AMS Realisation. Where an option meets the AMS objective but does not provide any improvement from today then this has been noted in the Assessment.

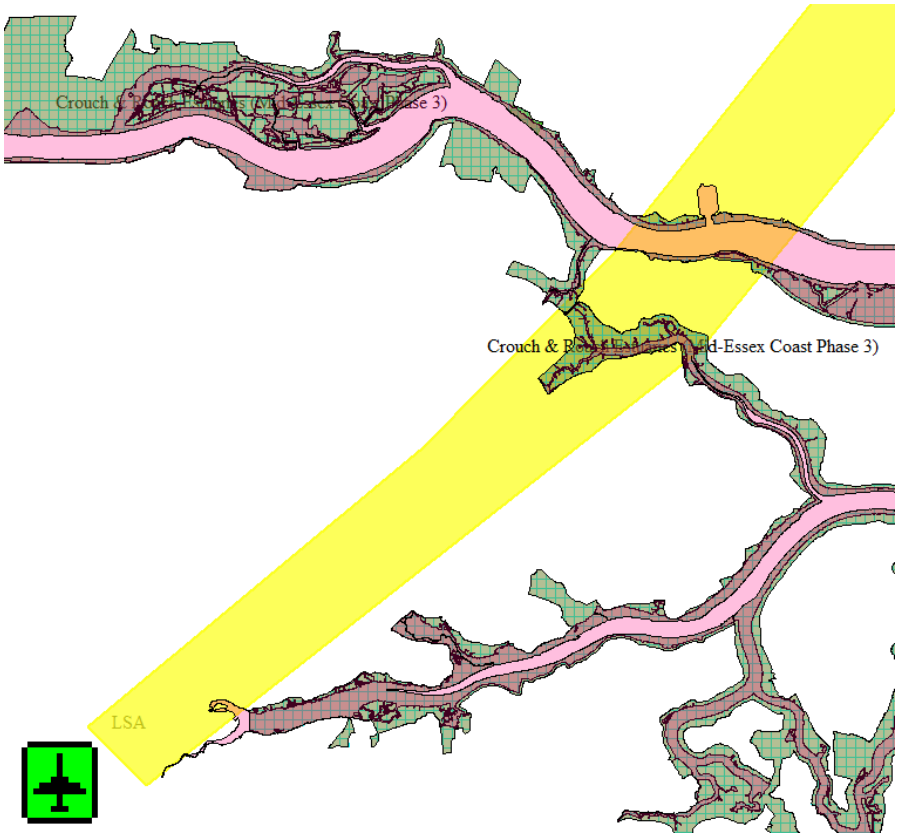
Table 1: IOA Methodology

4. Initial Options Appraisal – Departures Runway 05

In this section all options are qualitatively assessed as described in Table 1 section 3.

4.1. D05-NE-BASELINE

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact as this is the Baseline.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality. There are no Air Quality Management Areas (AQMAs) overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	No opportunity to increase capacity or resilience.
	Tranquillity	There are no Area of Outstanding Natural Beauty (AONBs) or National Parks (NP) overflown by this option below 7000ft.

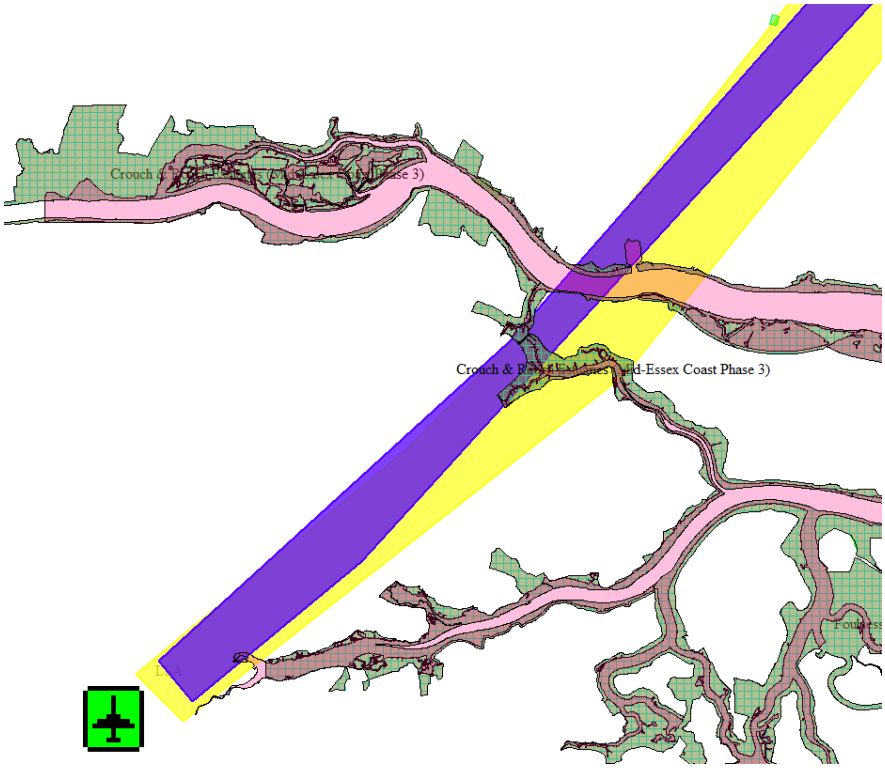
Group	Impact	Qualitative Assessment
	Biodiversity	The Crouch & Roach Estuaries are currently overflown below 7000ft, these are Ramsar sites, SPAs, SACs and an SSSI. Image shows swathe flying over Crouch & Roach Estuaries. 
General aviation	Access	No change in controlled airspace, or access to it, if the Baseline was to be retained.
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased capacity or benefit to economic impact should the Baseline option be retained.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No training costs for airlines as there would be no new procedures if this Baseline option were to be retained. Updates to flight procedures form part of an Aeronautical Information Regulation and Control (AIRAC) cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No commercial airline costs are anticipated should the Baseline be retained.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	No controller or assistant training will be required should the Baseline be retained as procedures will not be changed.
All	Safety	No safety concerns should this baseline option be retained.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification objectives.

Table 2: D05-NE-BASELINE

4.2. D05-NE-DO MINIMUM

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact although the flight path will be more concise.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Resilience would be increased due to the introduction of RNAV. The New routes could also mean better integration with the en-route network and the potential introduction of free flow on departures which would contribute to an increase in capacity.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

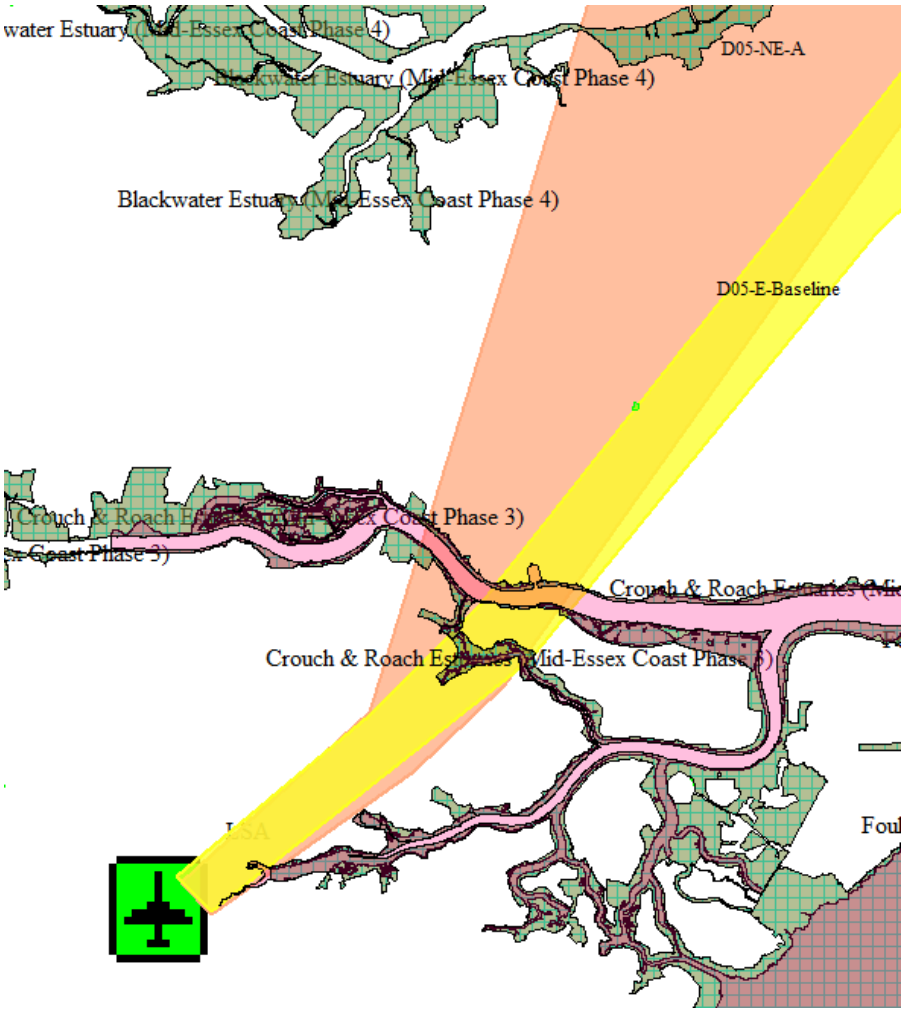
Group	Impact	Qualitative Assessment
	Biodiversity	The Crouch & Roach Estuaries would continue to be overflown. This contains a Ramsar site, SPA, SAC and an SSSI. Image shows Baseline (yellow) and Do minimum (blue) swathes flying over Crouch & Roach Estuaries. The Option would fly over less of the European sites than the Baseline. 
General aviation	Access	No increase or reduction in controlled airspace would be required for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	There could be some benefit in economic impact if free flow for departures becomes available as this would contribute towards an increase in capacity.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VHP Omni-Directional Radion Range (VOR) rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is assessed as being fully aligned with the AMS although there is no improvement expected for the environmental sustainability objectives. This is an improvement when compared to the Baseline.

Table 3: D05-NE-DO MIN

4.3. D05-NE-A

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off. Once the Baseline turns left, it would fly over similar communities as this option however, Option D05-NE-A (this option) would generally be closer to populated area.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up to 1000ft with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option may mean better integration with the en-route network if deconflicted with neighbouring airport routes, although this option moves traffic closer to those routes. The potential introduction of free flow on departures would contribute to an increase in capacity.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

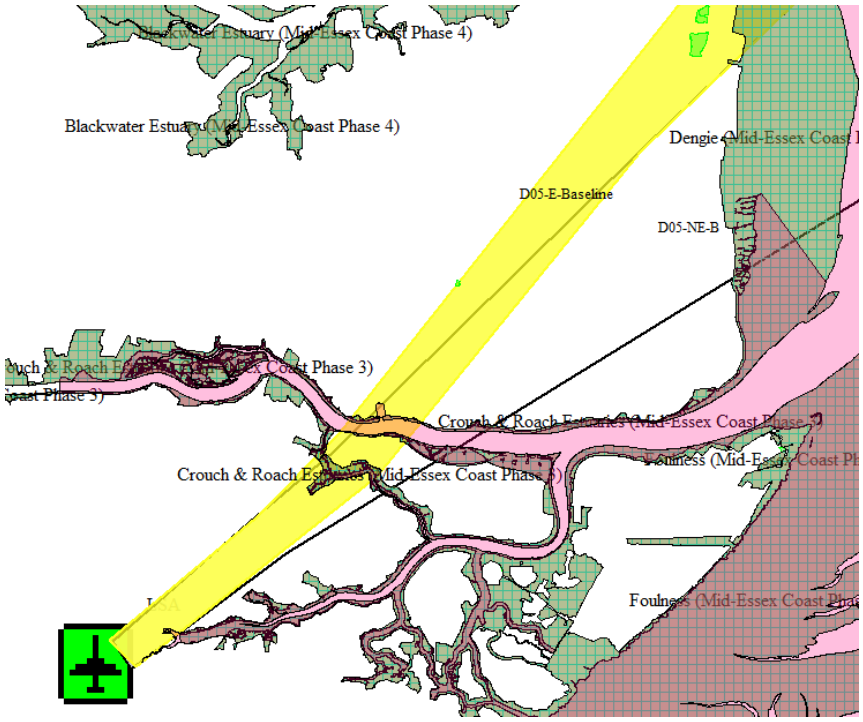
Group	Impact	Qualitative Assessment
	Biodiversity	The Crouch & Roach Estuaries would continue to be overflown, additionally, this option would fly over a small portion of the Blackwater Estuary; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) and D05-NE-A (peach) swathes, flying over Crouch & Roach along with Blackwater Estuaries D05-NE-A. The Option would fly over more of the European sites than the Baseline. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	There could be some benefit in economic impact if free flow for departures becomes available as this would contribute towards an increase in capacity, although this is less likely with this option as traffic would be moved close to neighbouring airport's routes.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 4: D05-NE-A

4.5. D05-NE-B

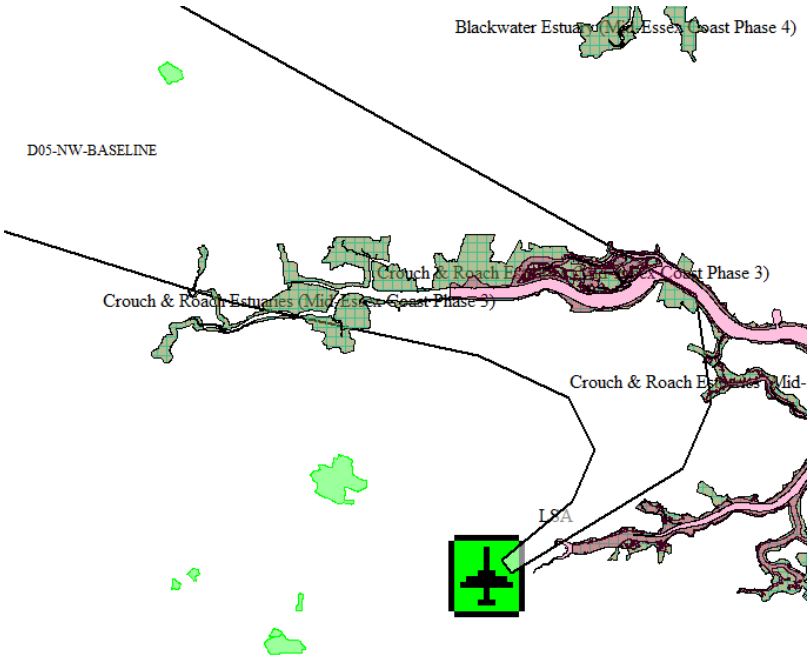
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off. After the Baseline route turns right, similar communities would be overflown, although this option would generally be further from populated areas.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up to 1000ft, with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option could mean better integration with the en-route network and the potential introduction of free flow on departures, which would contribute to an increase in capacity. The intention for this option is to facilitate free flow for Departures from the Airport which enables significant increases in both capacity and resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

Group	Impact	Qualitative Assessment
	Biodiversity	The Crouch & Roach Estuaries would continue to be overflown, additionally, this option would fly over a small portion of the Dengie; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) and D05-NE-B (white) swathes flying over Crouch & Roach along with Dengie for Option D05-NE- B. The Option would also fly over more of the European sites than the Baseline. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	There could be some benefit in economic impact if free flow for departures becomes available as this would contribute towards an increase in capacity.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.

Group	Impact	Qualitative Assessment
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage, this option has minimal difference from today's baseline operation.
	AMS Realisation	This option is assessed as being fully aligned with the AMS although there is no improvement expected for the environmental sustainability objectives. This is an improvement when compared to the Baseline.

Table 5: D05-NE-B

4.6. D05-NW-BASELINE (previously D05-NW-A)

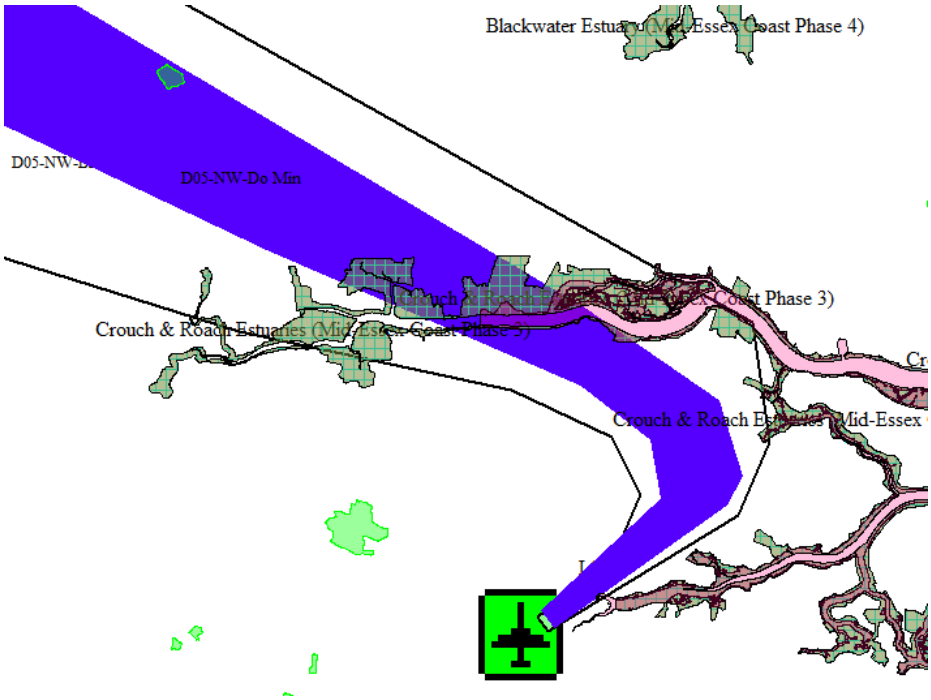
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact as this is the Baseline.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality. There are no AQMAs overflown by this option at or below 1000ft.
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	No opportunity to increase capacity or resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Crouch & Roach Estuaries are currently overflown, this is a Ramsar site, an SPA, SAC and an SSSI. Image shows swathe flying over Crouch & Roach Estuaries. The Baseline flies over SSSIs (marked in light green). 
General aviation	Access	No change in controlled airspace or access to it if the Baseline was to be retained.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased capacity or benefit to economic impact should the Baseline option be retained.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No training costs for airlines as there would be no new procedures if this baseline option were to be retained. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No commercial airline costs are anticipated should the Baseline be retained.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	No controller or assistant training will be required should the Baseline be retained as procedures will not be changed.
All	Safety	No safety concerns should this baseline option be retained.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the simplification objectives.

Table 6: D05-NW-BASELINE

4.7. D05-NW-DO MINIMUM

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact although the flight path will be more concise.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality and below 1000ft. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be minimal change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Resilience would be increased due to the introduction of RNAV. This may also mean better integration with the en-route network if deconflicted with neighbouring airport routes, there is potential for conflict with current and future London Stansted departures to the East and the South which if not procedurally deconflicted could further limit capacity and resilience. Limited opportunity for the introduction of free flow on departures.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

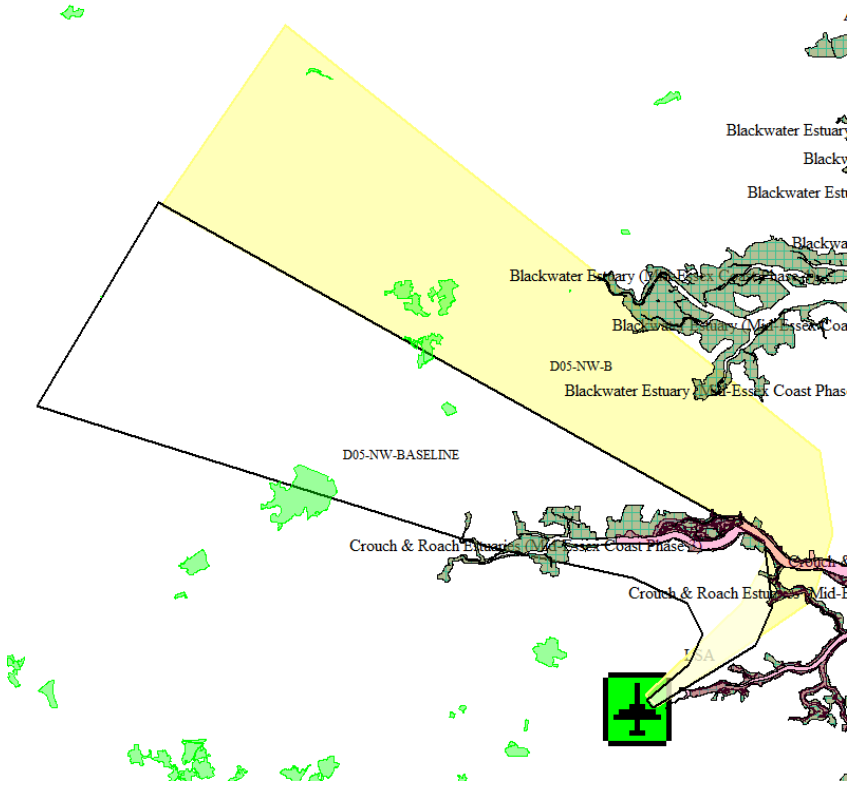
Group	Impact	Qualitative Assessment
	Biodiversity	The Crouch & Roach Estuaries would continue to be overflown, this is a Ramsar site, an SPA, an SAC, and an SSSI. Image shows baseline (white) and Do-minimum (blue) swathes flying over Crouch & Roach Estuaries. The do-minimum Option would fly over fewer SSSIs. The Option would fly over less of the European sites than the Baseline. 
General aviation	Access	No change in controlled airspace or access to it if the Baseline was to be retained.
General aviation/ commercial airlines	Economic impact from increased effective capacity	Limited opportunity for increased capacity or benefit to economic impact is anticipated.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is assessed as being fully aligned with the AMS although there is no improvement expected for the Environmental Sustainability Objectives. This is an improvement when compared to the Baseline.

Table 7: D05-NW-DO MIN

4.9. D05-NW-B

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns left. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas have a broadly similar population density compared to those overflown in the Baseline.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality and likely below 1000ft, there is a small chance that a different community would be flown over as this is a sharper left turn compared with the Baseline. This will be investigated further in Stage 3. There are no AQMAs overflown by this option at or below 1000ft.
Wider society	Greenhouse gas impact	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option is broadly similar to the Baseline so limited opportunity for increased capacity or resilience is anticipated. There is potential for conflict with current and future London Stansted departures to the East and the South which, if not procedurally deconflicted, could further limit capacity and resilience. Limited opportunity for the introduction of free flow on departures.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

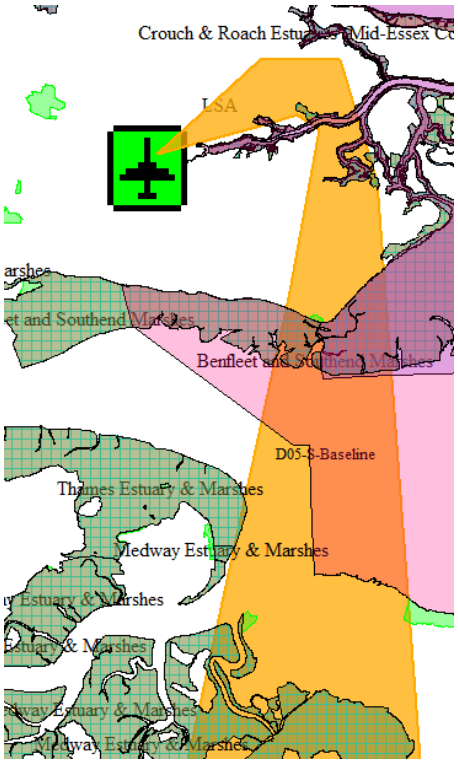
Group	Impact	Qualitative Assessment
	Biodiversity	This option flies over a different section of the Crouch & Roach Estuaries and the westerly section of the Blackwater Estuary this is a Ramsar site, an SPA, an SAC and an SSSI. Image shows baseline (white) and Option NW-B (yellow) swathes flying over Crouch & Roach and Blackwater Estuaries. The Baseline and Option D05-NW-B fly over different SSSIs (marked in light green). 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option is broadly similar to the Baseline. Limited opportunity for increased capacity or benefit to economic impact is anticipated.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability and simplification objectives. As the Objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 8: D05-NW-B

4.11. D05-S-BASELINE

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact as this is the Baseline.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	No opportunity to increase capacity or resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

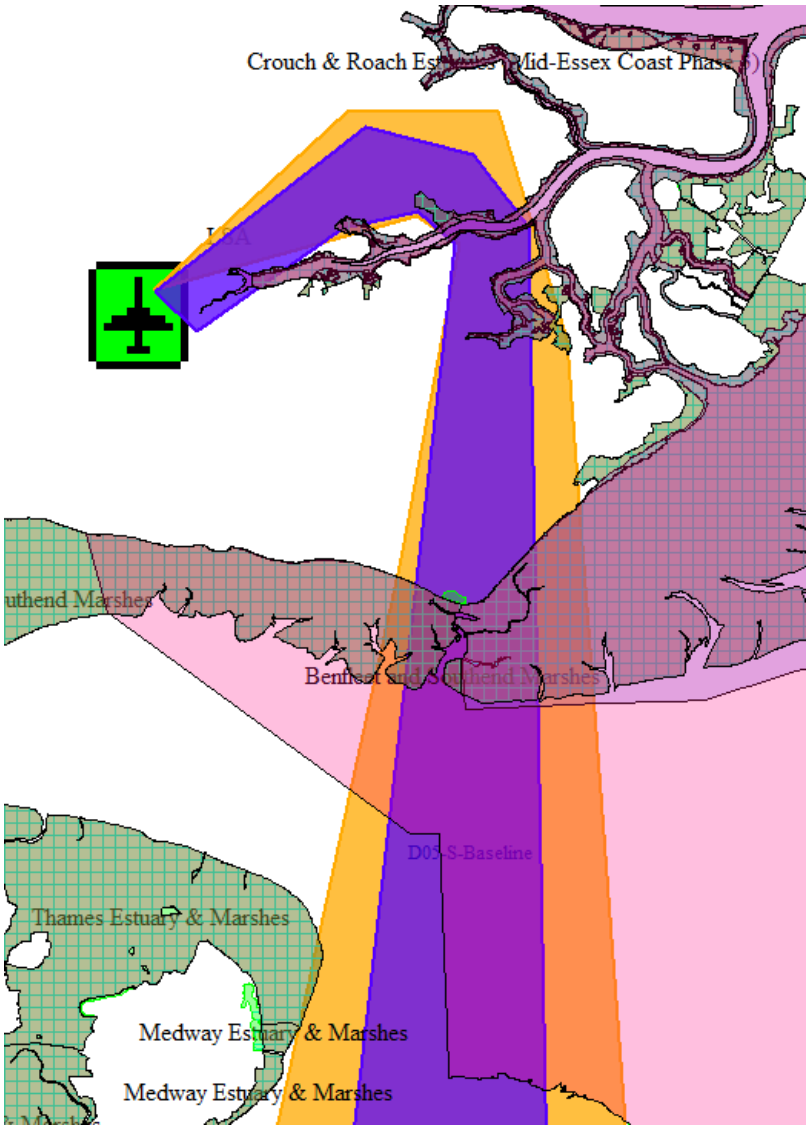
Group	Impact	Qualitative Assessment
	Biodiversity	The Crouch & Roach Estuaries, Benfleet and Southend Marshes, Medway Estuary & Marshes and the Swale are flown over below 7000ft, these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (orange) Ramsar sites and SACs (green area), SSSIs (light green areas), SPAs (pink areas). 
General aviation	Access	No change in controlled airspace or access to it if the Baseline was to be retained.
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased capacity or benefit to economic impact should the Baseline option be retained.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No training costs for airlines as there would be no new procedures if this baseline option were to be retained. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No commercial airline costs are anticipated should the Baseline be retained.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	No controller or assistant training will be required should the Baseline be retained as procedures will not be changed.
All	Safety	No safety concerns should this baseline option be retained.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification objectives. Additionally, no improvement is expected for the Environmental Sustainability Objectives.

Table 9: D05-S-BASELINE

4.12. D05-S-DO MINIMUM

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact although the flight path will be more concise.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality and below 1000ft. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be minimal change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Resilience would be increased due to the introduction of RNAV. This may also mean better integration with the en-route network if deconflicted with neighbouring airport routes and the potential introduction of free flow on departures which would contribute to an increase in capacity.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

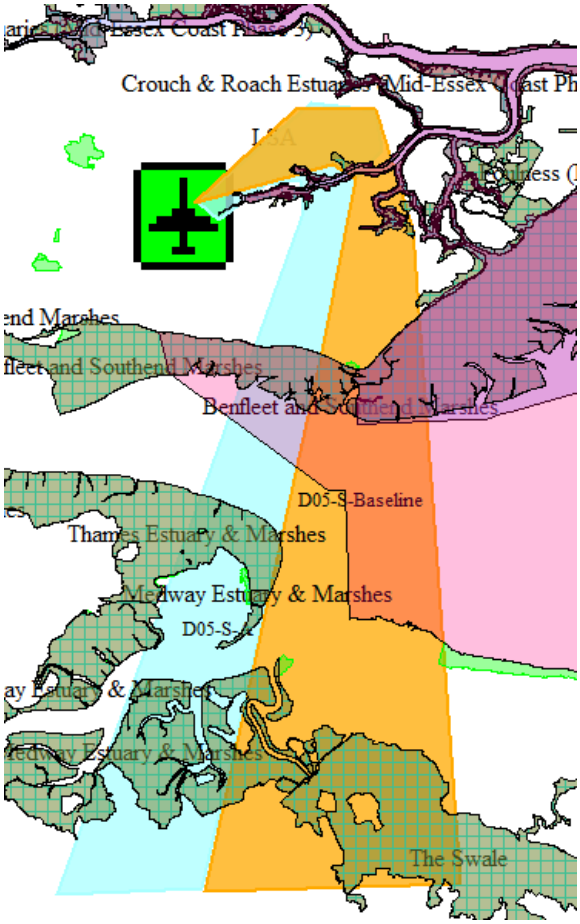
Group	Impact	Qualitative Assessment
	Biodiversity	The Crouch & Roach Estuaries, Benfleet and Southend Marshes, Medway Estuary & Marshes and the Swale are flown over below 7000ft, these are Ramsar sites, SPAs and SSSIs. Additionally, the option flies over SACs (purple area – see annex E), SSSIs (light green area), SPAs (pink areas). Image shows baseline (orange) and Do-minimum (purple). The Option would fly over less of the European sites than the Baseline. 
General aviation	Access	No increase or reduction in controlled airspace would be required for this option.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option may mean better integration with the en-route network if deconflicted with neighbouring airport routes. The potential introduction of free flow on departures would contribute to an increase in capacity.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is assessed as being fully aligned with the AMS although there is no improvement expected for the environmental sustainability objectives. This is an improvement when compared to the Baseline.

Table 10: D05-S-DO MIN

4.13. D05-S-A

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly similar communities as the Baseline after take-off.
	Air Quality	This design option would overfly similar communities as the Baseline after take-off with no change in impact to local air quality and below 1000ft.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option has the potential to improve capacity and resilience due to the right turn out on departure, this would help to keep the traffic free of conflict with London Terminal Manoeuvring Area (LTMA) traffic. Due to the proximity of the Shoeburyness Danger Areas (DAs) this may not be a viable Option for a permanent route, but consideration should be given to its potential as a respite route should the DAs be inactive.
	Tranquillity	A smaller portion of the same area would be overflown. There are no AONBs or NPs overflown by this option below 7000ft.

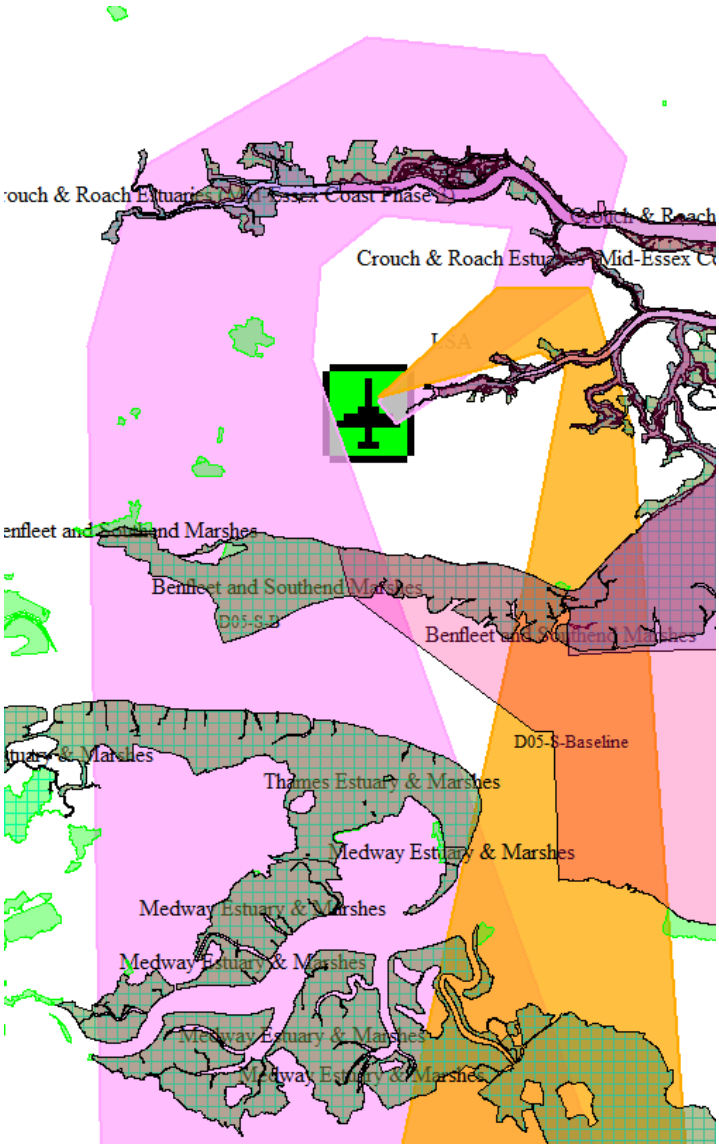
Group	Impact	Qualitative Assessment
	Biodiversity	Crouch & Roach Estuaries continue to be overflown by this option as per the baseline. Benfleet and Southend Marshes and Medway Estuary & Marshes are still flown over below 7000ft, however different sections of these areas are flown over compared to the Baseline, these are Ramsar sites, SPAs, SACs and SSSIs. The Swale would no longer be flown over, compared with the Baseline. The option flies over the same, but different sections of SACs (purple area), SSSIs (light green areas), SPAs (pink areas). Image shows baseline (orange) and D05-S-A (turquoise) over Benfleet and Southend marshes, Medway & Marshes. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option has the potential to contribute to increased effective capacity which could have a positive economic impact.

Group	Impact	Qualitative Assessment
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 11: D05-S-A

4.15. D05-S-B

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the route turns. After this point, This design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density when compared to those overflown by the Baseline, although at subsequent higher altitudes the areas would be of a higher population density as aircraft would take a longer route to reach the Thames Estuary.
	Air Quality	This option would continue to overfly the same communities after take-off, and on a 6% climb gradient be expected to be over 1000ft by the time it digresses from the Baseline, however as this option is a wraparound, it does fly over an AQMA, however aircraft are expected to be almost at 5000ft at this point.
Wider society	Greenhouse gas impact	There would be approximately double the track miles when compared with the Baseline. This could contribute to increased impacts to greenhouse gas and CO2 emissions.
	Capacity/ resilience	With this option, there is potential for conflict with London City Airport, however, due to the wraparound and additional track miles, the assumption is traffic will be above the London City arrivals.
	Tranquillity	The same area initially and then different areas would be overflown. There are no AONBs or NPs overflown by this option below 7000ft.

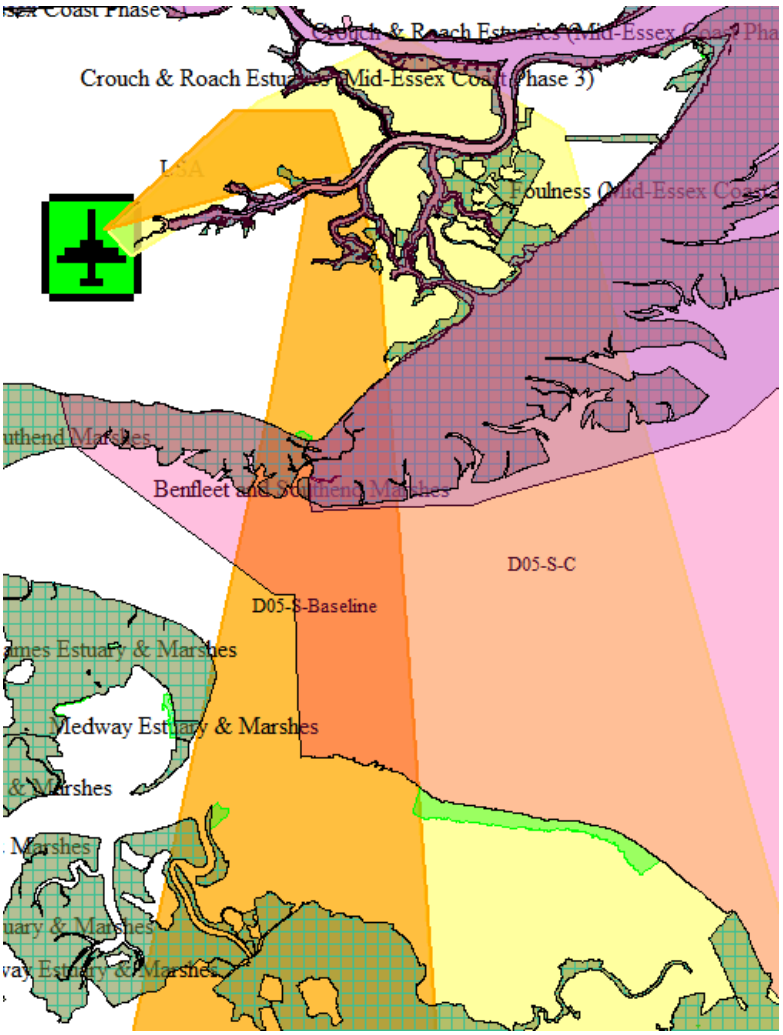
Group	Impact	Qualitative Assessment
	Biodiversity	A greater area of The Crouch & Roach Estuaries, Benfleet and Southend Marshes, Thames Estuary & Marshes, Medway Estuary & Marshes are flown over below 7000ft than the Baseline, these are Ramsar sites, SPAs, SACs, and SSSIs. Image shows baseline (orange) over Benfleet and Southend marshes, and Option D05-S-B (pink) over Benfleet and Southend marshes, Thames Estuary &marshes, Medway Estuary & Marshes. This option flies over additional SSSIs compared with the Baseline. The Option would fly over more of the European sites than the Baseline. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option could potentially provide positive economic impact due to the increased track miles possibly affording opportunity for Continuous Climb Operations and as such contributing to increased effective capacity. This is not a given and would have to be assessed in future bilateral sessions and workshops should this option be taken forward.
	Fuel burn	There would be approximately double the track miles when compared with the Baseline. This could contribute to increased impacts to fuel burn.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability, simplification and improving efficiency objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 12: D05-S-B

4.16. D05-S-C

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns right. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline with a larger portion of the route over the mouth of the Thames Estuary.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up to 1000ft with no change in impact to local air quality and below 1000ft.
Wider society	Greenhouse gas impact	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option has the potential to improve capacity and resilience due to the right turn out on departure, this would help to keep the traffic free of conflict. There could be a potential reduction in complexity due to the swathe being further away from the LTMA and associated airfields. Due to the proximity of the Shoeburyness DA this may not be a viable Option for a permanent route, but consideration should be given to its potential as a respite route should the DA be inactive.
	Tranquillity	Different areas would be flown over compared to the Baseline. There are no AONBs or NPs overflown by this option below 7000ft.

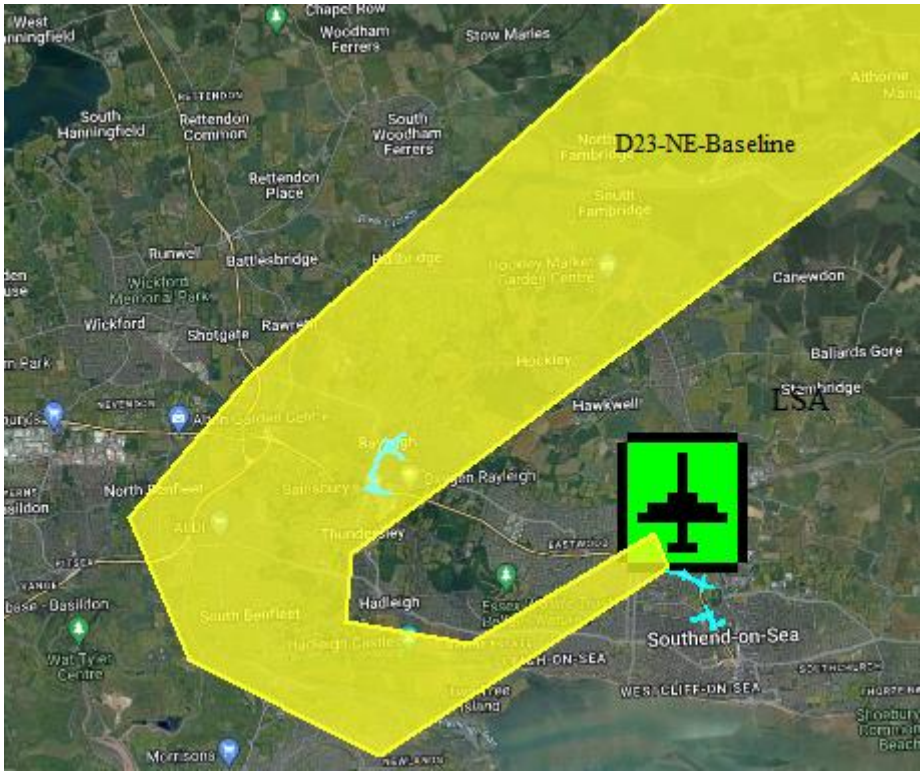
Group	Impact	Qualitative Assessment
	Biodiversity	A different, and greater area, of The Crouch & Roach Estuaries, Benfleet and Southend Marshes, and the Swale is overflown compared with the Baseline. Additionally Foulness is overflown, however the Thames Estuary & Marshes, Medway Estuary & Marshes are avoided, these are Ramsar sites, SPAs, SACs, and SSSIs. Image shows baseline (orange) over Benfleet and Southend marshes, Thames Estuary &marshes, Medway Estuary & Marshes., and Option D05-S-C (yellow) over Crouch & Roach Estuaries, Foulness, Benfleet and Southend marshes. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.

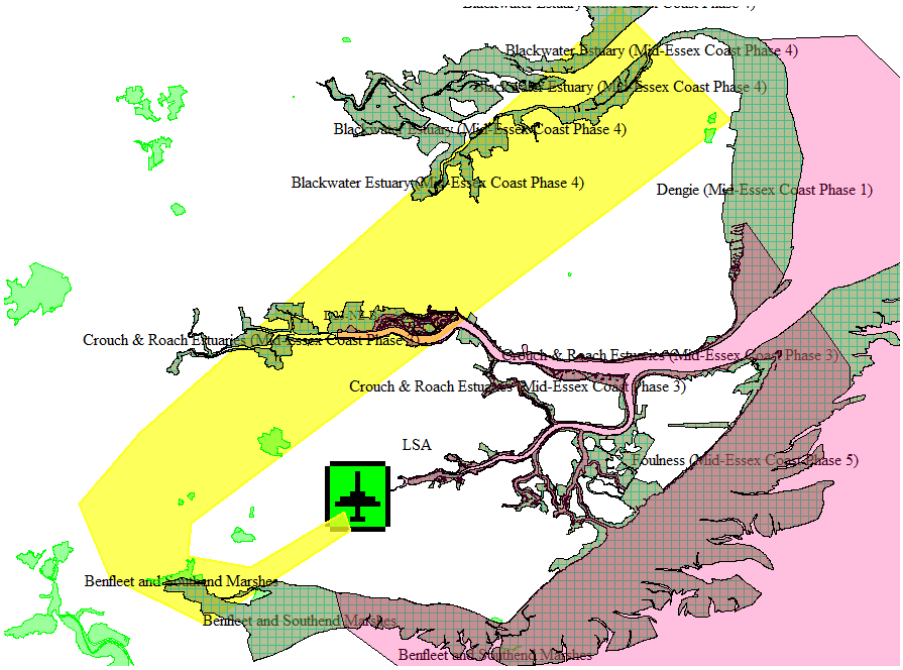
Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option has the potential to contribute to increased effective capacity which could have a positive economic impact.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	Additional safety work would need to be done to make this a viable Option. The entire swathe routes through the Shoeburyness DA. This option could be used as a potential respite route for when the DA are inactive.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the safety and simplification objectives. Additionally, no improvement is expected for the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 13: D05-S-C

5. Initial Options Appraisal – Departures Runway 23

5.1. D23-NE-BASELINE

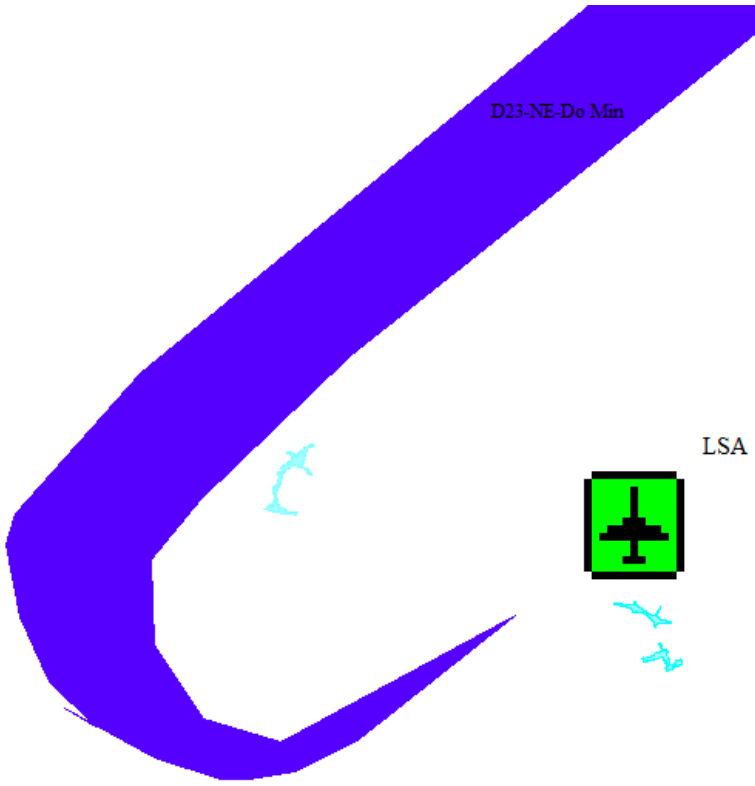
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact as this is the baseline.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality. There are AQMAs overflown and overflown by the Baseline however aircraft are expected to be above 1000ft at this point. Image shows AQMAs in the vicinity (turquoise shaded areas). 
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	No opportunity to increase capacity or resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

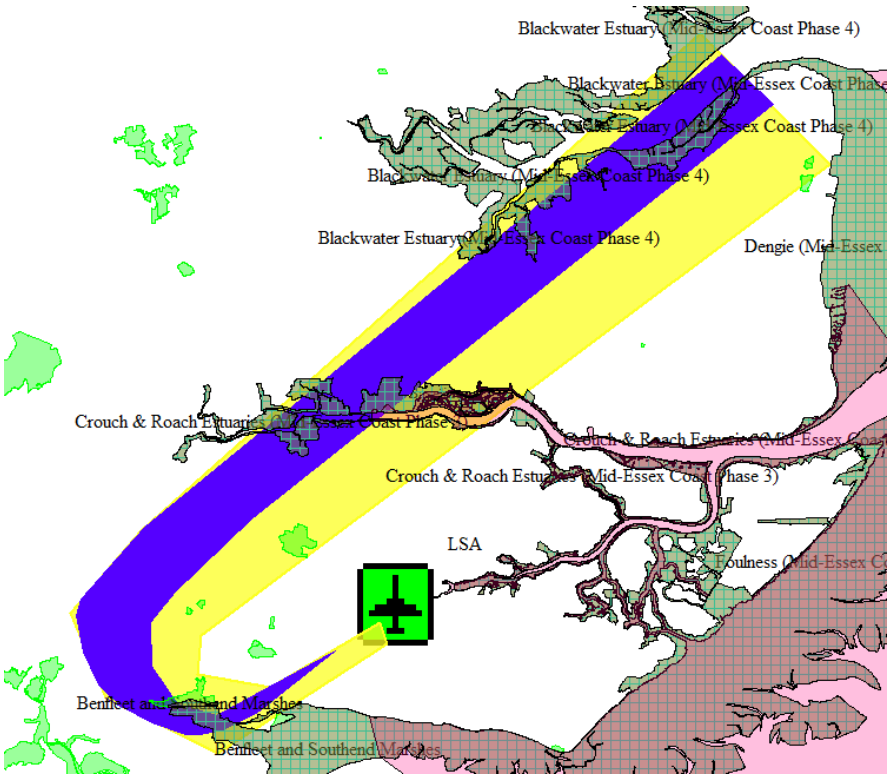
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes and Crouch & Roach Estuaries would continue to be overflown, also over a small portion of the Blackwater Estuary at a higher altitude and below 7000ft; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) flying over these European sites. 
General aviation	Access	No change in controlled airspace or access to it if the Baseline was to be retained.
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased capacity or benefit to economic impact should the Baseline option be retained.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No training costs for airlines as there would be no new procedures if this baseline option were to be retained. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No commercial airline costs are anticipated should the Baseline be retained.

Group	Impact	Qualitative Assessment
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	No controller or assistant training will be required should the Baseline be retained as procedures will not be changed.
All	Safety	No safety concerns should this baseline option be retained.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification objectives. Additionally, no improvement is expected for the environmental sustainability objectives.

Table 14: D23-NE-BASELINE

5.2. D23-NE-DO MINIMUM

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact although the flight path will be more concise.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality. There are AQMAs overflown by this option however, this option would avoid the AQMA flown over by the Baseline because the flight path may be more concise. Image shows the Option (blue) with AQMAs (turquoise). 
Wider society	Greenhouse gas impact	There would be minimal change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Resilience would be increased due to the introduction of RNAV. The new routes could also mean better integration with the en-route network and the potential introduction of free flow on departures which would contribute to an increase in capacity.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

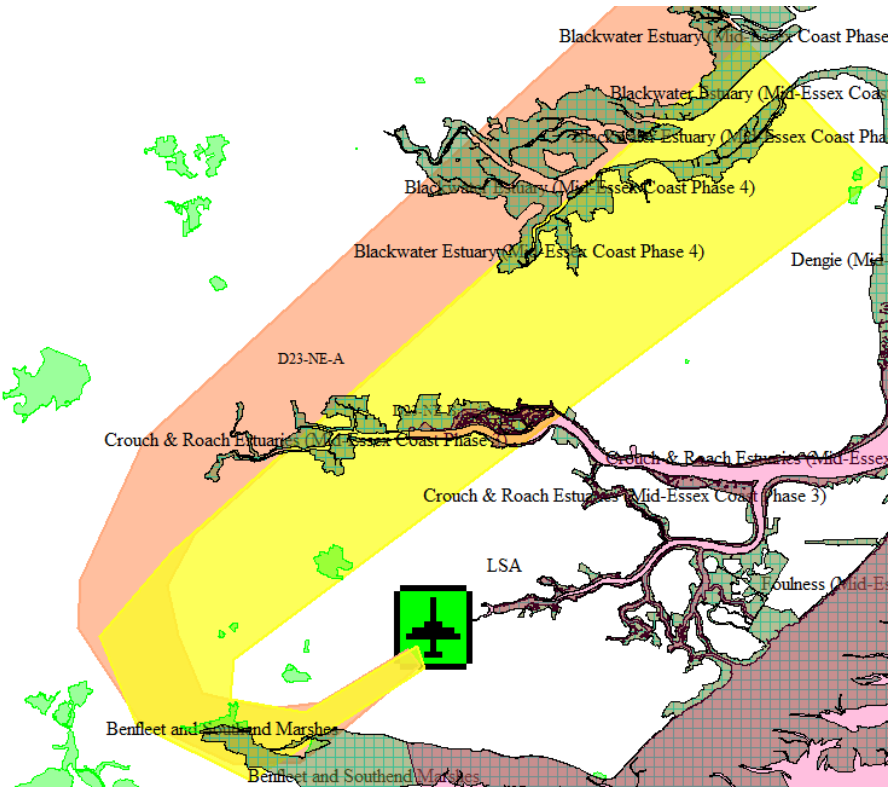
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes and Crouch & Roach Estuaries would continue to be overflown, also over a small portion of the Blackwater Estuary at a higher altitude and below 7000ft; these are Ramsar sites, SPAs, SACs and SSSIs. Fewer SSSIs are overflown compared to the Baseline. Image shows baseline (yellow) and do minimum Option (blue) flying over these European sites. 
General aviation	Access	No increase or reduction in controlled airspace would be required for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option could mean better integration with the en-route network and the potential introduction of free flow on departures which would contribute to an increase in capacity.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is assessed as being aligned with the AMS although there is no improvement expected for the environmental sustainability objectives. This is an improvement when compared to the Baseline.

Table 15: D23-NE-DO MIN

5.3. D23-NE-A

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly similar communities as the Baseline after take-off.
	Air Quality	This design option would overfly similar communities as the Baseline after take-off with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option is similar to today's baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option may mean better integration with the en-route network if deconflicted with neighbouring airport routes. The potential introduction of free flow on departures would contribute to an increase in capacity.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

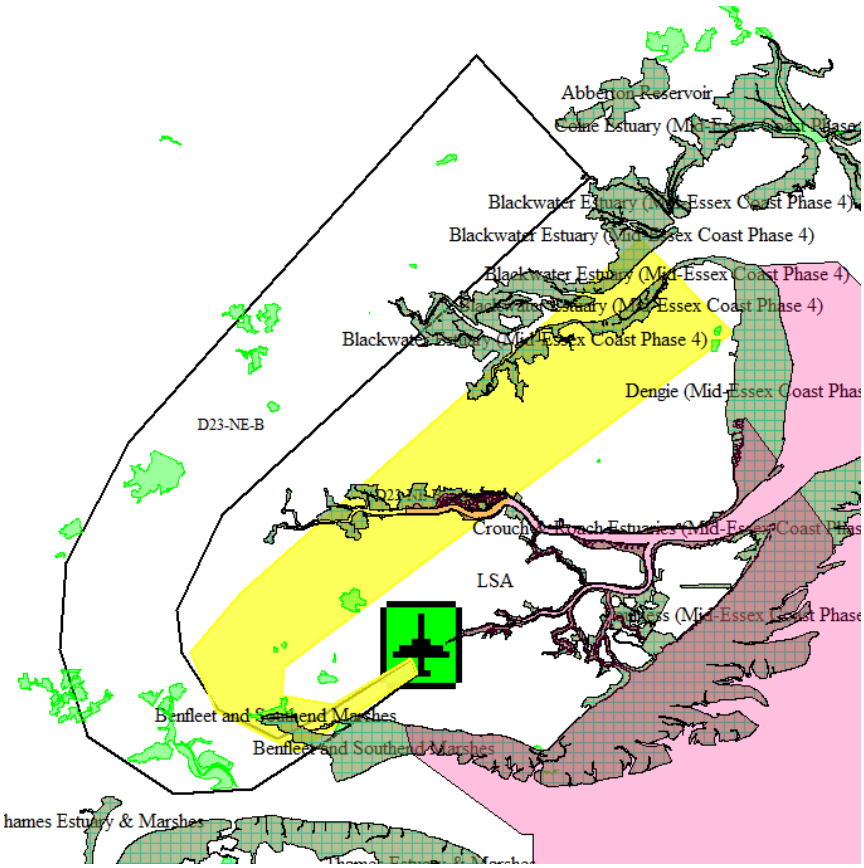
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes are flown over as per the Baseline, less of the Crouch & Roach Estuaries are overflown compared with the Baseline. This option flies over a larger portion of the Blackwater Estuary than the Baseline at a higher altitude and below 7000ft; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) and D23-NE-A Option (peach) flying over these European sites. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	There could be some benefit in economic impact if free flow for departures becomes available as this would contribute towards an increase in capacity.
	Fuel burn	This option is similar to today's baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage, this option has minimal difference from today's baseline operation.
	AMS Realisation	This option is assessed as being aligned with the AMS although there is no improvement expected for the environmental sustainability objectives. This is an improvement when compared to the Baseline.

Table 16: D23-NE-A

5.4. D23-NE-B

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns right. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up potentially different communities before aircraft reach 1000ft, this will be further assessed in stage 3. No change in impact to local air quality is anticipated.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	Minimal difference from today's baseline operation although closer proximity to LTMA traffic, particularly London Stansted and London City, could mean an increase in complexity which could contribute to reduced capacity and resilience, if not procedurally separated.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

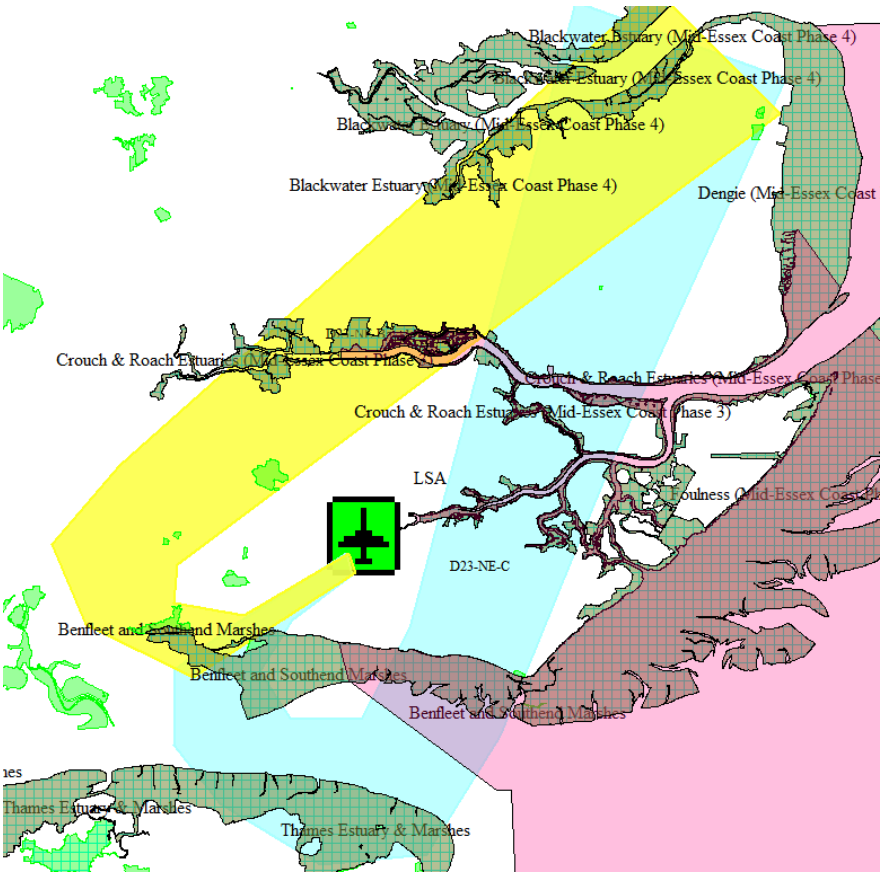
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes are flown over as per the Baseline, this option avoids the Crouch & Roach and more of the Blackwater Estuaries compared with the Baseline. These are Ramsar sites, SPAs, SACs and SSSIs. This option does fly over a number of SSSIs (green areas). Image shows baseline (yellow) and D23-NE-B Option (white), and the portions of European sites flown over. Option flies over fewer Ramsar, SPA, and SACs than baseline but more SSSIs. 
General aviation	Access	This option would potentially require an increase in controlled airspace to contain the procedures.
General aviation/ commercial airlines	Economic impact from increased effective capacity	Limited opportunity for increased effective capacity or benefit to economic impact is anticipated.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.

Group	Impact	Qualitative Assessment
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability, reducing complexity and simplification objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 17: D23-NE-B

5.5. D23-NE-C

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns right. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline as aircraft would fly over part of the Thames Estuary.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up to 1000ft with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Extra track miles from today's baseline operation – approx. double due to the wraparound of this swathe. This could contribute to increased impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	This option has the potential to improve capacity and resilience due to the left turn out on departure, this would help to keep the traffic free of conflict with LTMA traffic. There is the possibility for increased complexity with London Southend arrival traffic due to this option crossing the final approach, although the assumption would be departure traffic would be above this with the increased potential for Continuous Climb Operations (CCO). Due to the proximity of the Shoeburyness DA this may not be a viable Option for a permanent route, but consideration should be given to its potential as a respite route should the DA be inactive.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

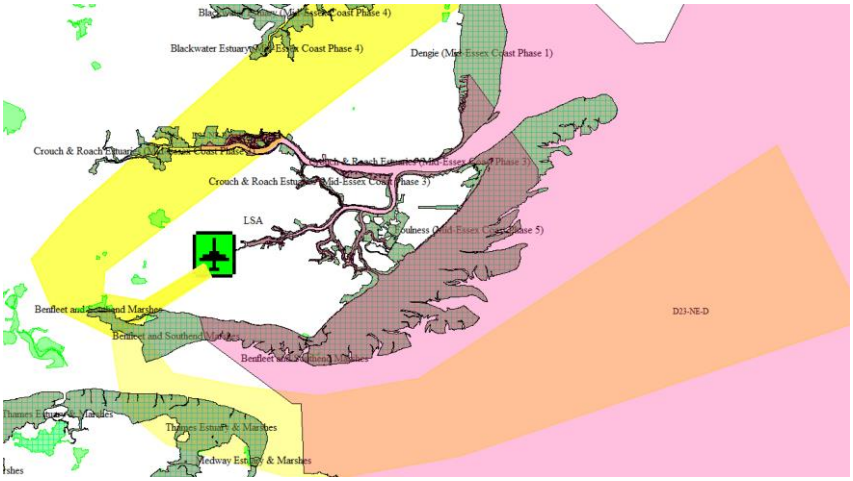
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes are flown over as per the Baseline, however as this option turns left, a different portion is flown over compared to the Baseline. This option flies over a different section of the Crouch & Roach Estuary compared with the Baseline and also potentially the Thames Estuary and Marshes; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) and D23-NE-C Option (blue) and the portions of European sites flown over. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option has the potential to contribute to increased effective capacity by moving traffic away from other LTMA traffic, however the potential complexity with the Shoeburyness DAs means on balance there is no benefit expected.
	Fuel burn	Extra track miles from today's baseline operation – approx. double due to the wraparound of this swathe. This could contribute to increased impacts to fuel burn.

Group	Impact	Qualitative Assessment
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	Due to the tight turn to the left on departure there is potential for penetration of the Shoeburyness DA. Work would need to be done to ensure the IFP protected area remains clear of the DA. Alternatively, use of a route inside this swathe would only be available when the DA are not active.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability and improving efficiency objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 18: D23-NE-C

5.6. D23-NE-D

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns right. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline as aircraft would fly over the Thames Estuary.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up to 1000ft with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Extra track miles from today's baseline operation – approximately double due to the wraparound of this swathe. This could contribute to increased impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	This option has the potential to improve capacity and resilience due to the left turn out on departure, this would help to keep the traffic free of conflict with LTMA traffic, however there could be potential for conflict with the current London City point merge should it remain. The potential introduction of free flow on departures would contribute to an increase in capacity.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

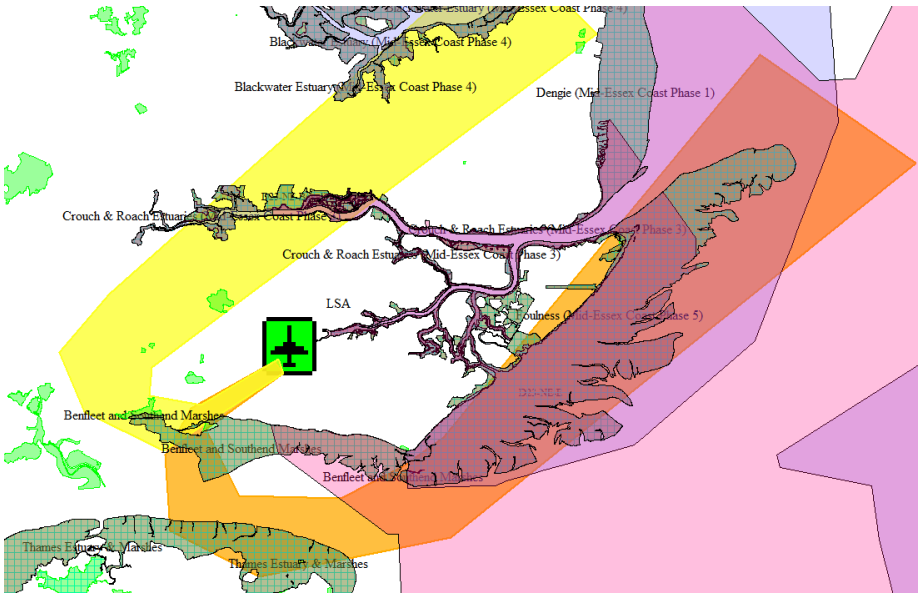
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes are flown over as per the Baseline, however as this option turns left, it also flies over the Thames Estuary & Marshes, unlike the Baseline. Image shows baseline (yellow) and D23-NE-D Option (lighter yellow) and the European sites flown over. Option flies over one SSSI compared to the baseline which flies over many. 
General aviation	Access	This option would require an increase in controlled airspace.
General aviation/ commercial airlines	Economic impact from increased effective capacity	Potential increase in complexity with arrivals due to this option crossing the final approach and interaction with the Shoeburyness DAs so limited opportunity for increased effective capacity or benefit to economic impact is anticipated.
	Fuel burn	Extra track miles from today's baseline operation – approximately double due to the wraparound of this swathe. This could contribute to increased impacts to fuel burn.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.

Group	Impact	Qualitative Assessment
service provider	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability, simplification, reducing complexity or improving efficiency objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 19: D23-NE-D

5.7. D23-NE-E

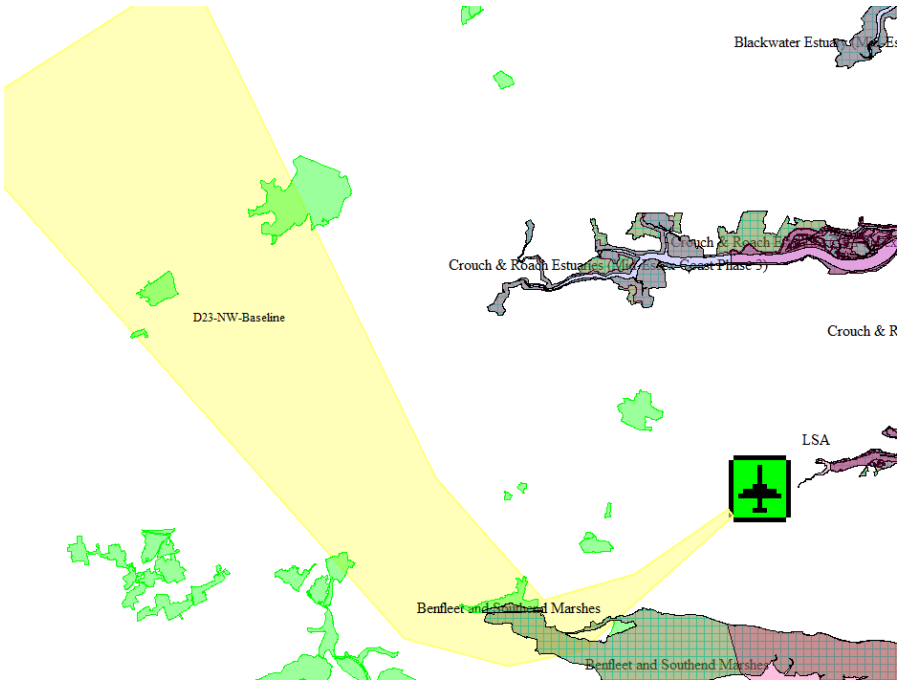
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns right. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline as aircraft would fly over the Thames Estuary.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up to 1000ft with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Extra track miles from today's baseline operation – approx. double due to the wraparound of this swathe. This could contribute to increased impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	This option has the potential to decrease capacity and resilience due to the overflight of the Shoeburyness DA's and associated increased coordination, there could also be potential for conflict with the current London City point merge should it remain.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes are flown over as per the Baseline, however as this option turns left, it also flies over the Thames Estuary & Marshes, unlike the Baseline. This option also flies over a significant part of Foulness Ramsar site, which is also a SPA, SAC and SSSI. Image shows baseline (yellow) and D23-NE-D Option (dark orange) and the European sites flown over. The Option would fly over more surface area of European sites than the Baseline. 
General aviation	Access	This option would require an increase in controlled airspace.
General aviation/ commercial airlines	Economic impact from increased effective capacity	Potential increase in complexity with arrivals due to this option crossing the final approach and interaction with the Shoeburyness DAs so limited opportunity for increased effective capacity or benefit to economic impact is anticipated.
	Fuel burn	Extra track miles from today's baseline operation – approximately double due to the wraparound of this swathe. This could contribute to increased impacts to fuel burn.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.

Group	Impact	Qualitative Assessment
service provider	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	Additional safety work would need to be done to make this a viable Option. The entire swathe routes through the Shoeburyness DAs. This option could be used as a potential respite route for when the DA are inactive.
	AMS Realisation	This option fails to achieve any of the AMS objectives. This option aligns with less objectives than the Baseline so is considered to have a negative impact on the AMS.

Table 20: D23-NE-E

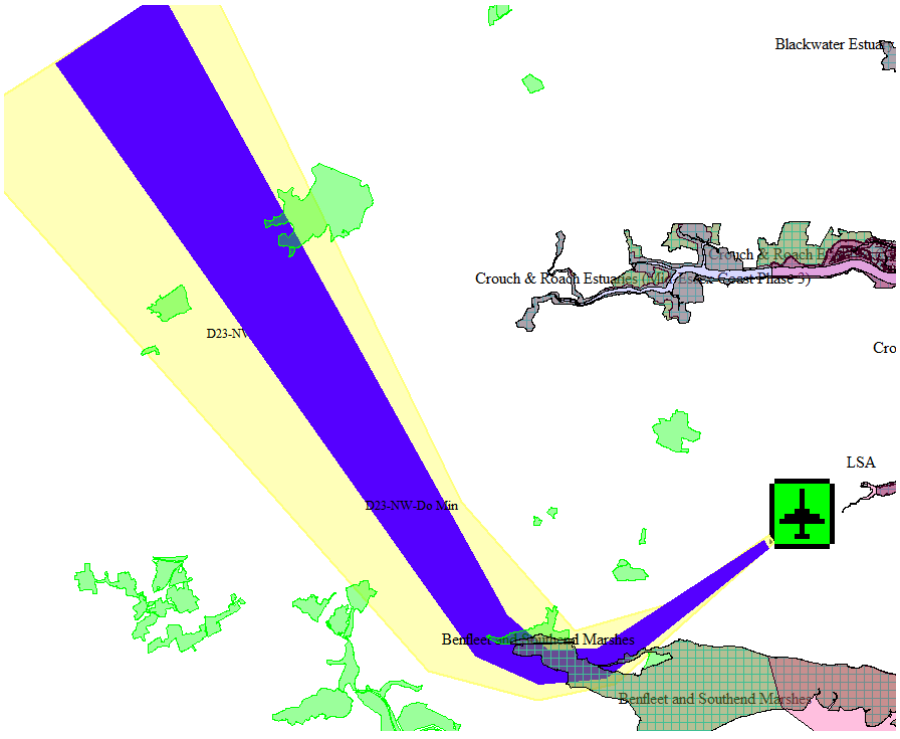
5.9. D23-NW-BASELINE (previously D23-NW-C)

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact as this is the baseline.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	No opportunity to increase capacity or resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Benfleet & Southend marshes are flown over by the Baseline, additionally some SSSIs (green shaded areas). Image shows baseline (yellow). 
General aviation	Access	No change in controlled airspace or access to it if the Baseline was to be retained.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased capacity or benefit to economic impact should the Baseline option be retained.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No training costs for airlines as there would be no new procedures if this baseline option were to be retained. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No commercial airline costs are anticipated should the Baseline be retained.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	No controller or assistant training will be required should the Baseline be retained as procedures will not be changed.
All	Safety	No safety concerns should this baseline option be retained.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification objective. Additionally, does not improve the environmental sustainability objectives.

Table 21: D23-NW-BASELINE

5.10. D23-NW-DO MINIMUM

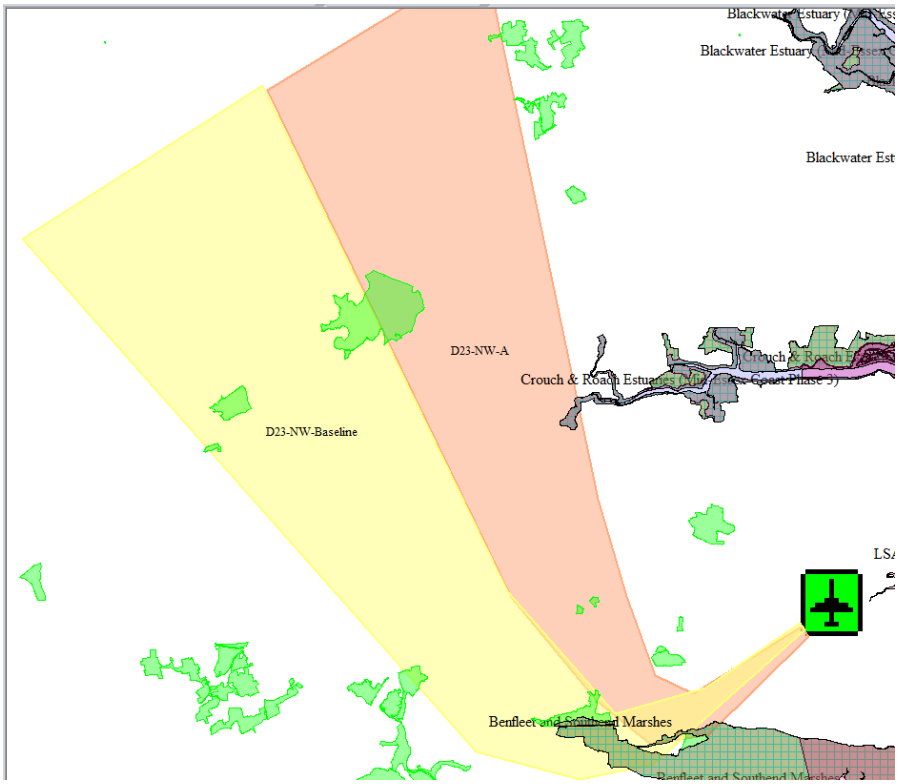
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact although the flight path will be more concise.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be minimal change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Resilience would be increased due to the introduction of RNAV. This may also mean better integration with the en-route network if deconflicted with neighbouring airport routes. Limited opportunity for the introduction of free flow on departures.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Benfleet & Southend marshes are flown over by the do minimum Option, which is the same as the Baseline, additionally some SSSIs (green shaded areas), however less SSSIs are flown over due to the route being more concise than the Baseline. Image shows baseline (yellow) and Do minimum (blue). 

Group	Impact	Qualitative Assessment
General aviation	Access	No increase or reduction in controlled airspace would be required for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	Limited opportunity for increased capacity or benefit to economic impact is anticipated.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is assessed as being aligned with the AMS although there is no improvement expected for the environmental sustainability objectives. This is an improvement when compared to the Baseline.

Table 22: D23-NW-DO MINIMUM

5.11. D23-NW-A

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the route turns right. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up to 1000ft with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option is broadly similar to the Baseline so limited opportunity for increased capacity or resilience is anticipated. There is the potential for conflict with London Stansted departures to the East which could mean an increased possibility for step climbs if not procedurally separated, again, there is minimal difference to today's operation so no negative impact on capacity or resilience would be expected.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

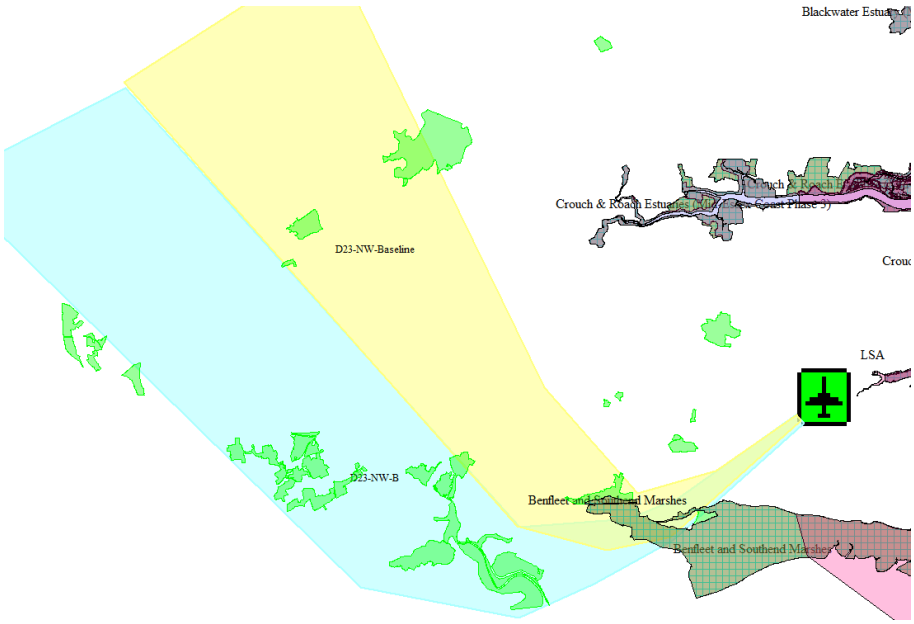
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes are flown over by this option, however considerably less than the Baseline. Additionally some SSSIs (green shaded areas) as with the Baseline, however different SSSIs. Image shows baseline (yellow) and Option D23-NW-A (peach). 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option is broadly similar to the Baseline so limited opportunity for increased effective capacity or benefit to economic impact is anticipated.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is assessed as being aligned with the AMS although there is no improvement expected for the environmental sustainability or simplification objectives. This is an improvement when compared to the Baseline.

Table 23: D23-NW-A

5.12. D23-NW-B

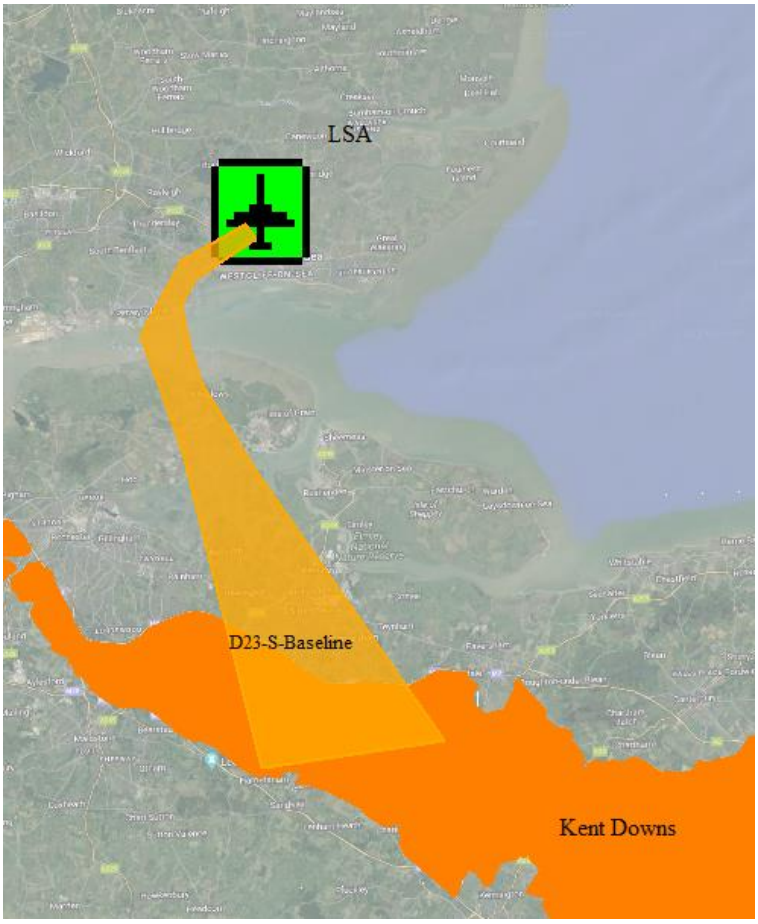
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns right. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up to 1000ft with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	Minimal difference from today's baseline operation although closer proximity to LTMA traffic, particularly London Stansted departures to the South, means we could see an increase in complexity which could contribute to reduced capacity and resilience, if conflicting routes are not procedurally separated.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

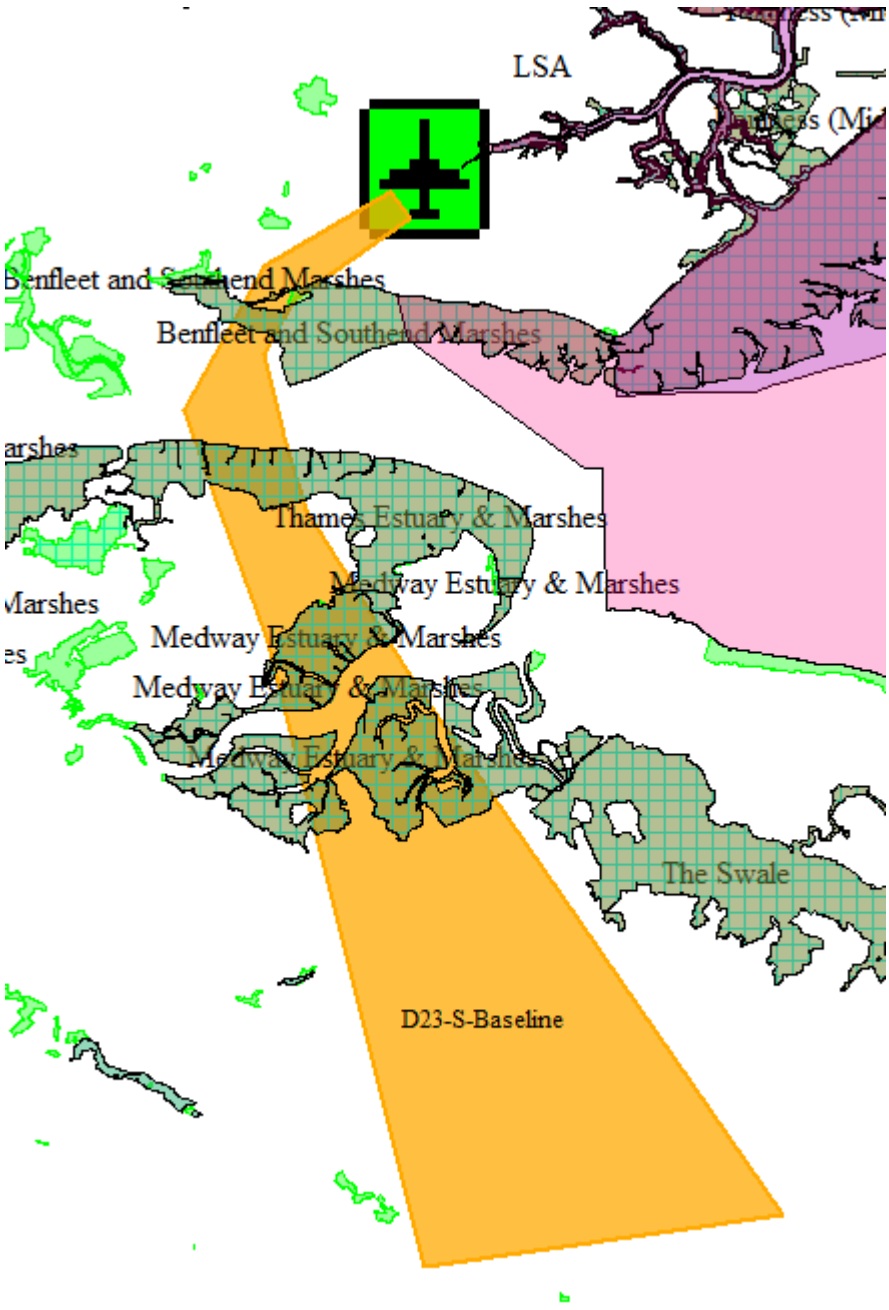
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes are flown over by this option, similarly to the Baseline Additionally, some SSSIs (green shaded areas) as with the Baseline, however different, and more, SSSIs. Image shows baseline (yellow) and Option D23-NW-B (light blue). 
General aviation	Access	Depending on the final track placement there could be a need for some additional controlled airspace due to the lateral dimensions being exceeded.
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased effective capacity or benefit to economic impact is anticipated due to the increased complexity of proximity to the LTMA.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.

Group	Impact	Qualitative Assessment
service provider	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification or reducing complexity objectives. Additionally, no improvement is expected for some of the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 24: D23-NW-B

5.14. D23-S-BASELINE

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact as this is the baseline.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	No opportunity to increase capacity or resilience.
	Tranquillity	The Kent Downs AONBs is flown over by the Baseline below 7000ft. Aircraft are expected to be approximately 6000ft when they reach the edge of the AONB. 

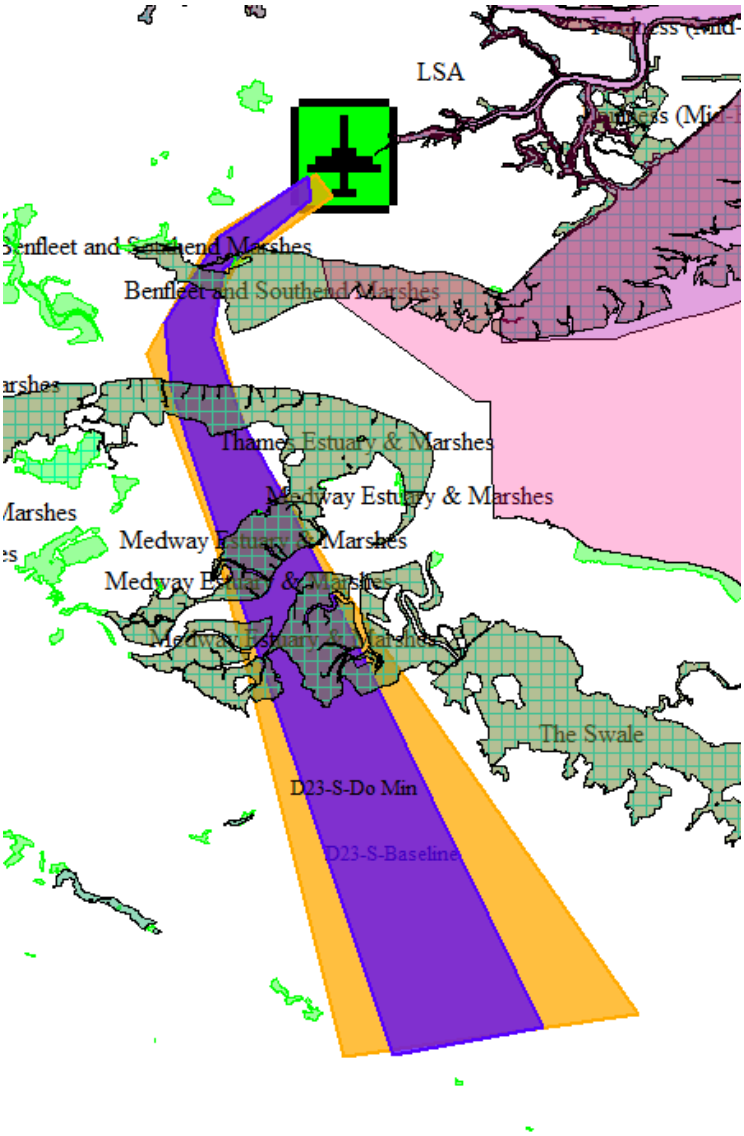
Group	Impact	Qualitative Assessment
	Biodiversity	Benfleet and Southend & Marshes are flown over by the Baseline in addition to an SSSI. The Thames Estuary & Marshes and Medway Estuary & Marshes are also flown over at a higher altitude but below 7000ft; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (orange) and the European sites. 
General aviation	Access	No change in controlled airspace or access to it if the Baseline was to be retained.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased capacity or benefit to economic impact should the Baseline option be retained.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No training costs for airlines as there would be no new procedures if this Baseline option were to be retained. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No commercial airline costs are anticipated should the Baseline be retained.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	No controller or assistant training will be required should the Baseline be retained as procedures will not be changed.
All	Safety	No safety concerns should this baseline option be retained.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification objective. Additionally, no improvement is expected for the environmental sustainability objectives.

Table 25: D23-S-BASELINE

5.15. D23-S-DO MINIMUM

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact although the flight path will be more concise.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be minimal change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Resilience would be increased due to the introduction of RNAV. This may also mean better integration with the en-route network if deconflicted with neighbouring airport routes.
	Tranquillity	The Kent Downs AONBs is flown over by this option below 7000ft. Aircraft are expected to be approximately 6000ft when they reach the edge of the AONB. This option will fly over less of the AONB than the Baseline. 

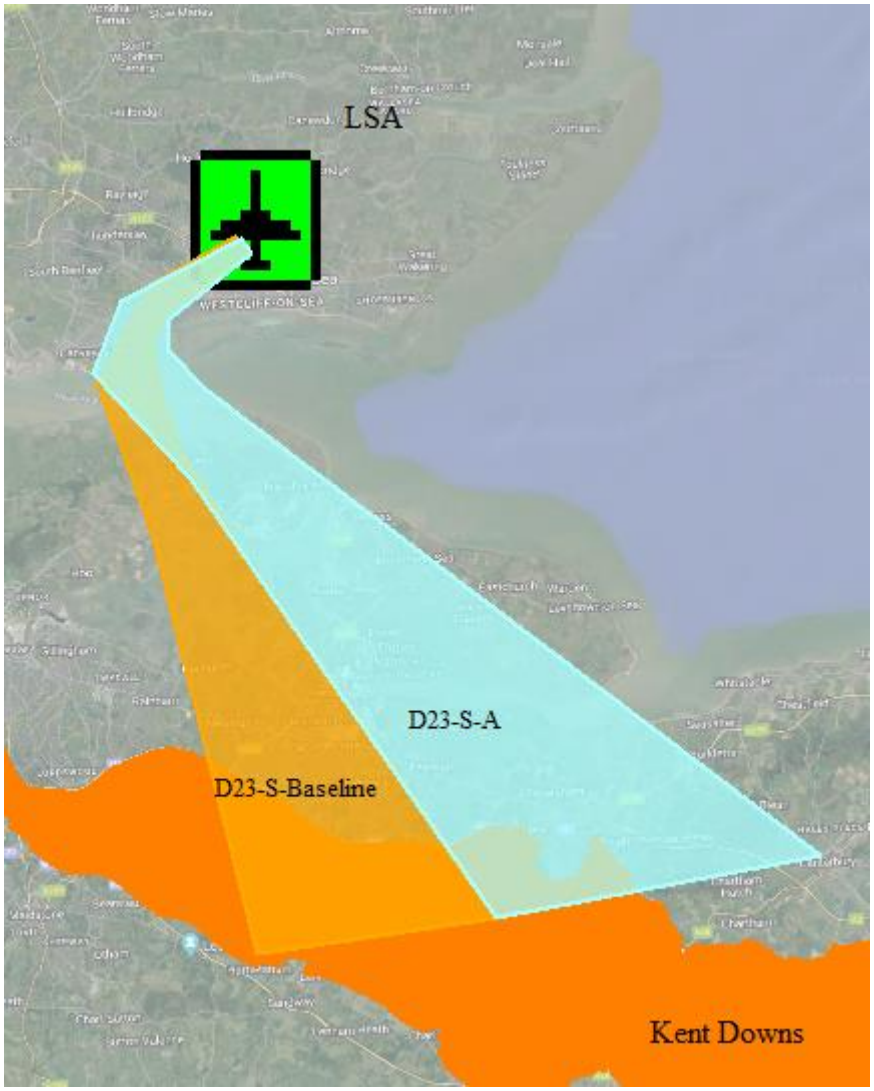
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet and Southend & Marshes are flown over by the do minimum Option. The Thames Estuary & Marshes and Medway Estuary & Marshes are also flown over at a higher altitude but below 7000ft; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows the Baseline (orange), the do minimum Option (purple) and the European sites. The Option would fly over less of the European sites than the Baseline. 
General aviation	Access	No increase or reduction in controlled airspace would be required for this option.

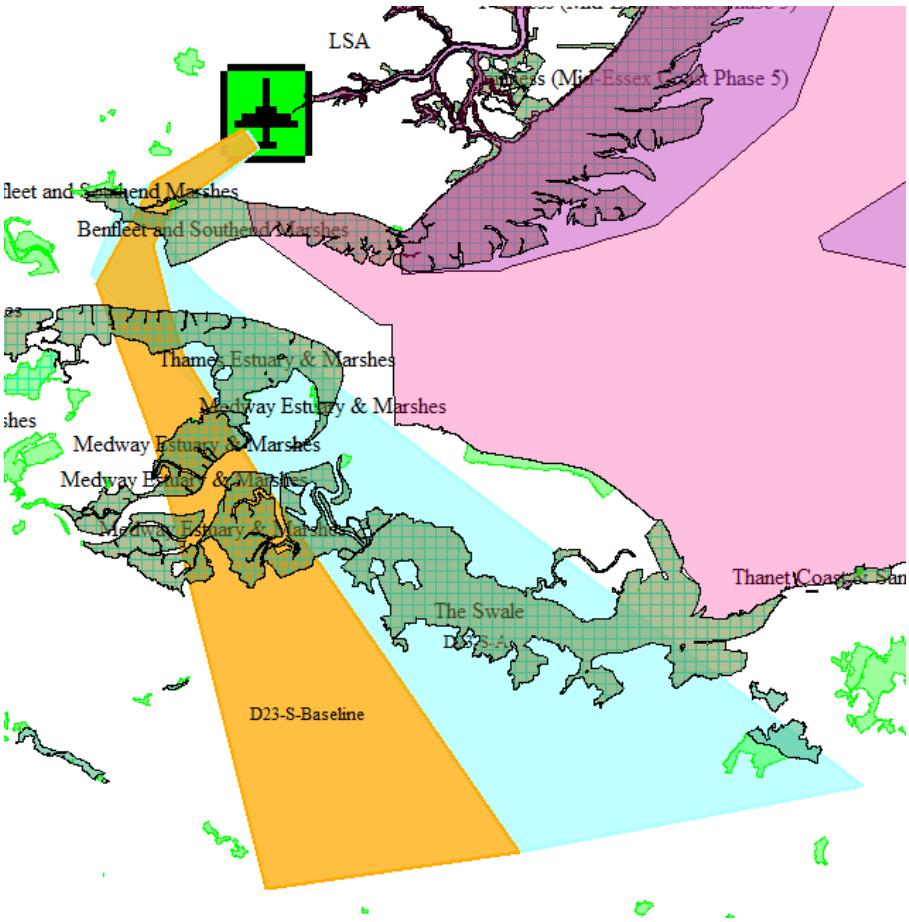
Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	limited opportunity for increased effective capacity or benefit to economic impact is anticipated unless deconflicted from neighbouring airport routes.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is assessed as being aligned with the AMS although there is no improvement expected for the environmental sustainability objectives. This is an improvement when compared to the Baseline.

Table 26: D23-S-DO MINIMUM

5.16. D23-S-A

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the route turns left. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up to 1000ft with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option would move traffic further away from LTMA traffic which could mean better integration with the en-route network and the potential introduction of free flow on departures which would contribute to an increase in capacity.

Group	Impact	Qualitative Assessment
	Tranquillity	The Kent Downs AONB is flown over by this option, possibly just below 7000ft. Aircraft are expected to be approximately 7000ft when they reach the edge of the AONB. This option will fly over less of the AONB and reach it later than the Baseline. 

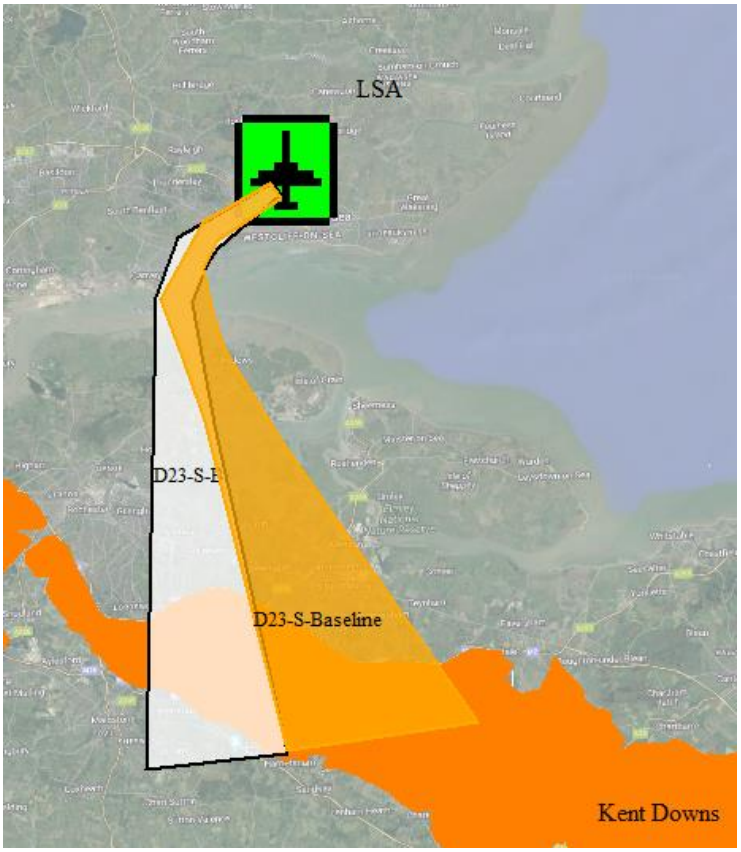
Group	Impact	Qualitative Assessment
	Biodiversity	Benfleet and Southend & Marshes are flown over by this option. The Thames Estuary & Marshes, Medway Estuary & Marshes and additional SSSIs are also flown over at a higher altitude but below 7000ft, which is similar to the Baseline but in different sections of these sites. The Swale would be newly overflown compared to the Baseline; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (orange), the D23-S-A Option (light blue) and the European sites. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	There could be some benefit in economic impact if free flow for departures becomes available as this would contribute towards an increase in capacity.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.

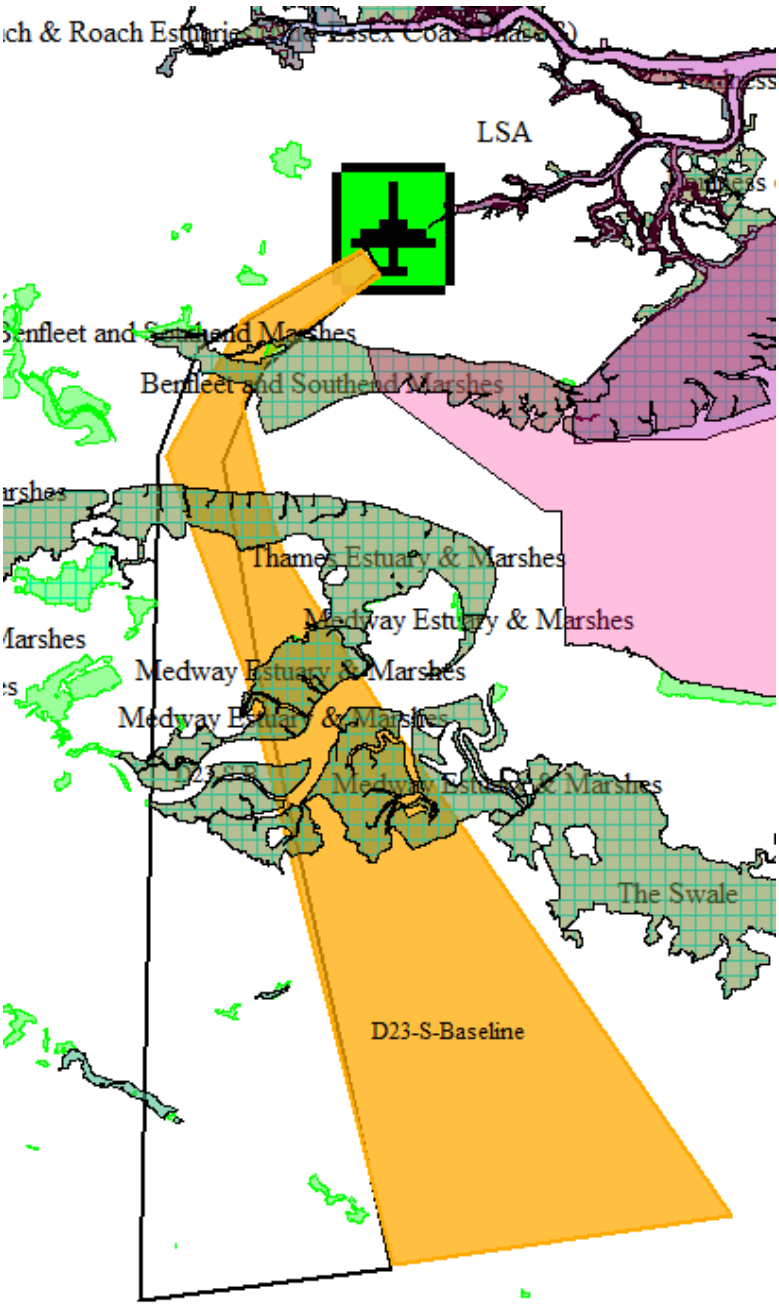
Group	Impact	Qualitative Assessment
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification objectives. Additionally, no improvement is expected for the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 27: D23-S-A

5.17. D23-S-B

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly similar communities as the Baseline after departure.
	Air Quality	This design option would overfly similar communities as the Baseline after departure with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option is broadly similar to the Baseline so limited opportunity for increased capacity or resilience is anticipated, this option may also conflict with the London City Point Merge, reducing potential capacity if not procedurally separated, this is no different to today.

Group	Impact	Qualitative Assessment
	Tranquillity	The Kent Downs AONB is flown over by this option below 7000ft. Aircraft are expected to be approximately 5500ft when they reach the edge of the AONB. This option will fly over same amount, but within a different section of the AONB, than the Baseline. However, this option will reach the AONB marginally sooner than the Baseline. 

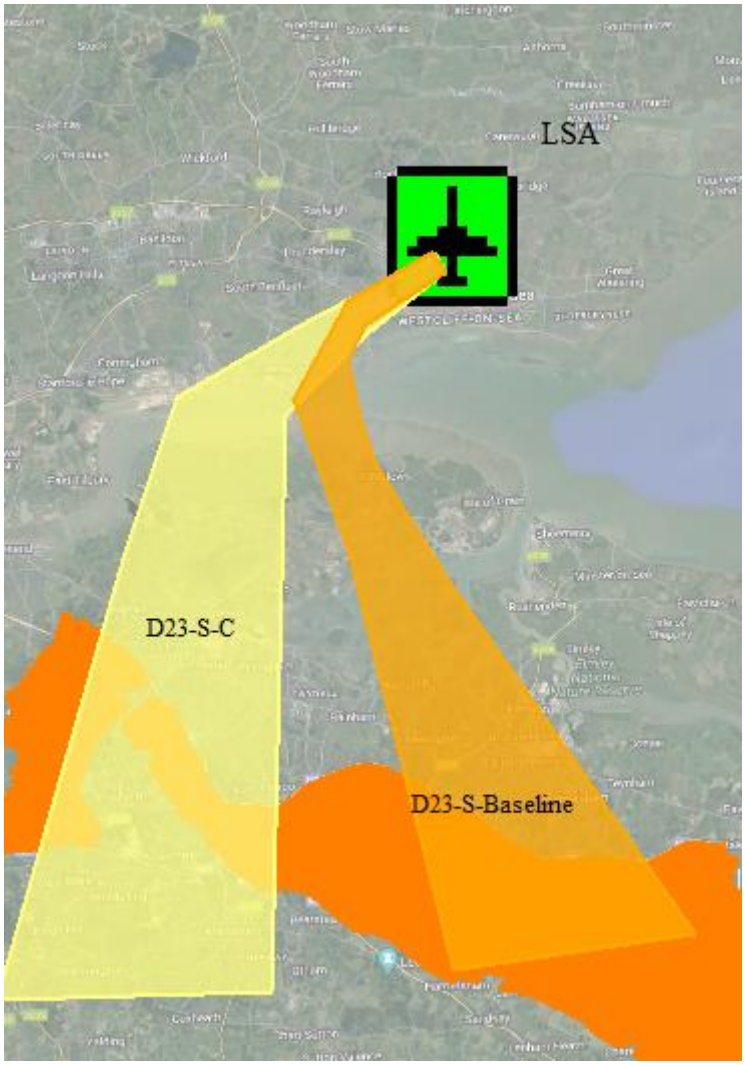
Group	Impact	Qualitative Assessment
	Biodiversity	Benfleet and Southend & Marshes are flown over by this option, similarly to the Baseline. The Thames Estuary & Marshes, Medway Estuary & Marshes are also flown over at a higher altitude but below 7000ft. This is similar to the Baseline but within different sections of the sites; these are Ramsar sites, SPAs, SACs and SSSIs. This option flies over fewer SSSIs. Image shows the Baseline (orange), the D23-S-B Option (white) and the European sites. 

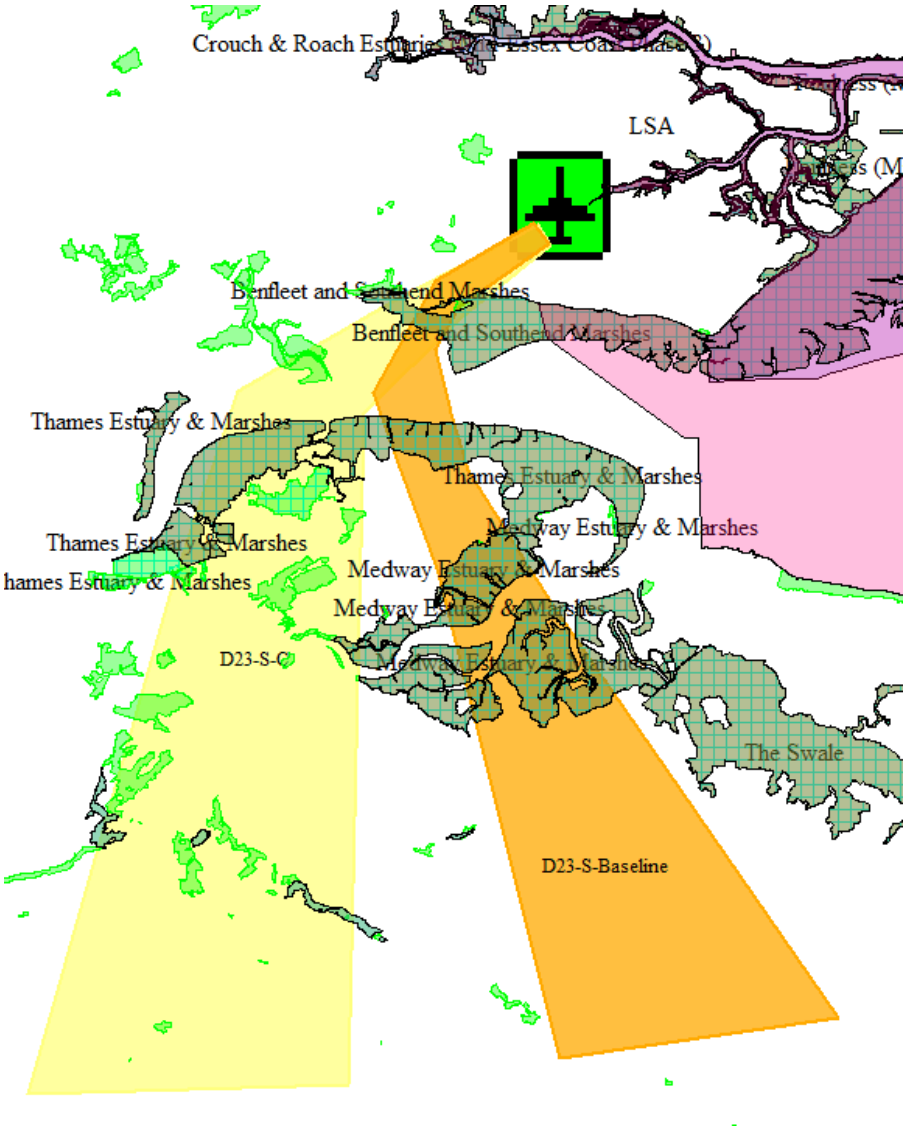
Group	Impact	Qualitative Assessment
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option is broadly similar to the Baseline so limited opportunity for increased effective capacity or benefit to economic impact is anticipated.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 28: D23-S-B

5.18. D23-S-C

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns left. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a higher population density compared to those overflown in the Baseline.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off and up to 1000ft with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option would move the departures for this runway and direction closer to the LTMA and London Gatwick traffic, which could contribute to a reduction in capacity and resilience reducing potential capacity if not procedurally separated.

Group	Impact	Qualitative Assessment
	Tranquillity	The Kent Downs AONB is flown over by this option below 7000ft. Aircraft are expected to be approximately 5000ft when they reach the edge of the AONB. This option will fly over a similar amount, but within a different section, of the AONB than the Baseline, however this option will reach the AONB sooner than the Baseline. 

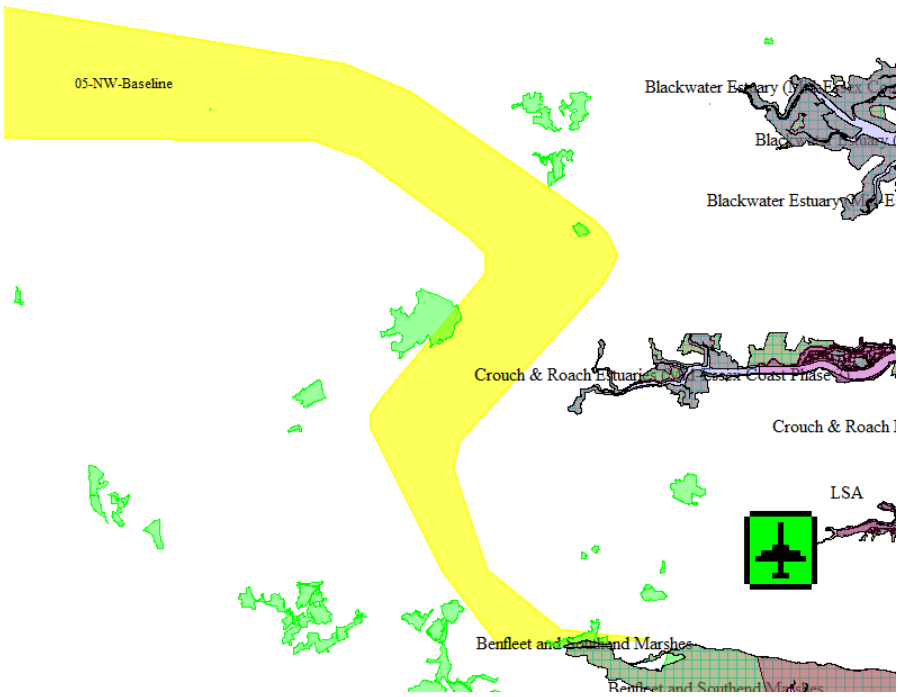
Group	Impact	Qualitative Assessment
	Biodiversity	Benfleet and Southend & Marshes are flown over by this option similarly to the Baseline. The Thames Estuary & Marshes, Medway Estuary & Marshes are also flown over at a higher altitude but below 7000ft which is similar to the Baseline but within different sections of the sites; these are Ramsar sites, SPAs, SACs and SSSIs. More SSSIs are flown over with this option compared to the Baseline (green shaded areas). Image shows the Baseline (orange), the D23-S-C Option (yellow) and the European sites. . 
General aviation	Access	This option would potentially require a slight increase in controlled airspace to contain the procedures. Further assessment in Stage 3 to understand the additional volume of controlled airspace required.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would move the departures for this runway and direction closer to the LTMA and London Gatwick traffic, which could contribute to a reduction in increased effective capacity with no benefit to economic impact.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability, simplification, reducing complexity or improving efficiency objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 29: D23-S-C

6. Initial Options Appraisal – Arrivals Runway 05

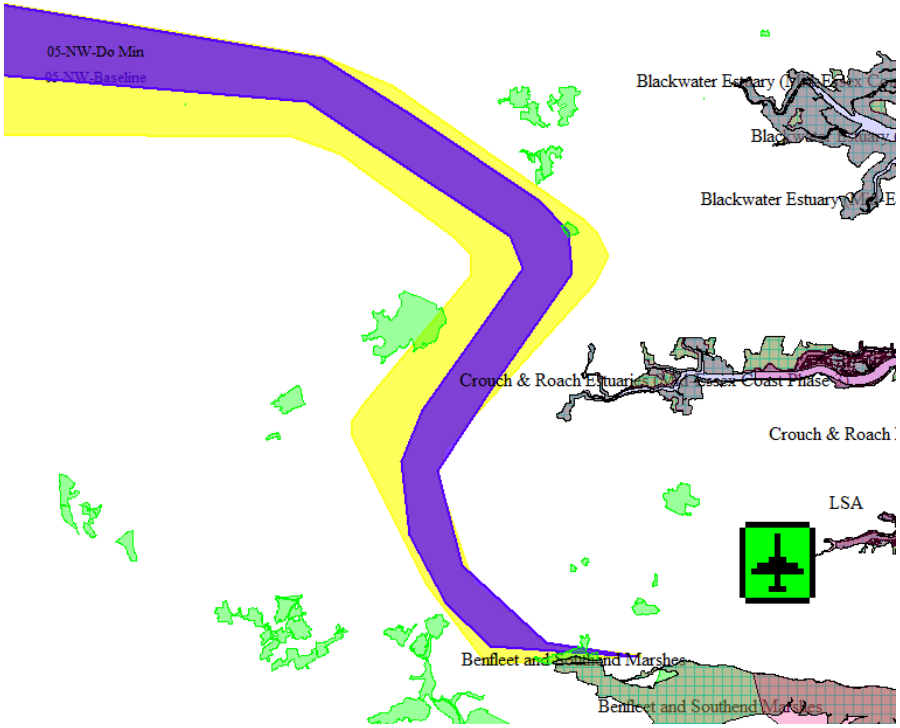
6.1. A05-NW-BASELINE

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities before landing with no change to noise impact as this is the baseline.
	Air Quality	This option would continue to overfly the same communities before landing with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	No opportunity to increase capacity or resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Benfleet & Southend marshes are flown over by the Baseline, additionally some SSSIs (green shaded areas). Image shows baseline (yellow). 

Group	Impact	Qualitative Assessment
General aviation	Access	No change in controlled airspace or access to it if the Baseline was to be retained.
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased capacity or benefit to economic impact should the Baseline option be retained.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No training costs for airlines as there would be no new procedures if this baseline option were to be retained. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No commercial airline costs are anticipated should the Baseline be retained.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	No controller or assistant training will be required should the Baseline be retained as procedures will not be changed.
All	Safety	No safety concerns should this baseline option be retained.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification objectives. Additionally, no improvement is expected for the environmental sustainability objectives.

Table 30: A05-NW-BASELINE

6.2. A05-NW-DO MINIMUM

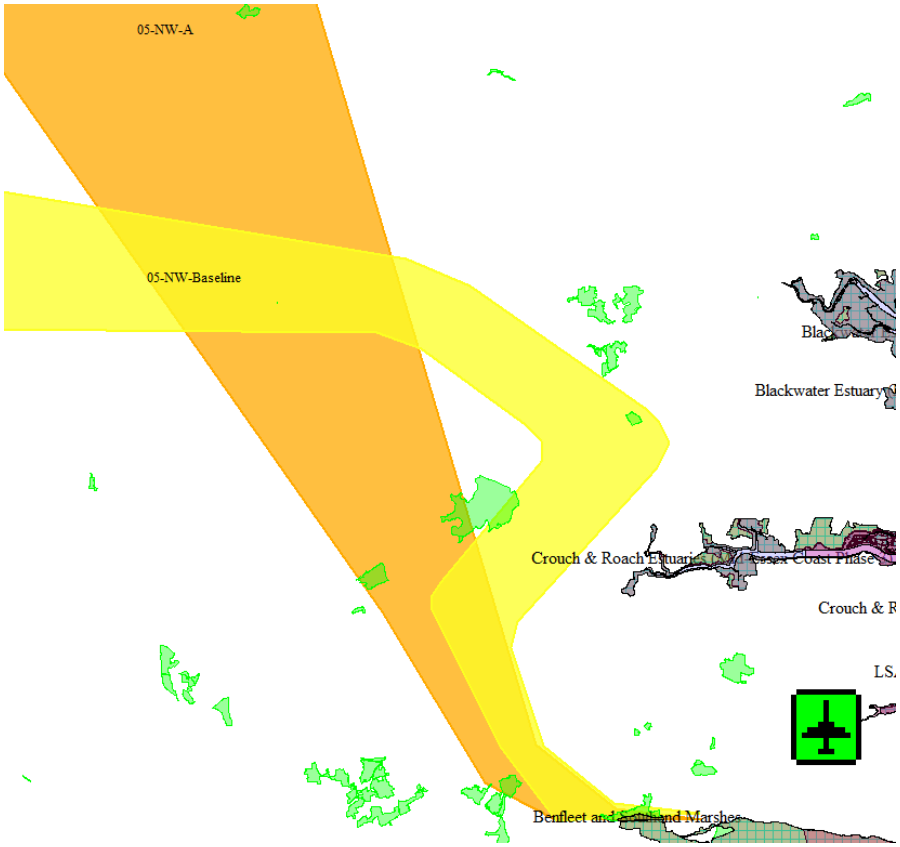
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities before landing with no change to noise impact although the flight path will be more concise.
	Air Quality	This option would continue to overfly the same communities before landing with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft. although the flight path may be more concise.
Wider society	Greenhouse gas impact	There would be minimal change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Resilience would be increased due to the introduction of RNAV.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Benfleet & Southend marshes are flown over by the Baseline, additionally some SSSIs (green shaded areas). Image shows baseline (yellow) and do minimum (purple). The do minimum Option flies over fewer SSSIs as it is more concise. 

Group	Impact	Qualitative Assessment
General aviation	Access	No increase or reduction in controlled airspace would be required for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	limited opportunity for increased effective capacity or benefit to economic impact is anticipated.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification and improving efficiency objectives. Additionally, no improvement is expected for the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 31: A05-NW-DO MIN

6.3. A05-NW-A

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	A slight reduction in track miles between this option and the Baseline. Some benefits to greenhouse gas and CO_2 emissions could be anticipated.
	Capacity/ resilience	This option could see potential complexity issues with network connectivity and proximity to LTMA traffic, specifically London Stansted traffic. There would be little opportunity for any increase in capacity or resilience reducing potential capacity if not procedurally separated.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

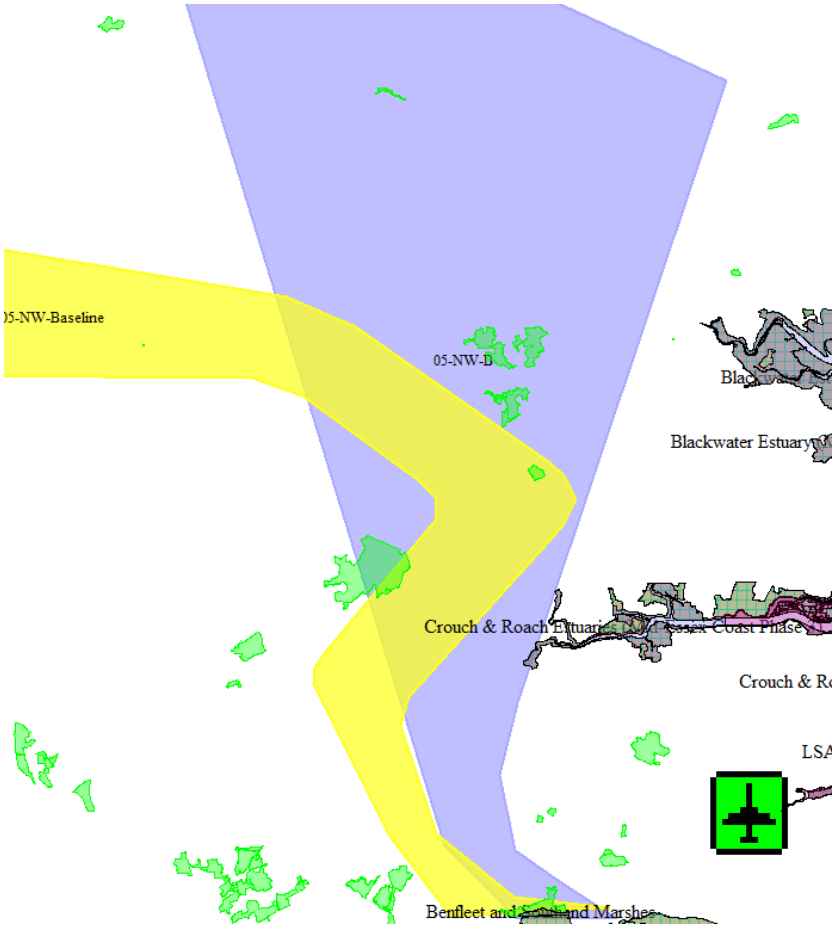
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes are flown over by this option, as with the Baseline. Additionally, some SSSIs (green shaded areas), the SSSIs are different to the Baseline at a higher altitude. Image shows baseline (yellow) and Option 05-NW-A (orange). 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	There is minimal difference between this option and the current baseline so limited opportunity for increased effective capacity or benefit to economic impact is anticipated.
	Fuel burn	A slight reduction in track miles between this option and the Baseline. Some benefits to fuel burn could be anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability, reducing complexity and simplification objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 32: A05-NW-A

6.4. A05-NW-B

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	This option could see potential complexity issues with network connectivity and proximity to LTMA traffic, specifically London Stansted, but there would be minimal difference to today's operation. There would be little opportunity for any increase in capacity or resilience unless conflicting routes were procedurally separated.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

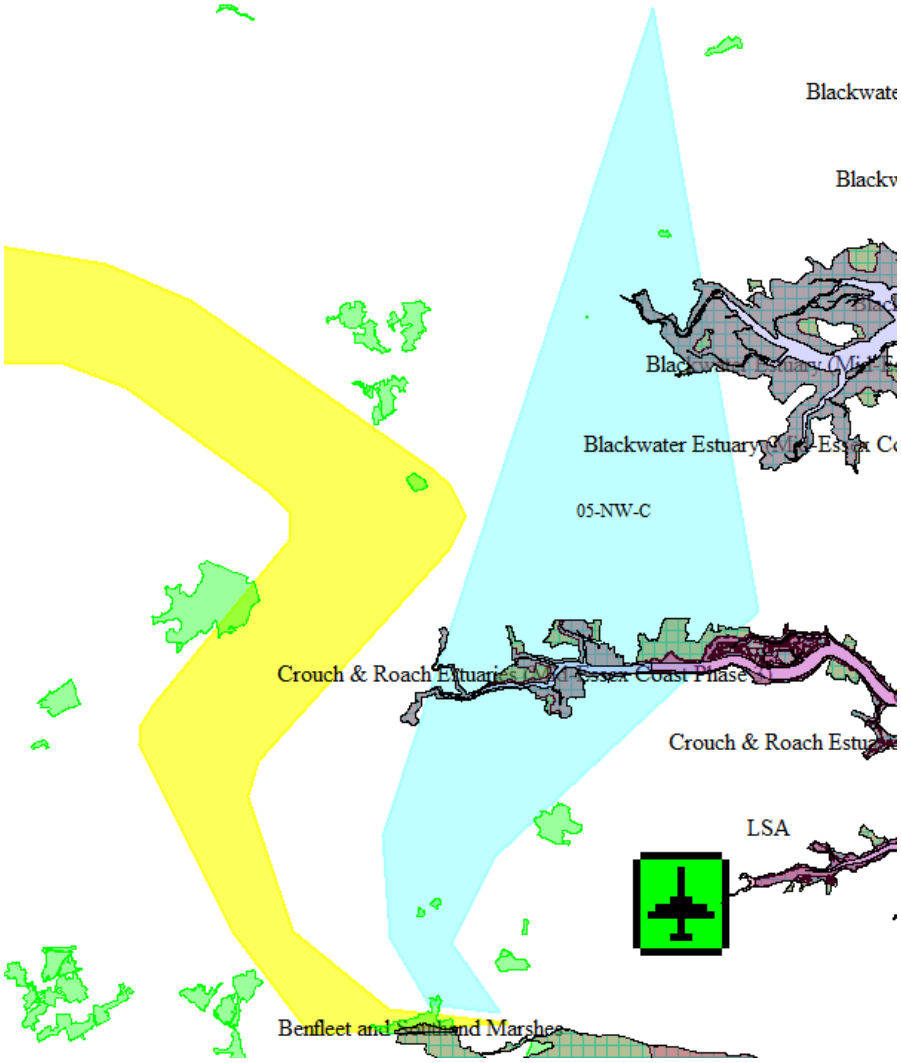
Group	Impact	Qualitative Assessment
	Biodiversity	The Benfleet & Southend marshes are flown over by this option as with the Baseline, additionally some SSSIs (green shaded areas). The SSSIs are different, and possibly a greater number, to the Baseline. Image shows baseline (yellow) and Option 05-NW-B (light purple). 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide limited opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.

Group	Impact	Qualitative Assessment
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability, reducing complexity and simplification objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 33: A05-NW-B

6.5. A05-NW-C

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	An increase in track miles between this option and the Baseline is anticipated. Potential for impacts to greenhouse gas and CO_2 emissions could be anticipated.
	Capacity/ resilience	Currently, there are not many arrivals from this direction. There is the potential for interactions with LTMA traffic, specifically London Stansted and London City traffic therefore, little opportunity for increased capacity or resilience is anticipated unless conflicting routes are procedurally separated.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

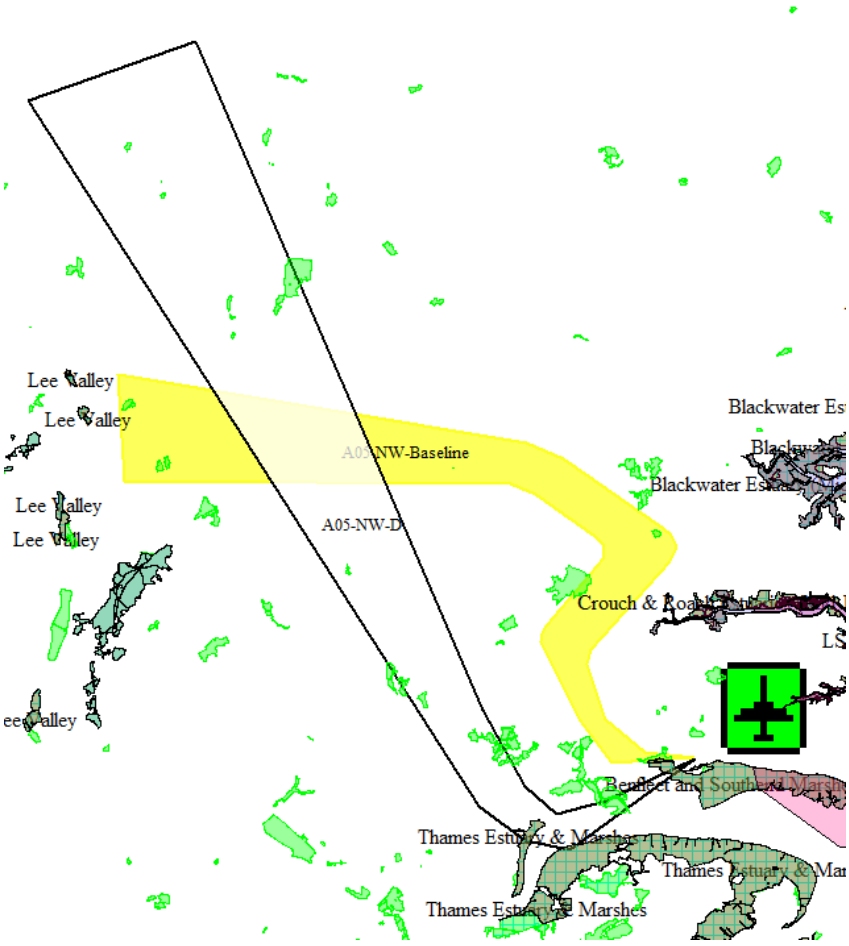
Group	Impact	Qualitative Assessment
	Biodiversity	Crouch & Roach Estuaries are overflown unlike the Baseline. This option also arrives over the Blackwater Estuary at a higher altitude. Additionally, some SSSIs (green shaded area) are flown over upon approach. Image shows baseline (yellow) and Option 05-NW-C (light blue). 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide limited opportunity for increased effective capacity or benefit to economic impact.

Group	Impact	Qualitative Assessment
	Fuel burn	An increase in track miles between this option and the Baseline is anticipated. Potential for impacts to fuel burn could be anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability, improving efficiency and simplification objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 34: A05-NW-C

6.6. A05-NW-D

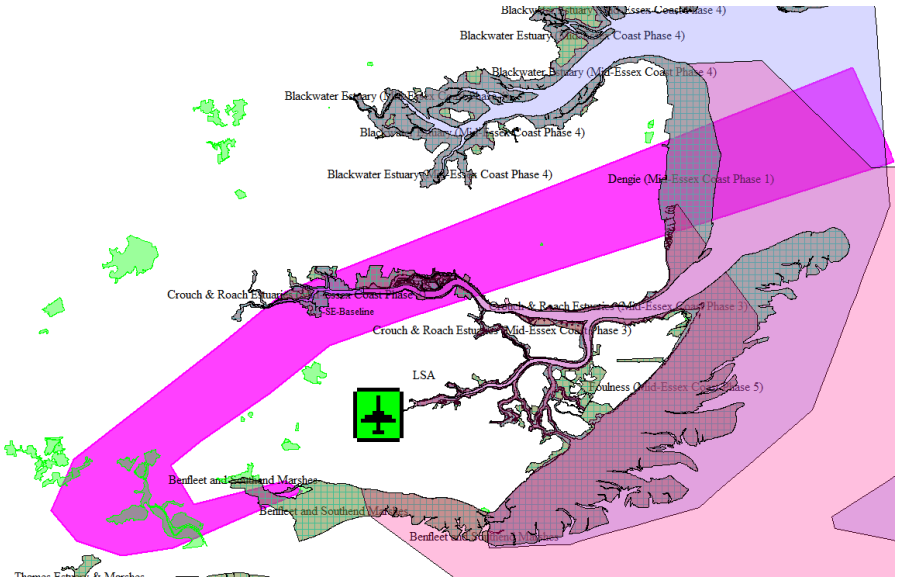
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline with aircraft also flying over part of the Thames Estuary.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach, which would mean a reduction in track miles from today's baseline option. There could potentially be significant benefits and impacts to greenhouse gas and CO_2 emissions should aircraft be able to receive a Continuous Descent Arrival (CDA).
	Capacity/ resilience	This option could see potential complexity issues with network connectivity and proximity to LTMA traffic, specifically the potential for multiple interactions with both current and future London Stansted departures to the East. There would be little opportunity for any increase in capacity or resilience, which could end up being reduced.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

Group	Impact	Qualitative Assessment
	Biodiversity	Benfleet & Southend marshes are flown over by the 05-NW-D Option as does the Baseline; the options also flies over Thames Estuary & Marshes which the baseline does not these are Ramsar sites, SPAs, SACs and SSSIs. The option also flies over different SSSIs to the baseline. Image shows the Baseline (yellow), the 05-NW-D Option (white) and the European sites. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option could see potential complexity issues with network connectivity and proximity to LTMA traffic, specifically the potential for multiple interactions with both current and future London Stansted departures to the East. This option would provide no opportunity for increased effective capacity or benefit to economic impact.

Group	Impact	Qualitative Assessment
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach, which would mean a reduction in track miles from today's baseline option. There could potentially be significant benefits to fuel burn should aircraft be able to receive a CDA however, this is unlikely due to potential interactions.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability and simplification objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 35: A05-NW-D

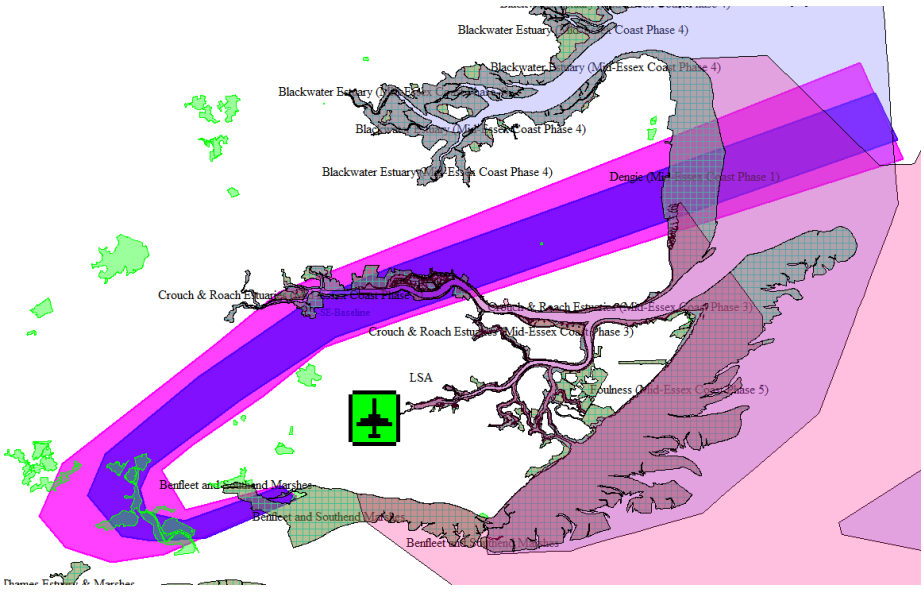
6.7. A05-SE-BASELINE (previously A05-SE-G)

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities before landing with no change to noise impact as this is the baseline.
	Air Quality	This option would continue to overfly the same communities before landing with no change in impact to local air quality. There is an AQMA overflown by this option but not below 1000ft.
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	No opportunity to increase capacity or resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Benfleet & Southend marshes, Crouch & Roach Estuary and Dengie are flown over by the Baseline; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows the Baseline (pink) and the European sites. 
General aviation	Access	No change in controlled airspace or access to it if the Baseline was to be retained.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased capacity or benefit to economic impact should the Baseline option be retained.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No training costs for airlines as there would be no new procedures if this baseline option were to be retained. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No commercial airline costs are anticipated should the Baseline be retained.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	No controller or assistant training will be required should the Baseline be retained as procedures will not be changed.
All	Safety	No safety concerns should this baseline option be retained.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the improving efficiency and simplification objectives. Additionally, does not improve the environmental sustainability objectives.

Table 36: A05-SE-BASELINE

6.8. A05-SE-DO MINIMUM

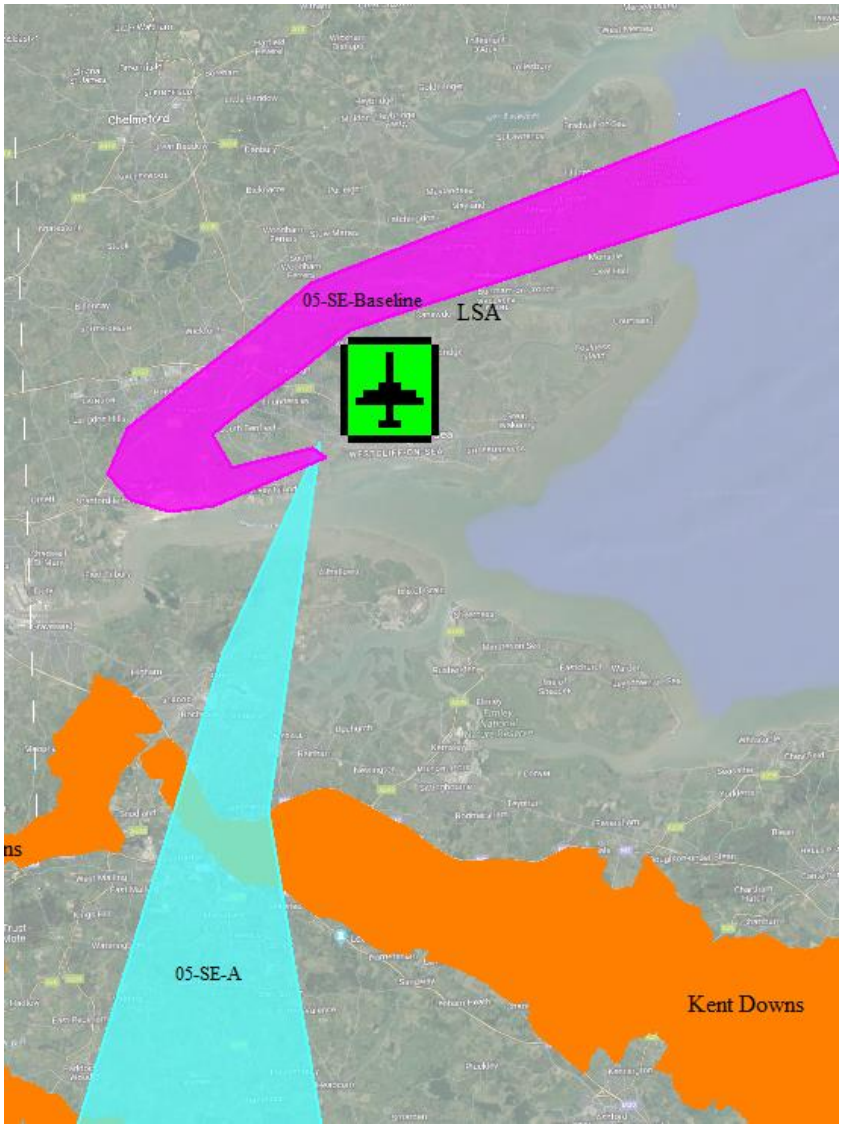
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities before landing with no change to noise impact although the flight path will be more concise.
	Air Quality	This option would continue to overfly the same communities before landing with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be minimal change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Resilience would be increased due to the introduction of RNAV.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Benfleet & Southend marshes, Crouch & Roach Estuary and Dengei are flown over by the do minimum Option.; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows the Baseline (pink) and do minimum Option (purple) the European sites. 
General aviation	Access	No increase or reduction in controlled airspace would be required for this option.

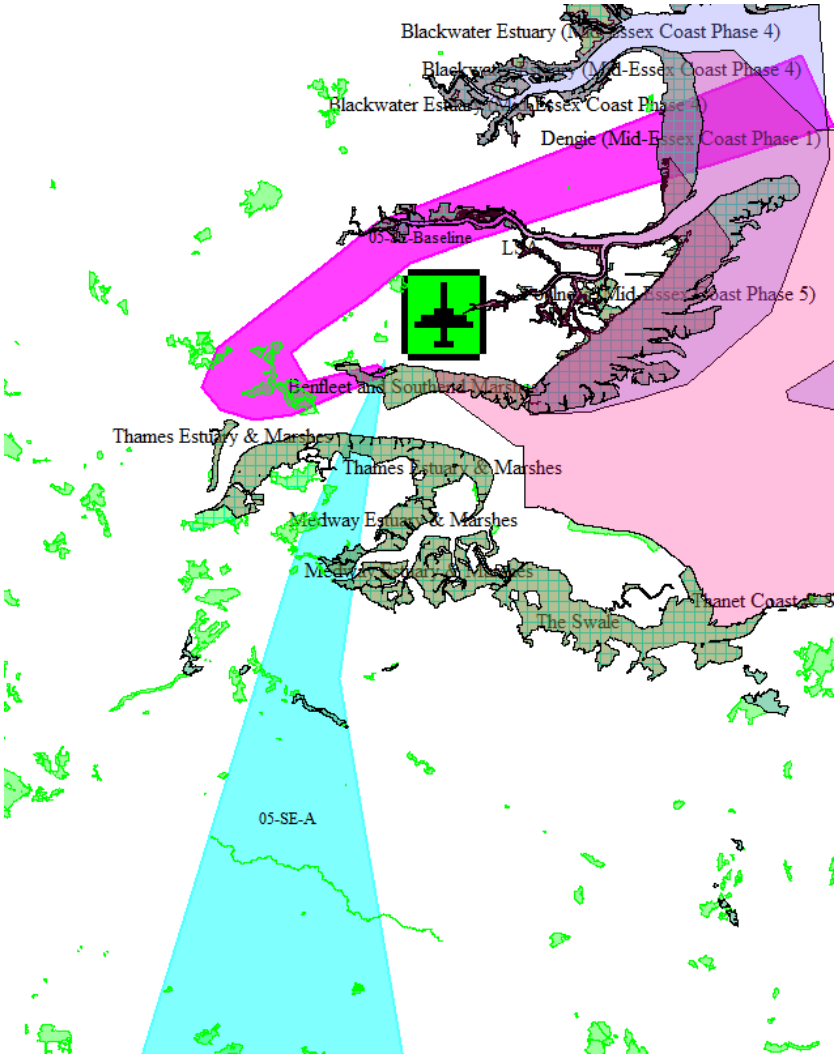
Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	limited opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the improving efficiency objectives. Additionally, does not improve the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 37: A05-SE-DO MINIMUM

6.9. A05-SE-A

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline at lower altitudes as aircraft would fly over the Thames Estuary, although at higher altitudes area of higher population density would be overflown. .
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Potential for more interactions with LTMA traffic, specifically London City and London Gatwick current procedures.

Group	Impact	Qualitative Assessment
	Tranquillity	The Kent Downs AONB is flown over by this option and potentially below 7000ft. This option will arrive over the AONB, and the Baseline does not. 

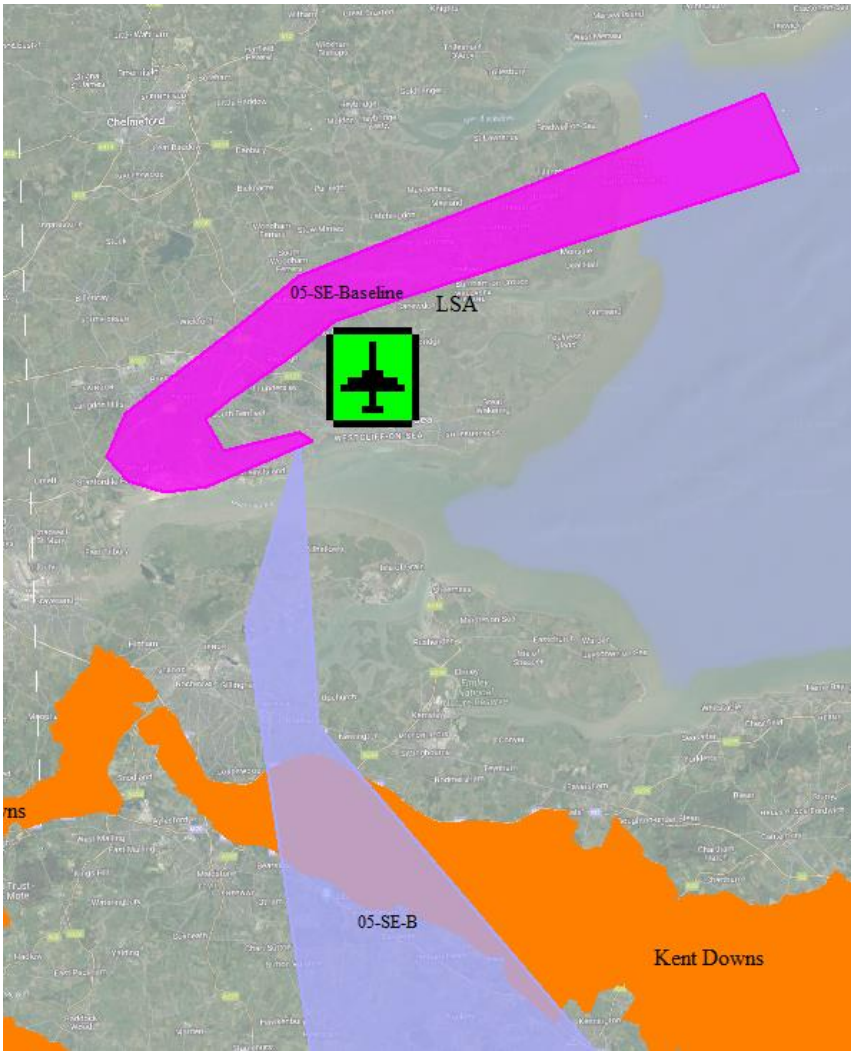
Group	Impact	Qualitative Assessment
	Biodiversity	Thames Estuary & Marshes and Medway Estuary & marshes are flown over by the 05-SE-A Option, this option flies over entirely different European sites to the Baseline. These are Ramsar sites, SPAs, SACs and SSSIs. Image shows the Baseline (pink), the 05-SE-A Option (turquoise) and the European sites. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide limited opportunity for increased effective capacity or benefit to economic impact and the closer proximity to other LTMA traffic could mean a decrease.

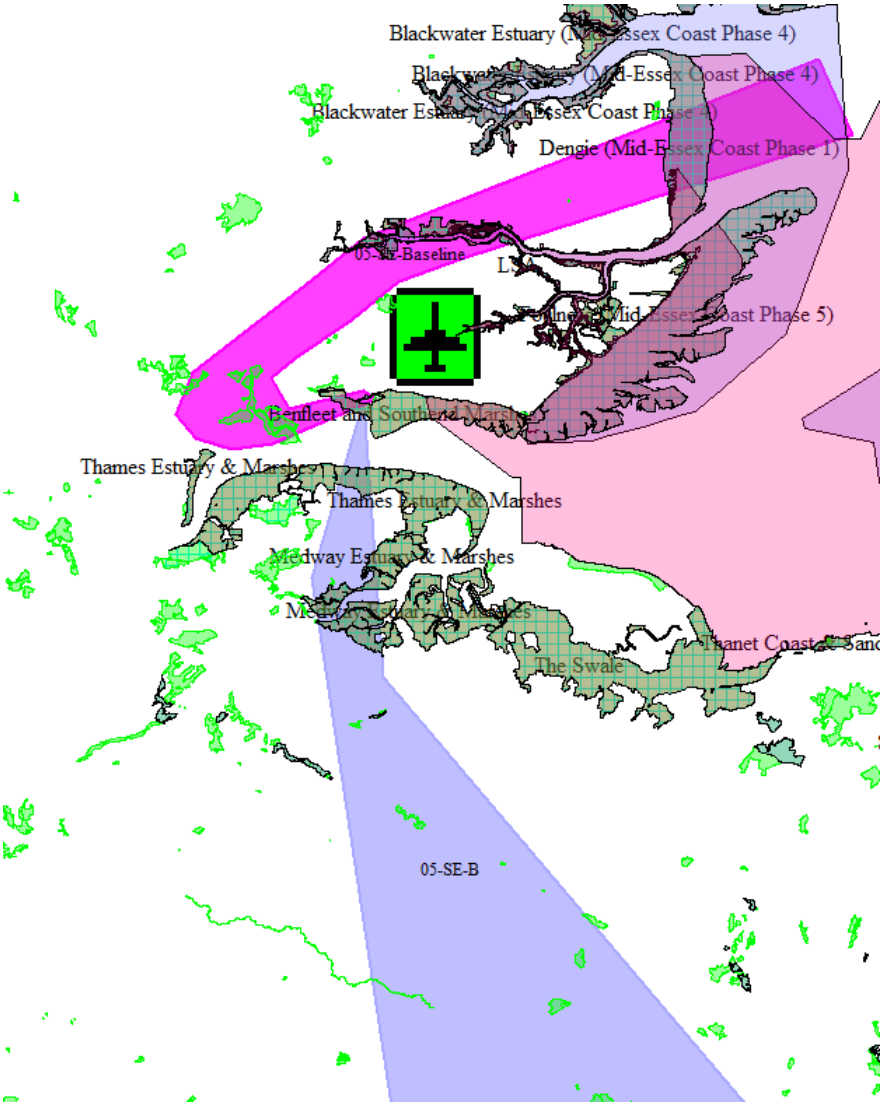
Group	Impact	Qualitative Assessment
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There could be potential for benefits to fuel burn, which could be even greater should CDAs be available.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability and simplification objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 38: A05-SE-A

6.10. A05-SE-B

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline at lower altitudes as aircraft would fly over the Thames Estuary, although at higher altitudes area of higher population density would be overflown.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Potential for more interactions with LTMA traffic, specifically London City.

Group	Impact	Qualitative Assessment
	Tranquillity	The Kent Downs AONB is flown over by this option and potentially below 7000ft. This option will arrive over the AONB, and the Baseline does not. 

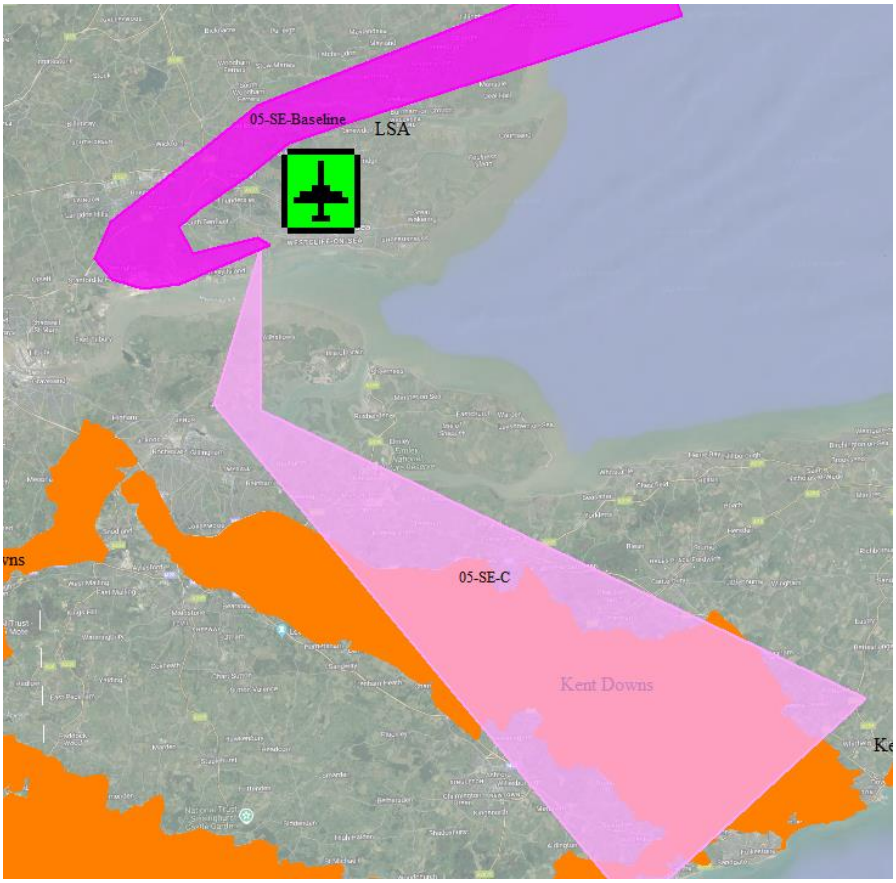
Group	Impact	Qualitative Assessment
	Biodiversity	Thames Estuary & Marshes and Medway Estuary & marshes are flown over by the 05-SE-B Option, this option flies over entirely different European sites to the Baseline. These are Ramsar sites, SPAs, SACs and SSSIs. Image shows the Baseline (pink), the 05-SE- Option (purple) and the European sites. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	There is little potential for this option to contribute to increased effective capacity and economic impact and the closer proximity to other LTMA traffic could mean a decrease.

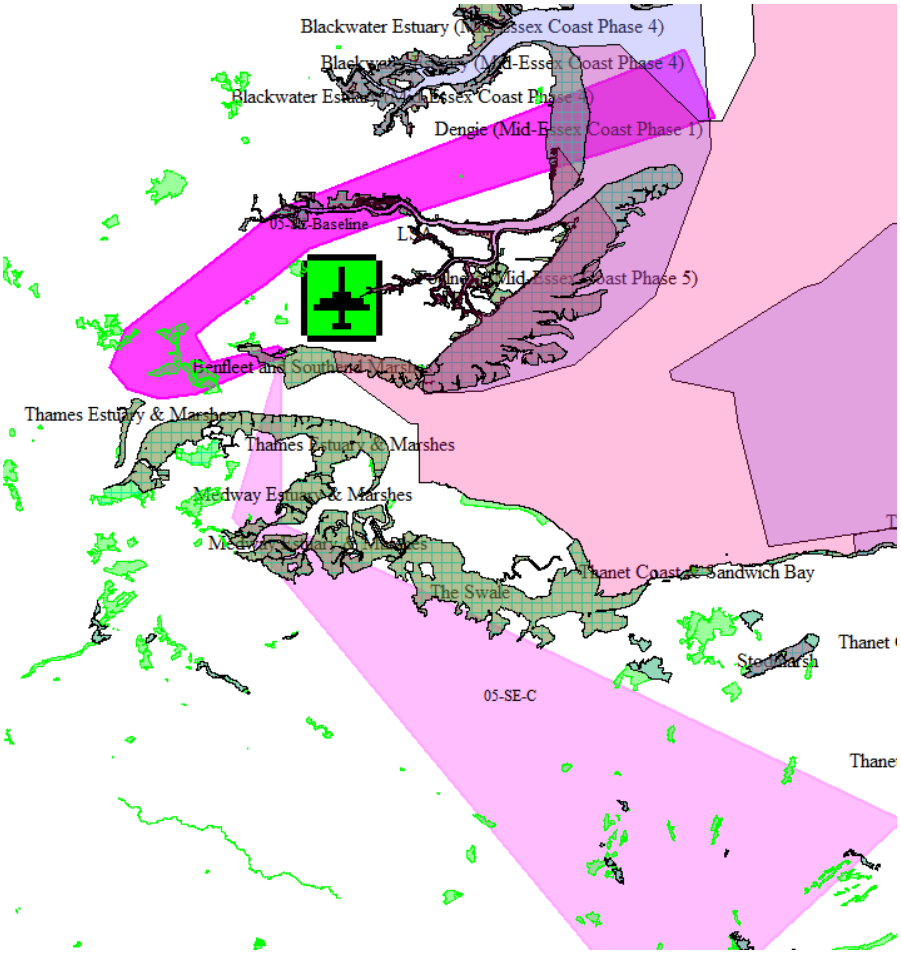
Group	Impact	Qualitative Assessment
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There could be potential benefits for fuel burn, which could be even greater should CDAs be available.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not achieve the simplification and environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 39: A05-SE-B

6.11. A05-SE-C

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline at lower altitudes as aircraft would fly over the Thames Estuary, although at higher altitudes area of similar population density would be overflown.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	This option is tactically achieved in today's operation but only when deconflicted from LTMA departing traffic to the Southeast. It may be a viable Option if arrivals were underneath the London City point merge.

Group	Impact	Qualitative Assessment
	Tranquillity	The Kent Downs AONB is flown over by this option and potentially below 7000ft. This option will arrive over the AONB, and the Baseline does not. 

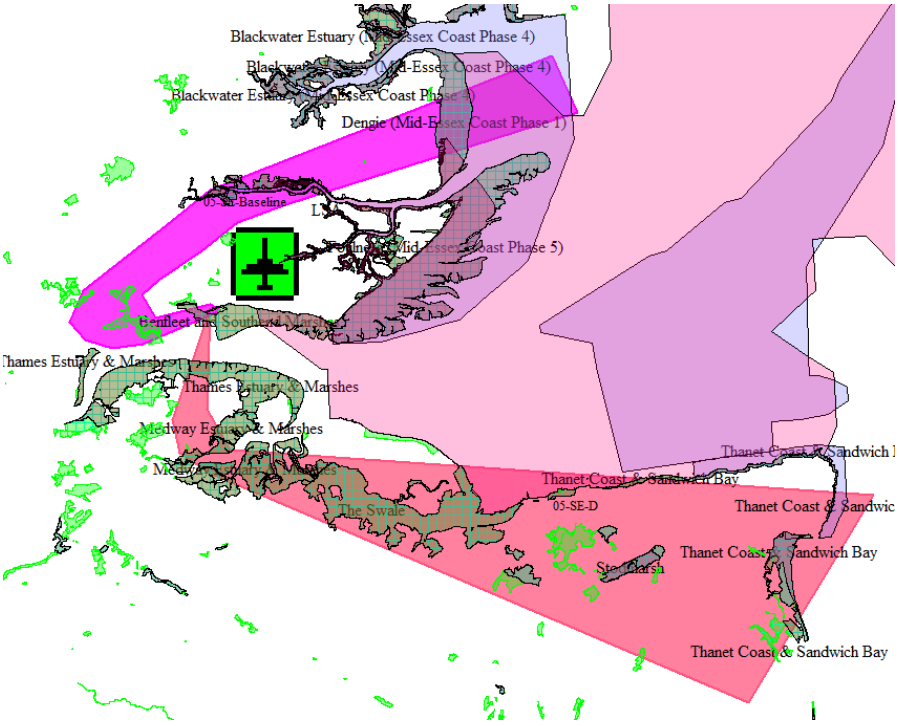
Group	Impact	Qualitative Assessment
	Biodiversity	Thames Estuary & Marshes and Medway Estuary & marshes are flown over by the 05-SE-C Option, this option flies over entirely different European sites to the Baseline. These are Ramsar sites, SPAs, SACs and SSSIs. Image shows the Baseline (pink), the 05-SE-C Option (light pink) and the European sites. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	There is little potential for this option to contribute to increased effective capacity and economic impact.

Group	Impact	Qualitative Assessment
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There could be potential for benefits to fuel burn, which could be even greater should CDAs be available.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training, if deemed necessary, as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not achieve the simplification and all environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 40: A05-SE-C

6.12. A05-SE-D

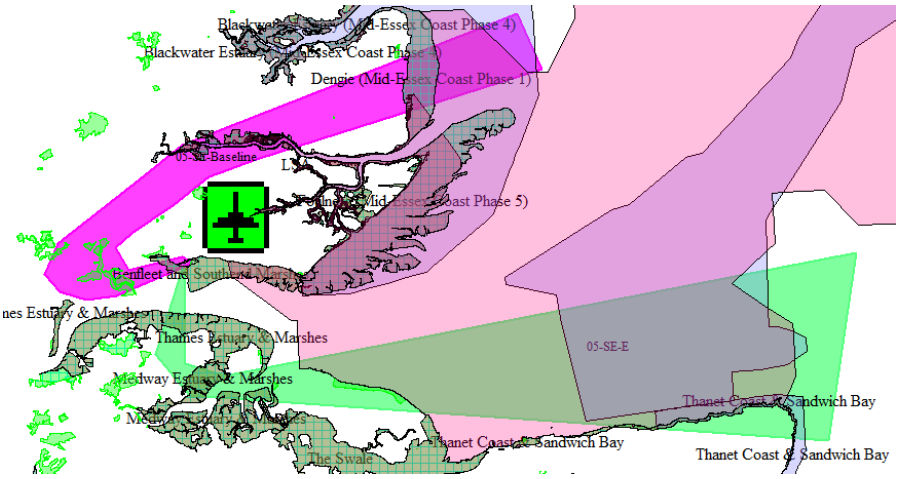
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline at lower altitudes as aircraft would fly over the Thames Estuary, although at higher altitudes area of similar population density would be overflown.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	This option could need deconflicting from the current London City point merge.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

Group	Impact	Qualitative Assessment
	Biodiversity	Thames Estuary & Marshes, Benfleet and Southend Marshes, Medway Estuary & Marshes and the Swale are flown over by the 05-SE-D Option, this option flies over entirely different European sites to the Baseline. These are Ramsar sites, SPAs, SACs and SSSIs. Image shows the Baseline (pink), the 05-SE-D Option (salmon pink) and the European sites. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	There is little potential for this option to contribute to increased effective capacity and economic impact.
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There could be potential for benefits to fuel burn, which could be even greater should CDAs be available.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the improving efficiency objectives or all environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 41: A05-SE-D

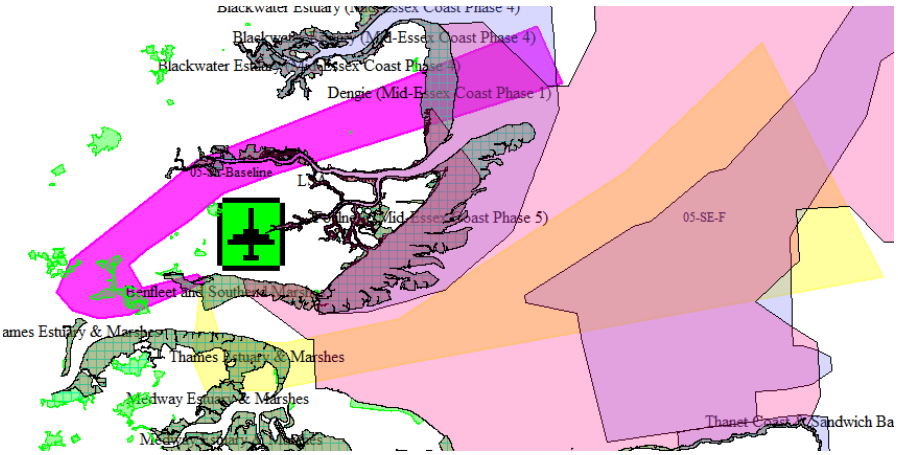
6.13. A05-SE-E

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline as aircraft would fly over the Thames Estuary and English Channel.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	There are few foreseen issues with LTMA traffic, potentially this option would need deconflicting from the current London City point merge.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	Thames Estuary & Marshes, Benfleet and Southend Marshes, and Medway Estuary & Marshes are flown over by the 05-SE-E Option, which flies over entirely different European sites to the Baseline. These are Ramsar sites, SPAs, SACs and SSSIs. Image shows the Baseline (pink), the 05-SE-E Option (green) and the European sites. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	There is little potential for this option to contribute to increased effective capacity and economic impact.
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and, as such, would all see a reduction in track miles from today's baseline option. There could be potential for benefits to fuel burn, which could be even greater should CDAs be available.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification, reducing complexity and improving efficiency objectives. Additionally, does not improve the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 42: A05-SE-E

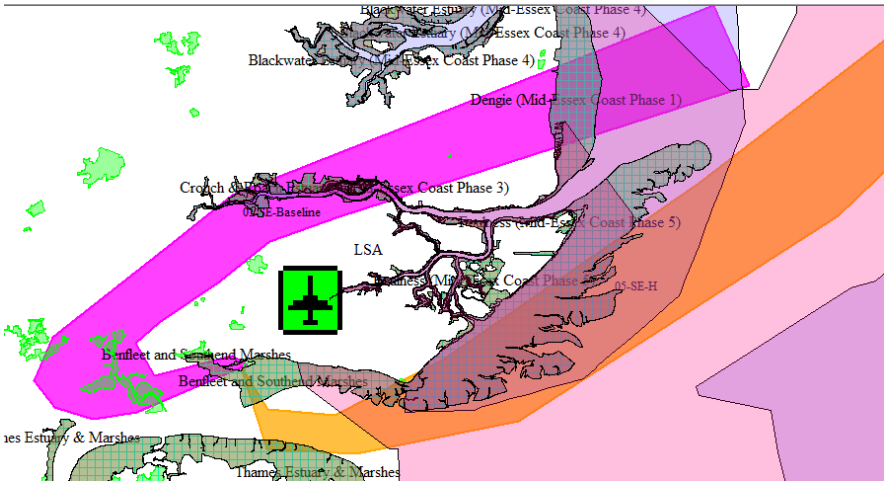
6.14. A05-SE-F

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline as aircraft would fly over the Thames Estuary.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	There are few foreseen issues with LTMA traffic, potentially this option would need deconflicting from the current London City point merge. It is a similar route to today's baseline so no anticipated benefit to capacity or resilience is anticipated.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	Thames Estuary & Marshes are flown over by the A05-SE-F Option, which flies over entirely different European sites to the Baseline. This is a Ramsar site, SPA, SAC and SSSI. Image shows the Baseline (pink), the A05-SE-F Option (yellow) and the European sites. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide limited opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There could be potential for benefits to fuel burn, which could be even greater should CDAs be available.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification, reducing complexity, environmental sustainability or improving efficiency objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 43: A05-SE-F

6.15. A05-SE-H

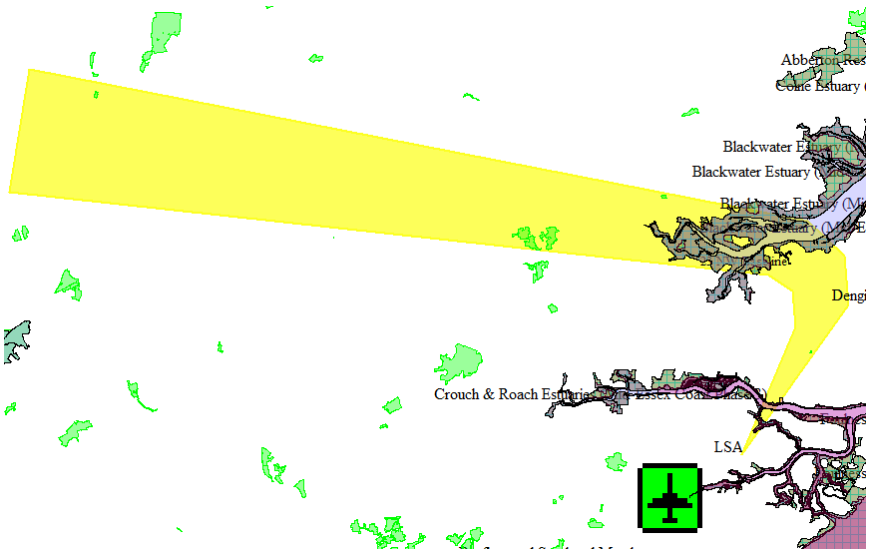
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density compared to those overflown in the Baseline as aircraft would fly over the Thames Estuary.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	There would be a decrease in capacity and resilience due to the entire swathe routing through the DAs.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	Benfleet and Southend & Marshes are flown over by the A05-SE-H Option, which also flies over the same European sites as the Baseline but a different section of it. This is a Ramsar site, SPA, SAC and SSSI. Image shows the Baseline (pink), the A05-SE-H Option (orange) and the European sites. 
General aviation	Access	This option would require an increase in controlled airspace.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide limited opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	Additional safety work would need to be done to make this a viable Option. The entire swathe routes through the Shoeburyness DAs. This option could be used as a potential respite route for when the DA are inactive.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the safety, simplification, environmental sustainability or improving efficiency objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 44: A05-SE-H

7. Initial Options Appraisal – Arrivals Runway 23

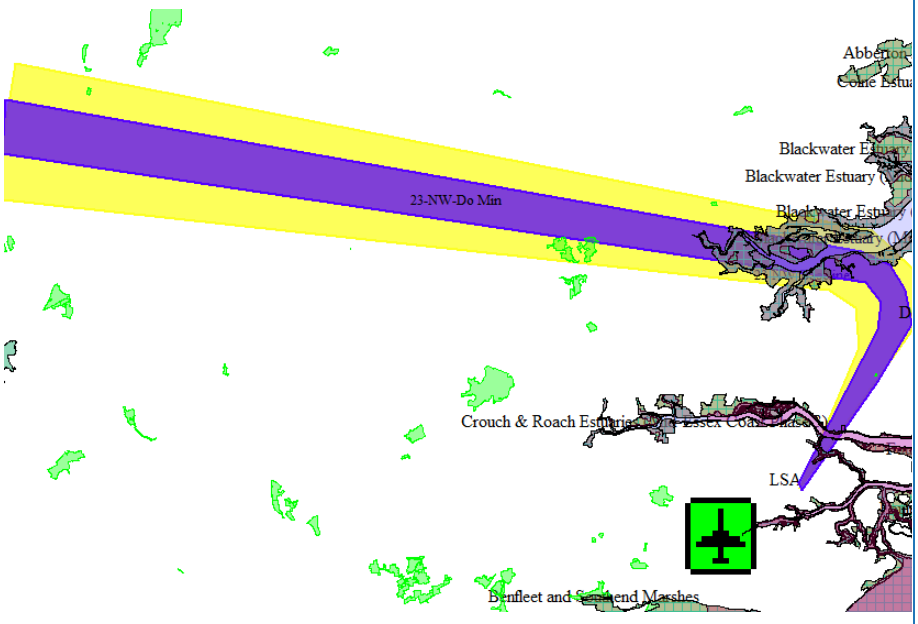
7.1. A23-NW-BASELINE

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	Before landing, this option would continue to overfly the same communities with no change to noise impact as this is the Baseline.
	Air Quality	Before landing, this option would continue to overfly the same communities with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	No opportunity to increase capacity or resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Crouch & Roach and Blackwater Estuaries would continue to be overflown, additionally a number of SSSIs; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows this option, the Baseline (yellow) and European sites. 

Group	Impact	Qualitative Assessment
General aviation	Access	No change in controlled airspace or access to it if the Baseline was to be retained.
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased capacity or benefit to economic impact should the Baseline option be retained.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No training costs for airlines as there would be no new procedures if this baseline option were to be retained. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No commercial airline costs are anticipated should the Baseline be retained.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	No controller or assistant training will be required should the Baseline be retained as procedures will not be changed.
All	Safety	No safety concerns should this baseline option be retained.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification objective. Additionally, no improvement is expected for the environmental sustainability objectives.

Table 45: A23-NW-BASELINE

7.2. A23-NW-DO MINIMUM

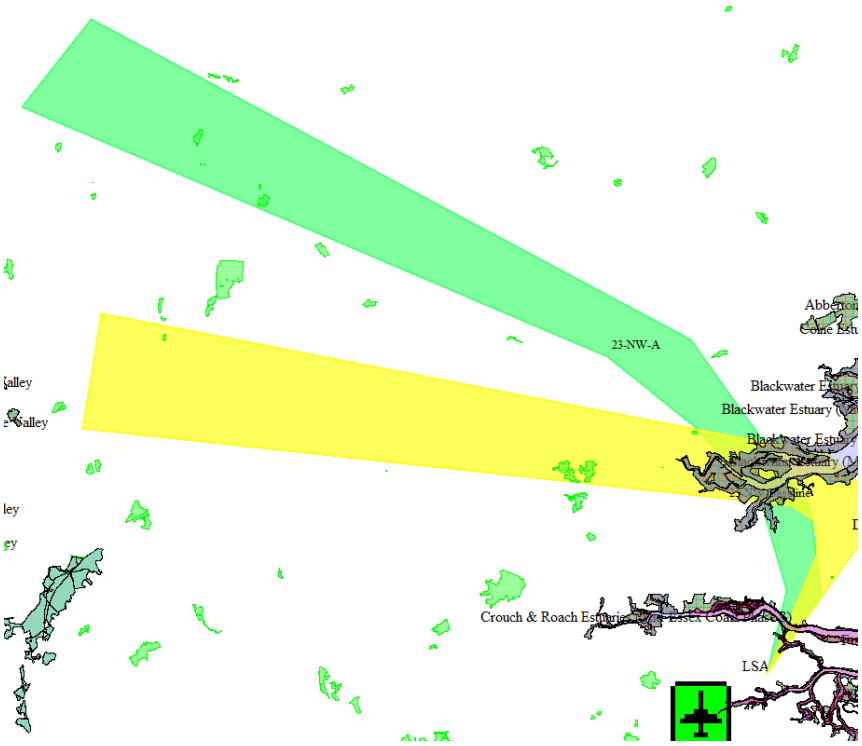
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities before landing with no change to noise impact although the flight path will be more concise.
	Air Quality	This option would continue to overfly the same communities before landing with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft. although the flight path may be more concise.
Wider society	Greenhouse gas impact	There would be minimal change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Resilience would be increased due to the introduction of RNAV.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Crouch & Roach and Blackwater Estuaries would continue to be overflown, a number of SSSIs, but less than the Baseline, would be overflown; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow), do minimum Option (purple) and European sites. 
General aviation	Access	No increase or reduction in controlled airspace would be required for this option.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide limited opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is assessed as being aligned with the AMS although there is no improvement expected for the environmental sustainability objectives. This is an improvement when compared to the Baseline.

Table 46: A23-NW-DO MIN

7.3. A23-NW-A

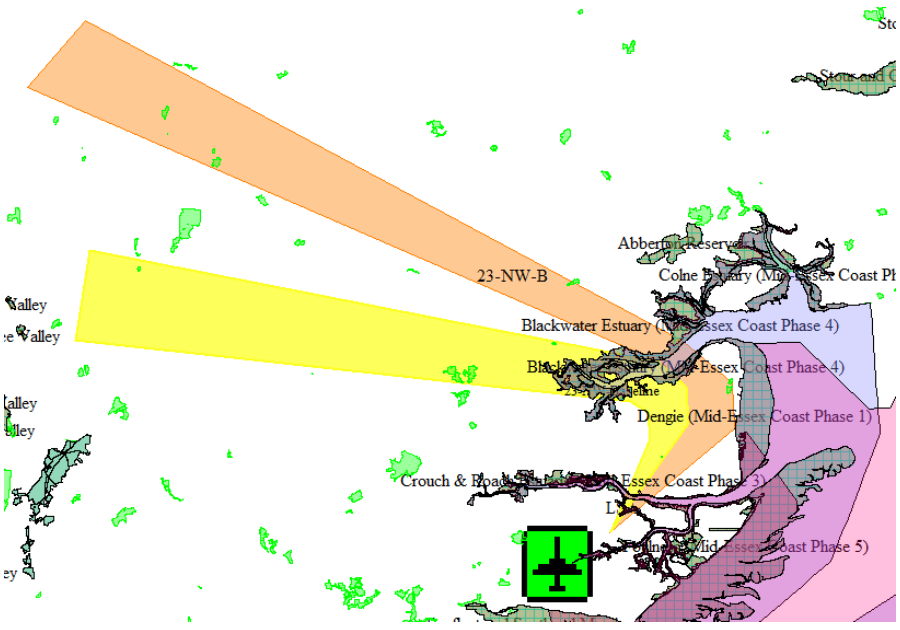
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	Deconfliction from London City and London Stansted traffic would be required, but this is true of today's baseline operation.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

Group	Impact	Qualitative Assessment
	Biodiversity	Blackwater Estuary would continue to be overflown, similar to the Baseline; these are Ramsar sites, SPAs, SACs and SSSIs. Different SSSIs are overflown compared to the Baseline Image shows baseline (yellow), 23-NW-A Option (green) and European sites. 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide limited opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.

Group	Impact	Qualitative Assessment
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 47: A23-NW-A

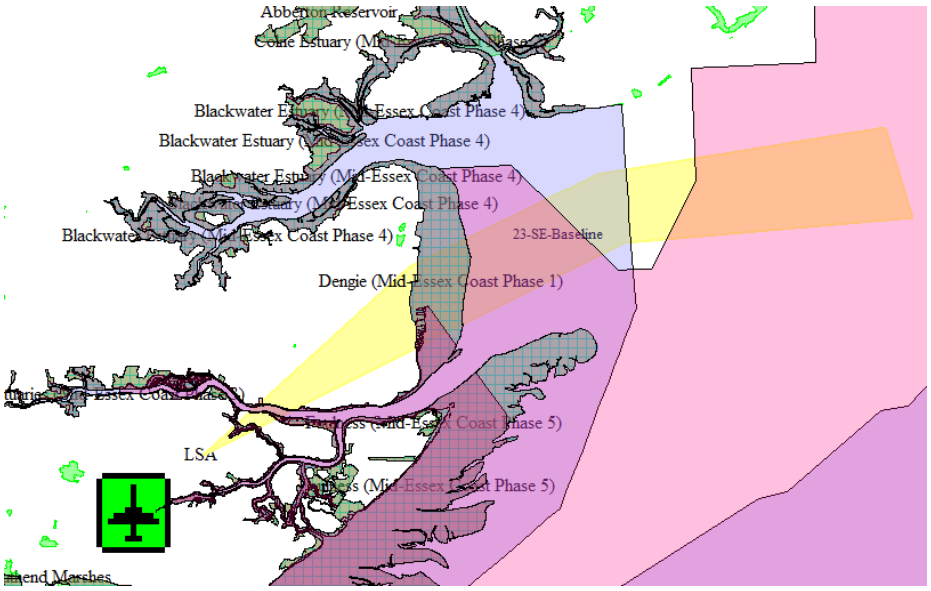
7.4. A23-NW-B

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality
Wider society	Greenhouse gas impact	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to greenhouse gas and CO_2 emissions are anticipated.
	Capacity/ resilience	Deconfliction from London City and London Stansted traffic would be required, but this is true of today's baseline operation.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Crouch & Roach Estuaries and Blackwater Estuary would be overflown below 7000ft, these are Ramsar sites, SPAs, SACs, and SSSIs. Additional SSSIs would be flown over with this option (green shaded areas) compared to the Baseline. Image shows baseline (yellow) and A23-NW-B Option (peach). 

Group	Impact	Qualitative Assessment
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide limited opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	Little to no difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated if the Baseline is retained for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns with this option.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 48: A23-NW-B

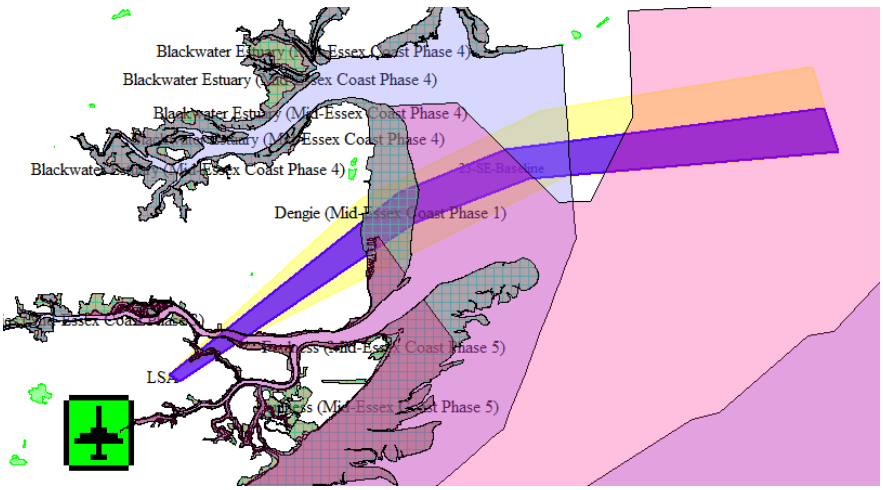
7.5. A23-SE-BASELINE (previously A23-SE-A)

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	Before landing, this option would continue to overfly the same communities with no change to noise impact as this is the baseline.
	Air Quality	Before landing, this option would continue to overfly the same communities with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be no change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	No opportunity to increase capacity or resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Crouch & Roach Estuaries would continue to be overflown, additionally this option would fly over a small portion of the Dengie; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow). 
General aviation	Access	No change in controlled airspace or access to it if the Baseline was to be retained.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	No opportunity for increased capacity or benefit to economic impact should the Baseline option be retained.
	Fuel burn	There would be no change in track length or altitudes. No change in benefits or impacts to fuel burn.
Commercial airlines	Training costs	No training costs for airlines as there would be no new procedures if this baseline option were to be retained. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No commercial airline costs are anticipated should this baseline be retained.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP.
	Deployment costs	No controller or assistant training will be required should the Baseline be retained as procedures will not be changed.
All	Safety	No safety concerns should this baseline option be retained.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the simplification or improving efficiency objectives. Additionally, no improvement is expected for the environmental sustainability objectives.

Table 49: A23-SE-BASELINE

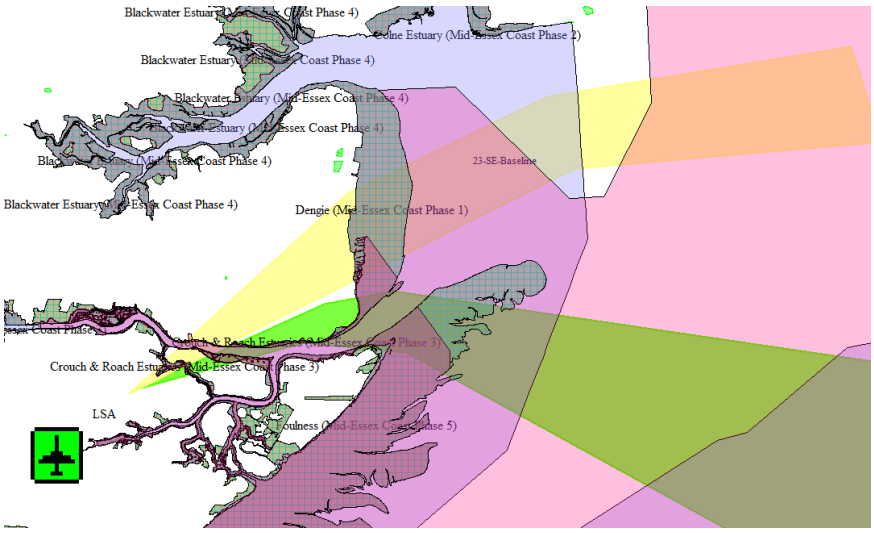
7.6. A23-SE-DO MINIMUM

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	Before landing, this option would continue to overfly the same communities with no change to noise impact although the flight path will be more concise.
	Air Quality	Before landing, this option would continue to overfly the same communities with no change in impact to local air quality. There are no AQMAs overflown by this option at /or below 1000ft.
Wider society	Greenhouse gas impact	There would be minimal change in track length or altitudes. No change in benefits or impacts to greenhouse gas and CO_2 emissions.
	Capacity/ resilience	Resilience would be increased due to the introduction of RNAV.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Crouch & Roach Estuaries would continue to be overflown, this option would also fly over a small portion of the Dengie as does the Baseline; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) and do minimum Option (purple). The Option would fly over less of the European sites than the Baseline. 
General aviation	Access	No increase or reduction in controlled airspace would be required for this option.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide limited opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	Minimal difference in track miles between this option and the Baseline. No significant benefits or impacts to fuel burn are anticipated.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	No initial safety concerns at this stage.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet the improving efficiency objectives. Additionally, no improvement is expected for the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 50: A23-SE-DO MIN

7.7. A23-SE-B

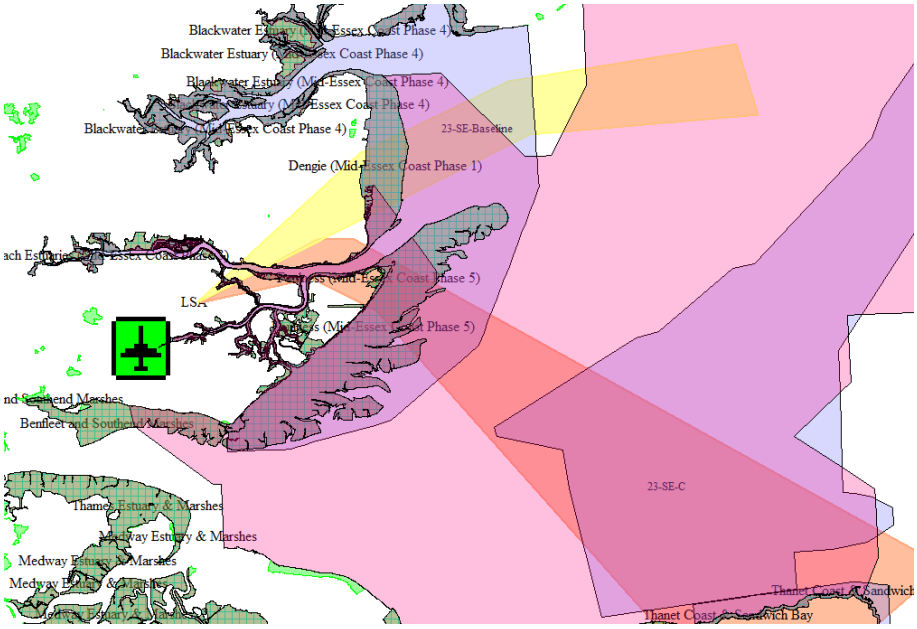
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	There are no foreseen issues with LTMA traffic with this option, however, the entire swathe routes through the DAs, this could mean a decrease to capacity and resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.
	Biodiversity	The Crouch & Roach Estuaries would continue to be overflown, however different sections. Additionally, this option would fly over a small portion of Foulness; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) and 23-SE-B Option (green). 

Group	Impact	Qualitative Assessment
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide little opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There could be potential for benefits to fuel burn, which could be even greater should CDAs be available.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	Additional safety work would need to be done to make this a viable Option. The entire swathe routes through the Shoeburyness DA. This option could be used as a potential respite route for when the DA are inactive.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the safety, simplification, reducing complexity and improving efficiency objectives. Additionally, no improvement is expected for the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 51: A23-SE-B

7.8. A23-SE-C

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline at lower altitudes, although some population would be overflown at higher altitudes whereas the Baseline route is over the English Channel at this point.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	There are no foreseen issues with LTMA traffic with this option, however, the entire swathe routes through the DAs, this could mean a decrease to capacity and resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

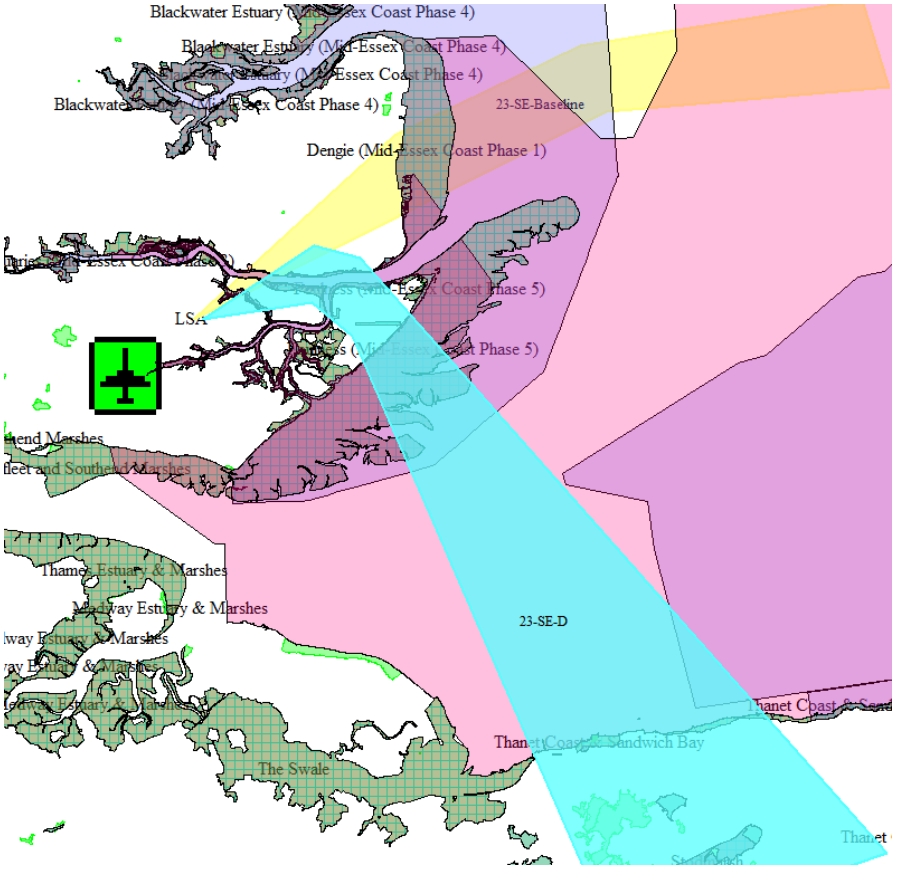
Group	Impact	Qualitative Assessment
	Biodiversity	The Crouch & Roach Estuaries would continue to be overflown, however different sections. Additionally, this option would fly over a small portion of Foulness and Thanet coast and Sandwich bay, although the latter would be at a high altitude but possibly below 7000ft; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) and 23-SE- Option (orange). 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide little opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There could be potential for benefits to fuel burn, which could be even greater should CDAs be available.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.

Group	Impact	Qualitative Assessment
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	Additional safety work would need to be done to make this a viable Option. The entire swathe routes through the Shoeburyness DA. This option could be used as a potential respite route for when the DA are inactive.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the safety, simplification, reducing complexity and improving efficiency objectives. Additionally, no improvement is expected for the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 52: A23-SE-C

7.9. A23-SE-D

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline at lower altitudes, although some population would be overflown at higher altitudes whereas the Baseline route is over the English Channel at this point.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such would see a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	There are no foreseen issues with LTMA traffic with this option, however, the entire swathe routes through the DAs, this could mean a decrease to capacity and resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

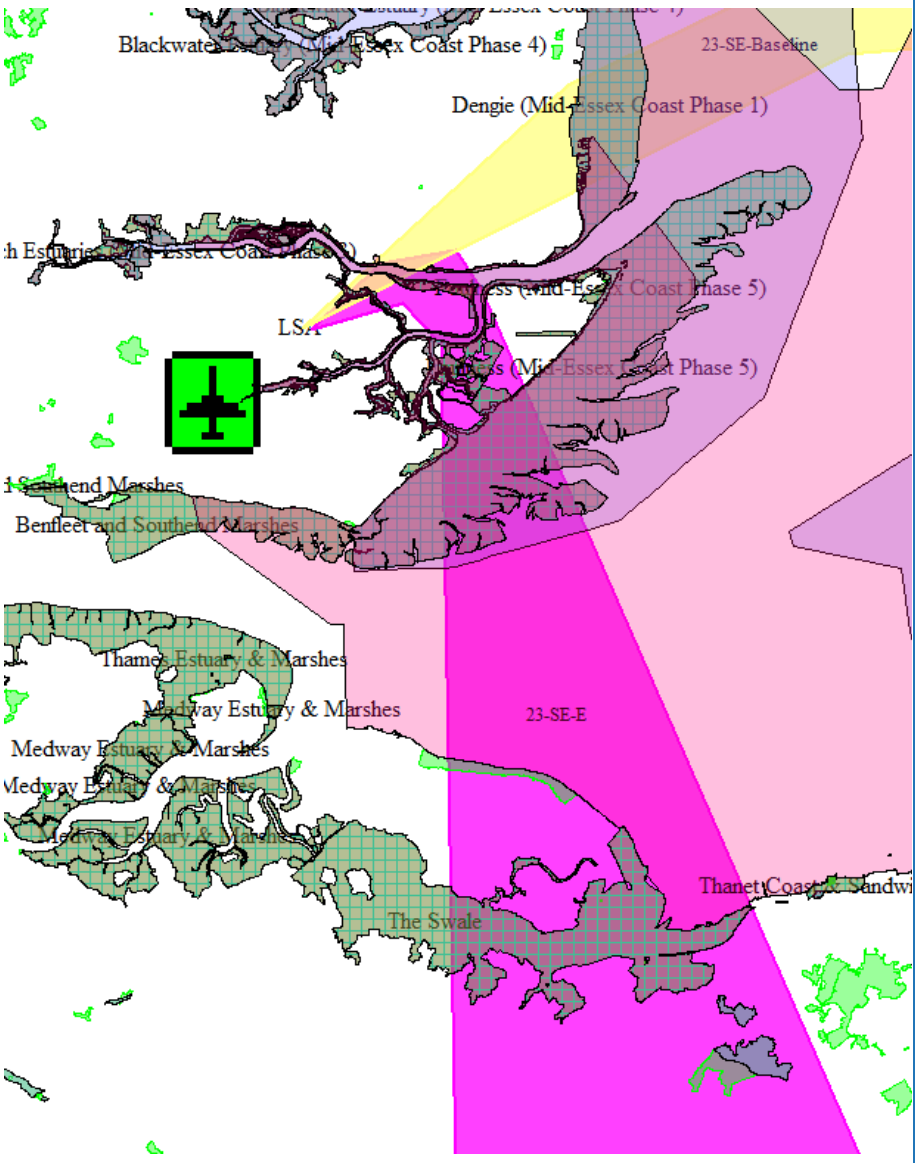
Group	Impact	Qualitative Assessment
	Biodiversity	The Crouch & Roach Estuaries would continue to be overflown, however different sections. Additionally, this option would fly over Foulness and Thanet coast and Sandwich bay, although the latter would be at a high altitude but possibly below 7000ft; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) and 23-SE-D Option (turquoise). 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide little opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There could be potential for benefits to fuel burn, which could be even greater should CDAs be available.

Group	Impact	Qualitative Assessment
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	Additional safety work would need to be done to make this a viable Option. The entire swathe routes through the Shoeburyness DA. This option could be used as a potential respite route for when the DA are inactive.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the safety, reducing complexity and simplification objectives. Additionally, no improvement is expected for the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 53: A23-SE-D

7.10. A23-SE-E

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline at lower altitudes, although some population would be overflown at higher altitudes whereas the Baseline route is over the English Channel at this point.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	There is potential for conflictions with LTMA departure traffic with this option and the entire swathe routes through the DAs which could mean a decrease to capacity and resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

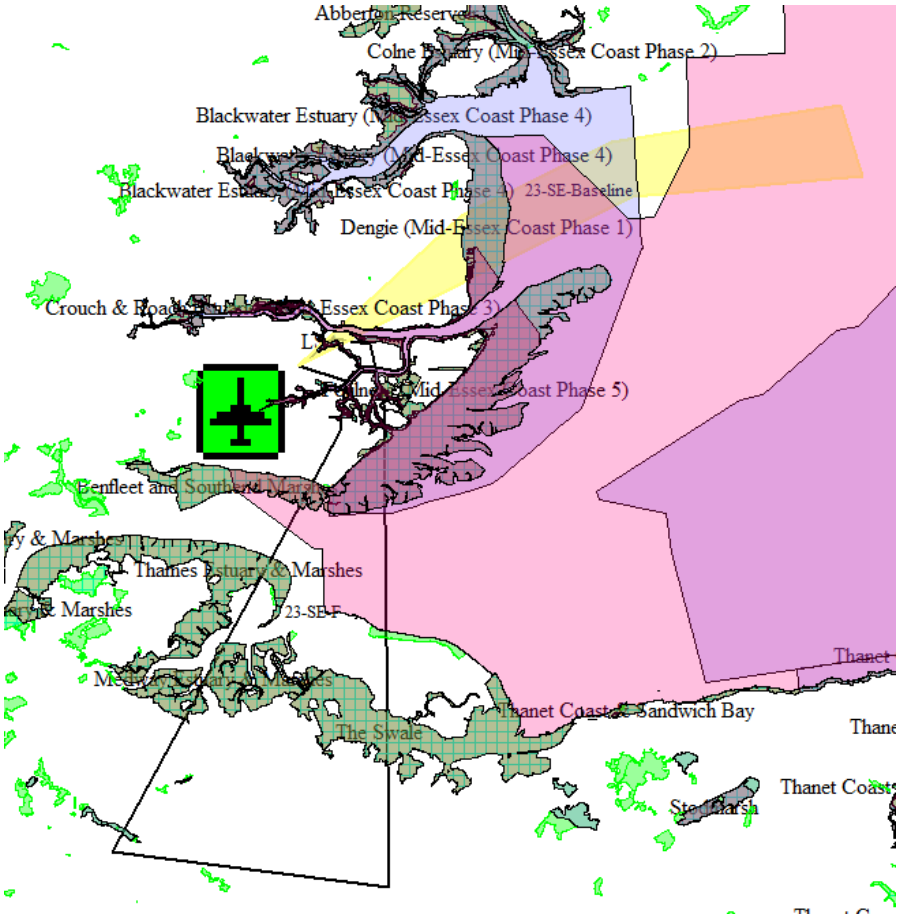
Group	Impact	Qualitative Assessment
	Biodiversity	The Crouch & Roach Estuaries would continue to be overflown. Additionally, this option would fly over Foulness and Benfleet & Marshes, and the Swale, although the latter would be at a high altitude but possibly below 7000ft unlike the Baseline; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) and 23-SE- E Option (pink). 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.

Group	Impact	Qualitative Assessment
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide little opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and as such would all see a reduction in track miles from today's baseline option. There could be potential for benefits to fuel burn, which could be even greater should CDAs be available.
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	There is potential for conflictions with LTMA departure traffic with this option, however, it is also a shorter, more expeditious route to today's baseline so some benefits to capacity or resilience may be possible. The majority of the swathe routes through the Shoeburyness DA. This option could be used as a potential respite route for when the DA are inactive, or a potential route missing the DA confines, subject to PBN requirements.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the safety, reduced complexity and simplification objectives. Additionally, no improvement is expected for the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 54: A23-SE-E

7.11. A23-SE-F

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown). Before that, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a similar population density compared to those overflown in the Baseline at lower altitudes, although some population would be overflown at higher altitudes whereas the Baseline route is over the English Channel at this point.
	Air Quality	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 nm of touchdown) with no change in impact to local air quality.
Wider society	Greenhouse gas impact	This option would mean aircraft are flying a more direct route to the final approach and as such there would be a reduction in track miles from today's baseline option. There would be potential for benefits to both greenhouse gas and CO_2 emissions.
	Capacity/ resilience	There is potential for conflictions with LTMA departure traffic and the close proximity to London Gatwick with this option. The entire swathe also routes through the DAs, this could mean a decrease to capacity and resilience.
	Tranquillity	There are no AONBs or NPs overflown by this option below 7000ft.

Group	Impact	Qualitative Assessment
	Biodiversity	Foulness and Benfleet & Marshes, Thames Estuary & Marshes, Medway Estuary & Marshes and the Swale would be overflown unlike the Baseline; these are Ramsar sites, SPAs, SACs and SSSIs. Image shows baseline (yellow) and 23-SE- F Option (white). 
General aviation	Access	No increase or reduction in controlled airspace is anticipated for this option.
General aviation/ commercial airlines	Economic impact from increased effective capacity	This option would provide little opportunity for increased effective capacity or benefit to economic impact.
	Fuel burn	This option would mean aircraft are flying a more direct route to the final approach and as such would see a reduction in track miles from today's baseline option. There could be potential for benefits to fuel burn, which could be even greater should CDAs be available.

Group	Impact	Qualitative Assessment
Commercial airlines	Training costs	No additional training costs for airlines are anticipated with this option. Updates to flight procedures form part of an AIRAC cycle where airlines will update their procedures and utilise training if deemed necessary as standard.
	Other costs	No other commercial airline costs are anticipated with the initial deployment of this option.
Airport/ Air navigation service provider	Infrastructure costs	No infrastructure costs are anticipated with the initial deployment of this option for either the Airport or ANSP.
	Operational costs	No operational costs are anticipated with the initial deployment of this option for either the Airport or the ANSP. This option contributes to the VOR rationalisation currently ongoing within the UK as it removes reliance on ground based navigational aids with the implementation of PBN.
	Deployment costs	It is anticipated that controller and assistant training will be required for the initial deployment of this option. The scope and scale of this training requirement will be assessed further during the Stage 3 Full Options Appraisal.
All	Safety	Additional safety work would need to be done to make this a viable Option. The majority of the swathe routes through the Shoeburyness DA. This option could be used as a potential respite route for when the DA are inactive, or a potential route missing the DA confines, subject to PBN requirements.
	AMS Realisation	This option is only partially aligned with the AMS as it does not meet all of the safety, reduced complexity and simplification objectives. Additionally, no improvement is expected for the environmental sustainability objectives. As the objectives of the AMS would still not be fully met it is deemed this option is no more aligned with the AMS than the Baseline.

Table 55: A23-SE-F

8. Methodology

8.1. Assessment

8.1.1. The Tables contained in this section provide a summary assessment of the net costs/benefits for each option in each of the categories which have been assessed against the individual baseline for each suite of options. Analysis has been qualitative and there are some categories that require further quantitative analysis at later stages of this ACP. The Options have been assessed as to whether there is potential for an overall net benefit, no benefit or cost[8] and overall net cost, they are colour coded as per the table below:

Qualitatively assessed as having potential for an overall net benefit.	
Qualitatively assessed as having neither cost nor benefit.	
Qualitatively assessed as having potential for an overall net cost.	

Table 56: IOA Summary Key

8.2. Discounting

8.2.1. The Qualitative assessment of each option was carried out by looking at the number of Red, Amber or Green (RAG) scores for each option and assessing the feasibility of each. Having completed the Qualitative assessment of each option, the Team at Cyrrus and LSA undertook the process of discounting. However, it was decided that due to a number of factors, no options would be discounted at this stage of the process. These reasons are summarised below:

- Assessment of Noise and Air Quality: due to our high-level approach with swathes, we have been unable to accurately quantify which areas could see an increase or decrease in noise or air quality. Our assessment of overflight is qualitative at this stage and does not align with CAP1498's definition and assessment. This means that when the swathes are refined to actual routes (lines on the map), communities that are contained within the swathe and feature in the assessment, may be avoided. Therefore, it has been decided that the analysis at this IOA stage is not sufficient to rule out or rule in options based on these assessments. It has been determined that further analysis should be done on each option (which will done in the Full Options Appraisal, at Stage 3 of this ACP). This will also ensure the best options are in keeping with the Government's Altitude Based Priorities, that stipulate:
    - In the airspace from the ground to below 4,000 feet, the Government's environmental priority is to limit and, where possible, reduce the total adverse effects on people;
    - Where Options for route design from the ground to below 4,000 feet are similar in terms of the number of people affected by total adverse noise effects, preference should be

[8] Cost here refers to negative impact and not necessarily monetised. See TAG Unit A1.1

given to that option which is most consistent with existing published airspace arrangements.

- Tranquillity and Biodiversity: In a similar vein to the issues discussed above with regards to swathes, the Assessments of Tranquillity and Biodiversity are made by assessing the sites that are contained within each swathe. Once the Options are refined to routes (lines on maps) there would be the opportunity to avoid various locations. This means that the impact on these sites may be minimised. Furthermore, a detailed analysis will be conducted in the Full Options Appraisal in Stage 3 of this ACP, which will allow more accurate quantification of the benefits and costs of each option.

- Safety Assessment: The Options that were assessed as having a net cost in safety all had the same negative safety impact, this was the fact that they all overfly the Shoeburyness DA. These options are still being considered as they have the potential of creating respite routes that would be used when the DAs are inactive. There is no intention to use the routes when the DAs are active, so it was decided that discounting options based on our safety assessments at this stage was not beneficial and does not align with our aim to potentially create respite routes. Detailed analysis will be conducted in the Full Options Appraisal in Stage 3 of this ACP.

- Integration with neighbouring airports and the network: LSA sits within a busy and congested area of airspace which sees arrival and departure traffic from many other LTMA airports and Manston airport. These airports have been engaged with, however there has not yet been any specific technical engagement between these neighbouring airports to deconflict routes. This situation also applies to the en-route network. Further work will need to be done and will be progressed as part of the Stage 3 activities. It has been decided to retain all options in order to facilitate flexibility and integration with these airports. This would potentially enable free flow for departures and better connectivity with the network. Detailed analysis will be conducted in the Full Options Appraisal in Stage 3 of this ACP.

9. Results

Following the Assessments of the options, this section assesses each suite of options against the same criteria and provides a (RAG) rating (see section 8.1 for explanation). As discussed in section 9.5, preferred options have not yet been identified due to lack of detailed quantitative analysis. Detailed analysis will be conducted in the Full Options Appraisal in Stage 3 of this ACP.

9.1. Departures Runway 05

Northeast

Group	Impact	D05-NE-BASELINE	D05-NE-DOMIN	D05-NE-A	D05-NE-B
Communities	Noise impact on health and quality of life				
	Air Quality				
Wider society	Greenhouse gas impact				
	Capacity/ resilience				
	Tranquillity				
	Biodiversity				
General aviation	Access				
General aviation/ commercial airlines	Economic impact from increased effective capacity				
	Fuel burn				
Commercial airlines	Training costs				
	Other costs				
Airport/ Air navigation service provider	Infrastructure costs				
	Operational costs				

Group	Impact	D05-NE-BASELINE	D05-NE-DO MIN	D05-NE-A	D05-NE-B
	Deployment costs				
All	Safety				
	AMS Realisation				

Table 57: Runway 05 - Northeast - IOA Summary

Northwest

Group	Impact	D05-NW-BASELINE	D05-NW-DO MIN	D05-NW-B
Communities	Noise impact on health and quality of life			
	Air Quality			
Wider society	Greenhouse gas impact			
	Capacity/ resilience			
	Tranquillity			
	Biodiversity			
General aviation	Access			
General aviation/ commercial airlines	Economic impact from increased effective capacity			
	Fuel burn			
Commercial airlines	Training costs			
	Other costs			

Group	Impact	D05-NW-BASELINE	D05-NW-DO MIN	D05-NW-B
Airport/ Air navigation service provider	Infrastructure costs			
	Operational costs			
	Deployment costs			
All	Safety			
	AMS Realisation			

Table 58: Runway 05 - Northwest - IOA Summary

South/Southeast

Group	Impact	D05-S-BASELINE	D05-S-DO MIN	D05-S-A	D05-S-B	D05-S-C
Communities	Noise impact on health and quality of life					
	Air Quality					
Wider society	Greenhouse gas impact					
	Capacity/ resilience					
	Tranquillity					
	Biodiversity					
General aviation	Access					
General aviation/ commercial airlines	Economic impact from increased effective capacity					
	Fuel burn					
Commercial airlines	Training costs					

Group	Impact	D05-S-BASELINE	D05-S-DOMIN	D05-S-A	D05-S-B	D05-S-C
	Other costs					
Airport/ Air navigation service provider	Infrastructure costs					
	Operational costs					
	Deployment costs					
All	Safety					
	AMS Realisation					

Table 59: Runway 05 - South/Southeast - IOA Summary

9.2. Departures Runway 23

Northeast

Group	Impact	D23-NE-BASELINE	D23-NE-DOMIN	D23-NE-A	D23-NE-B	D23-NE-C	D23-NE-D	D23-NE-E
Communities	Noise impact on health and quality of life							
	Air Quality							
Wider society	Greenhouse gas impact							
	Capacity/ resilience							
	Tranquillity							
	Biodiversity							
General aviation	Access							
General aviation/ commercial airlines	Economic impact from increased effective capacity							
	Fuel burn							
Commercial airlines	Training costs							
	Other costs							
Airport/ Air navigation service provider	Infrastructure costs							
	Operational costs							
	Deployment costs							
All	Safety							
	AMS Realisation							

Table 60: Runway 23 - Northeast - IOA Summary

Northwest

Group	Impact	D23-NW-BASELINE	D23-NW-DOMIN	D23-NW-A	D23-NW-B
Communities	Noise impact on health and quality of life				
	Air Quality				
Wider society	Greenhouse gas impact				
	Capacity/ resilience				
	Tranquillity				
	Biodiversity				
General aviation	Access				
General aviation/ commercial airlines	Economic impact from increased effective capacity				
	Fuel burn				
Commercial airlines	Training costs				
	Other costs				
Airport/ Air navigation service provider	Infrastructure costs				
	Operational costs				
	Deployment costs				
All	Safety				
	AMS Realisation				

Table 61: Runway 23 - Northwest - IOA Summary

South/Southeast

Group	Impact	D23-S-BASELINE	D23-S-DOMIN	D23-S-A	D23-S-B	D23-S-C
Communities	Noise impact on health and quality of life					
	Air Quality					
Wider society	Greenhouse gas impact					
	Capacity/ resilience					
	Tranquillity					
	Biodiversity					
General aviation	Access					
General aviation/ commercial airlines	Economic impact from increased effective capacity					
	Fuel burn					
Commercial airlines	Training costs					
	Other costs					
Airport/ Air navigation service provider	Infrastructure costs					
	Operational costs					
	Deployment costs					
All	Safety					
	AMS Realisation					

Table 62: Runway 23 - South/Southeast - IOA Summary

9.3. Arrivals Runway 05

Northwest

Group	Impact	A05-NW-BASELINE	A05-NW-DO MIN	A05-NW-A	A05-NW-B	A05-NW-C	A05-NW-D
Communities	Noise impact on health and quality of life						
	Air Quality						
Wider society	Greenhouse gas impact						
	Capacity/ resilience						
	Tranquillity						
	Biodiversity						
General aviation	Access						
General aviation/ commercial airlines	Economic impact from increased effective capacity						
	Fuel burn						
Commercial airlines	Training costs						
	Other costs						
Airport/ Air navigation service provider	Infrastructure costs						
	Operational costs						
	Deployment costs						
All	Safety						
	AMS Realisation						

Table 63: Runway 05 - Northwest - IOA Summary

South/Southeast

Group	Impact	A05-SE-BASELINE	A05-SE-DO MIN	A05-SE-A	A05-SE-B	A05-SE-C	A05-SE-D	A05-SE-E	A05-SE-F	A05-SE-H
Communities	Noise impact on health and quality of life									
	Air Quality									
Wider society	Greenhouse gas impact									
	Capacity/ resilience									
	Tranquillity									
	Biodiversity									
General aviation	Access									
General aviation/ commercial airlines	Economic impact from increased effective capacity									
	Fuel burn									
Commercial airlines	Training costs									
	Other costs									
Airport/ Air navigation service provider	Infrastructure costs									
	Operational costs									
	Deployment costs									
All	Safety									
	AMS Realisation									

Table 64: Runway 05 - South/Southwest - IOA Summary

9.4. Arrivals Runway 23

Northwest

Group	Impact	A23-NW-BASELINE	A23-NW-DO MIN	A23-NW-A	A23-NW-B
Communities	Noise impact on health and quality of life				
	Air Quality				
Wider society	Greenhouse gas impact				
	Capacity/ resilience				
	Tranquillity				
	Biodiversity				
General aviation	Access				
General aviation/ commercial airlines	Economic impact from increased effective capacity				
	Fuel burn				
Commercial airlines	Training costs				
	Other costs				
Airport/ Air navigation service provider	Infrastructure costs				
	Operational costs				
	Deployment costs				
All	Safety				
	AMS Realisation				

Table 65: Runway 23 - Northwest - IOA Summary

South/Southeast

Group	Impact	A23-SE-BASELINE	A23-SE-DO MIN	A23-SE-B	A23-SE-C	A23-SE-D	A23-SE-E	A23-SE-F
Communities	Noise impact on health and quality of life							
	Air Quality							
Wider society	Greenhouse gas impact							
	Capacity/ resilience							
	Tranquillity							
	Biodiversity							
General aviation	Access							
General aviation/ commercial airlines	Economic impact from increased effective capacity							
	Fuel burn							
Commercial airlines	Training costs							
	Other costs							
Airport/ Air navigation service provider	Infrastructure costs							
	Operational costs							
	Deployment costs							
All	Safety							
	AMS Realisation							

Table 66: Runway 23 - South/Southeast - IOA Summary

9.5. Preferred Options and Next Steps

9.5.1. Due to the Methodology applied in this IOA, we have not yet conducted any detailed quantitative assessments to make a decision on preferred options at this stage. These will be carried out at Stage 3 during the Full Options Appraisal. These quantitative assessments will include but are not limited to:

- Noise modelling analysis in accordance with Category C standards as defined in CAP2091 (see 9.5.3 below);
- WebTAG Assessments;
- Overflight assessments;
- Precise track miles calculations detailing fuel burn and CO_2 emission data using the Base of Aircraft Data (BADA) model;
- Detailed Controlled Airspace (CAS) requirement assessments;
- More detailed analysis of interdependencies with other airports and the en-route network;
- Monetarised commercial airline costs;
- Monetarised airport costs;
- HRA.

9.5.2. There will be many interdependencies between various stakeholders involved in FASI(S) programme, compromises and trade-offs may be necessary, these will be guided by ACOG.

9.5.3. LSA falls into noise modelling Category C. This category is defined as having a recommended minimum population exposed to 51dBLAeq, 16h or above (day) and 45dBLAeq, 8h or above (night) of 20,000 to a maximum of 200,000. LSA have not commissioned a noise report with these parameters (this will be done during Stage 3), however LSA's Noise Action Plan (2018) indicates that, for 2016, there was a population of 2500 within the >/= 54dBLAeq, 16h (day) contour area and 300 in the >/= 48dBLAeq, 8h (night) noise contour area. LSA consider it unlikely that an additional 197,500 (51dBLAeq) and 199,700 (48dBLAeq) members of the population would be additionally impacted. Thus, even allowing for population growth, changes in factors such as fleet mix, flight paths, or traffic volumes since 2018, the airport remains within this category.

A. Feedback from Natural England

A.1. Email received 17th August 2022

A.1.1. For LSAs first Stage 2 submission, the information provided by Natural England below was used to assist in the assessment of the Tranquillity section of the IOA. For this submission, we have included a new section called Biodiversity which captures the information below and gives a more comprehensive assessment of sites. This email discussion has been retained for background information.

Request from LSA

The purpose of the meeting was to discus with you at what heights you thought aircraft may or may not cause disturbance to the many sites you listed. Towards the ends of the 'swathes' aircraft are likely to be 7000ft-10,000ft so would hopefully not be an issue. Your feedback has been incredibly useful, I was hoping to quickly run through a few of the Options to see whether we could 'grade' them in order of severity.

I appreciate you must both be very busy. If there is a more general rule where you would not be concerned with the areas listed being overflown (3000ft for example) could you please let me know? Alternatively, if you are free for a quick Teams call at some point I would greatly appreciate it.

Response from Natural England

With aircraft flying at altitudes of between 7,000 and 10,000ft at the ends of the 'swathes', those heights would likely be low risk to many of the sites we have raised in terms of bird disturbance. However, it is our understanding that flight heights in real terms and interactions between aircraft may change the proposed range of altitudes, as commercial aircraft can be forced to fly at lower altitudes particularly during poor weather and high volume of air traffic.

The altitude and lateral distance of aircraft have been shown to be important factors affecting bird disturbance. A study carried out by Ward *et al.* (1994)[1] showed an effect of aircraft altitude for staging brent geese on the Izembeck Lagoon, Alaska. It was found that large planes flying above 610m (or 2,000 ft) had little effect, causing only brief responses by relatively few birds. Fixed-wing aircraft caused the greatest flight response when passing at less than 610 m and less than 0.8 nm lateral distance to the flock. Similarly, Owens (1977)[2] found that wintering brent geese showed a greater response to fixed-wing aircraft at less than 500 m (or 1,640 feet) altitude and less than 1.5 nm lateral distance.

[1] Ward, D.H., Stehn, R.A. and Derksen, D.V. (1994) Response of staging brant to disturbance at the Izembek Lagoon, Alaska. Wildlife Society Bulletin (1973-2006), 22(2), pp.220-228.

[2] Owens, N.W. (1977) Responses of wintering brent geese to human disturbance. Wildfowl, 28(28), p.10.

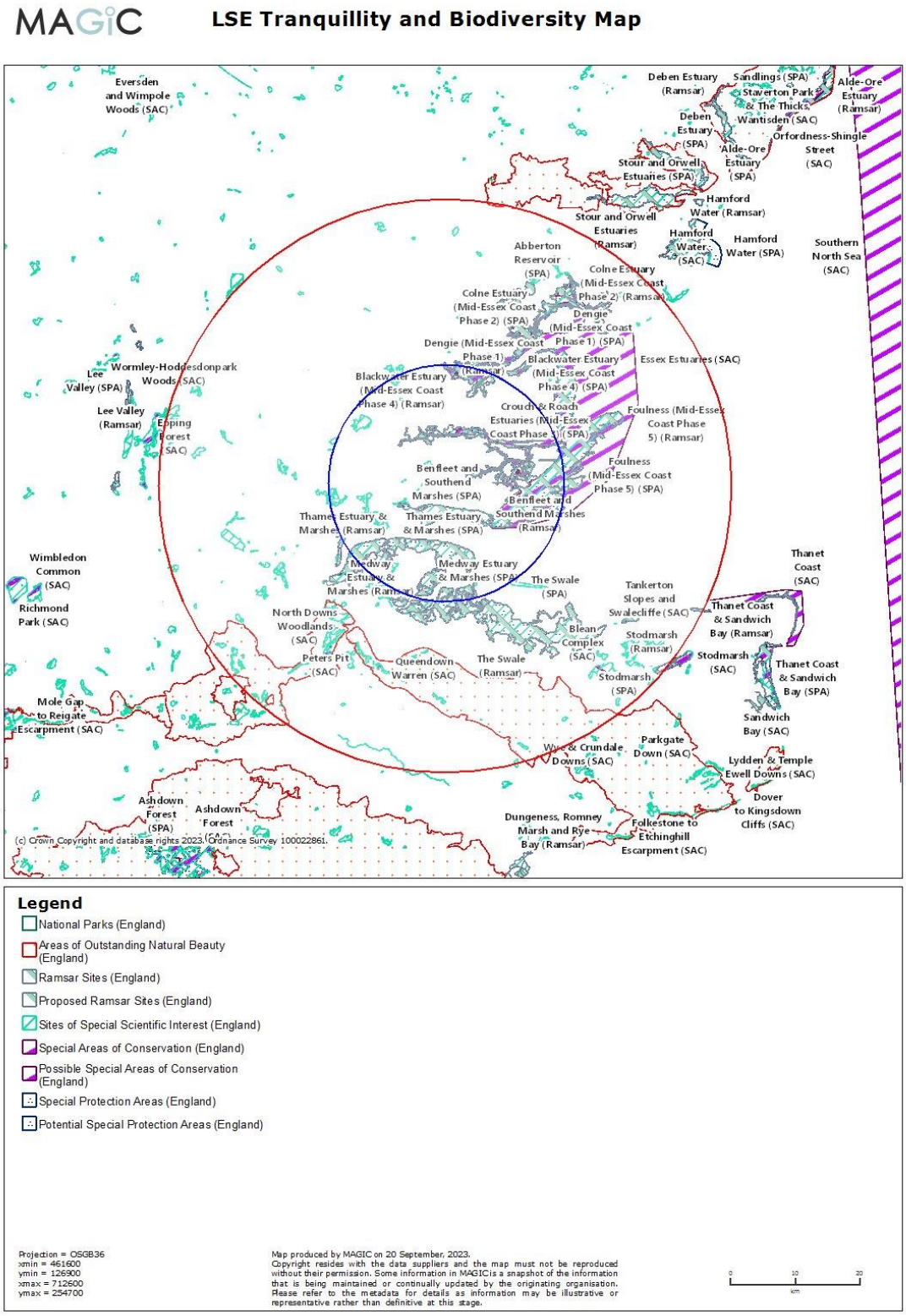
There will inevitably be a delay in understanding the full range of effects once operations are underway and aircraft movements increase and adjust in line with operational delivery demands, and therefore Natural England advises that a sufficiently precautionary approach

is taken. Flight heights that will be proposed should be embedded in a Flight Avoidance Plan and, as an additional precaution, bird disturbance monitoring should be included to check that these heights are sufficient. However, to demonstrate that likely significant effects can be ruled out as a result of the new airspace changes, the onus is on London Southend Airport to provide evidence that there is also no likely significant effects as a result of the presence of large commercial airliners.

There are also other factors to consider other than altitudes of aircraft including frequency of flights as well as fuel dumping and other pollution concerns.

B. Tranquillity and Biodiversity

B.1. London Southend Airport Tranquillity and Biodiversity Map



B.2. LSA Tranquility and Biodiversity Map notes

The blue circle is approximately 10nm (where aircraft would be assumed to be >3000ft) from LSA airport, red is 25nm (where aircraft would be >7000ft). The airport is at the center of the blue circle.

NB. National parks and potential[9] sites Ramsar/ SPAs/ and SACs are included in the legend as evidence they were investigated.

Within 25nm for tranquillity:

National Parks

There are no National Parks within a 25nm radius of LSA.

AONB

Kent Downs AONB to the south and Surrey Hills AONB are southwest of LSA, the area boundaries are marked in red and filled with red spots on the figure.

Within 10nm for biodiversity

Ramsar sites

There are a number of Ramsar sites within a 10nm radium of LSA, no identified potential sites. The existing sites are as follows:

- Crouch & Roach Estuaries;
- Blackwater Estuary;
- Foulness;
- Thames Estuary and Marshes;
- Medway Estuary and Marshes;
- Dengie Coast Phase:
- Thanet Coast and Sandwich bay.

SSSIs

There are a number of SSSIs within a 10nm radius of LSA:

- Danbury Common;
- Maldon Cutting;
- Blackwater Estuary;
- Foulness;
- Goldsands Road pit;
- The Cliff, Burnham on Crouch;

[9] Potential sites are areas that are being considered or proposed for designation due to their significant ecological value, these are included in the DEFRA database.

- Crouch & Roach Estuaries;
- Thrift Wood, Widham.
- Thanet coast and Sandwich bay.
- Hanningfield Reservoir;
- Norsey Wood;
- Mill Meadows;
- Hockley Woods;
- Thundresly great common;
- Garolds Meadow;
- Great wood and Dods Grove;
- Langdon Ridge;
- Vangue and Fobbing Marshes;
- Pitsea Marsh;
- Holehaven Creek;
- Vange and Fobbing Marshes;
- Canvey Wick;
- Mucking Flats and Marshes;
- Benfleet and Southend Marshes;
- South Thames Estuary and Marshes;
- Northward Hill;
- Dalham Farm;
- Chattenden Woods and Lodge Hill;
- Medway Estuary and Marshes;
- Tower Hill to Cockham Wood;
- Medway Estuary and Marshes;
- Thanet Coast and Sandwich bay.

SACs and potential SACs

Within 10nm radius. No identified possible SACs. One existing SAC:

- Essex Estuaries.

SPAs and potential SPAs

No potential SPAs identified. SPAs are:

- Blackwater Estuary;
- Crouch & Roach Estuaries;
- Blackwater Estuary;
- Dengie Coast Phase;
- Foulness;
- Benfleet and Southend Marshes;
- Thames Estuary and Marshes;
- Medway Estuary and Marshes.

Habitats that may require Habitats Regulations Assessment (HRA)

Habitats that may require a HRA have been identified using Priority Habitat Inventory and are mainly contained within the boundaries of SPAs, SACs, SSSIs and Ramsar sites identified above. For example coastal saltmarsh, mudflats and saline lagoons which are ecologically significant habitats supporting biodiversity. Habitats identified include coastal, grassland and marine.

Outside the identified boundaries are a small number of ancient woodland and deciduous woodland, however none of these are within the boundaries of the Forestry Commission Legal Boundary (within a 10nm of the airport). *There are some between 10-25nm.*

C. Population Density Maps

The maps show data from the Office for National Statistics (ONS) Open Geography portal (link below). Each dot represents the location of the Population Weighted Centroid (PWC) of an administrative unit. This is the traditional and most widely understood method for calculating an aggregate measure of human population density within any geographical region. A PWC is the total population by the total area (i.e. d = ΣP/ΣA).

Output Areas (December 2021) PWC (V3) | Output Areas (December 2021) PWC (V3) | Open Geography Portal (statistics.gov.uk)

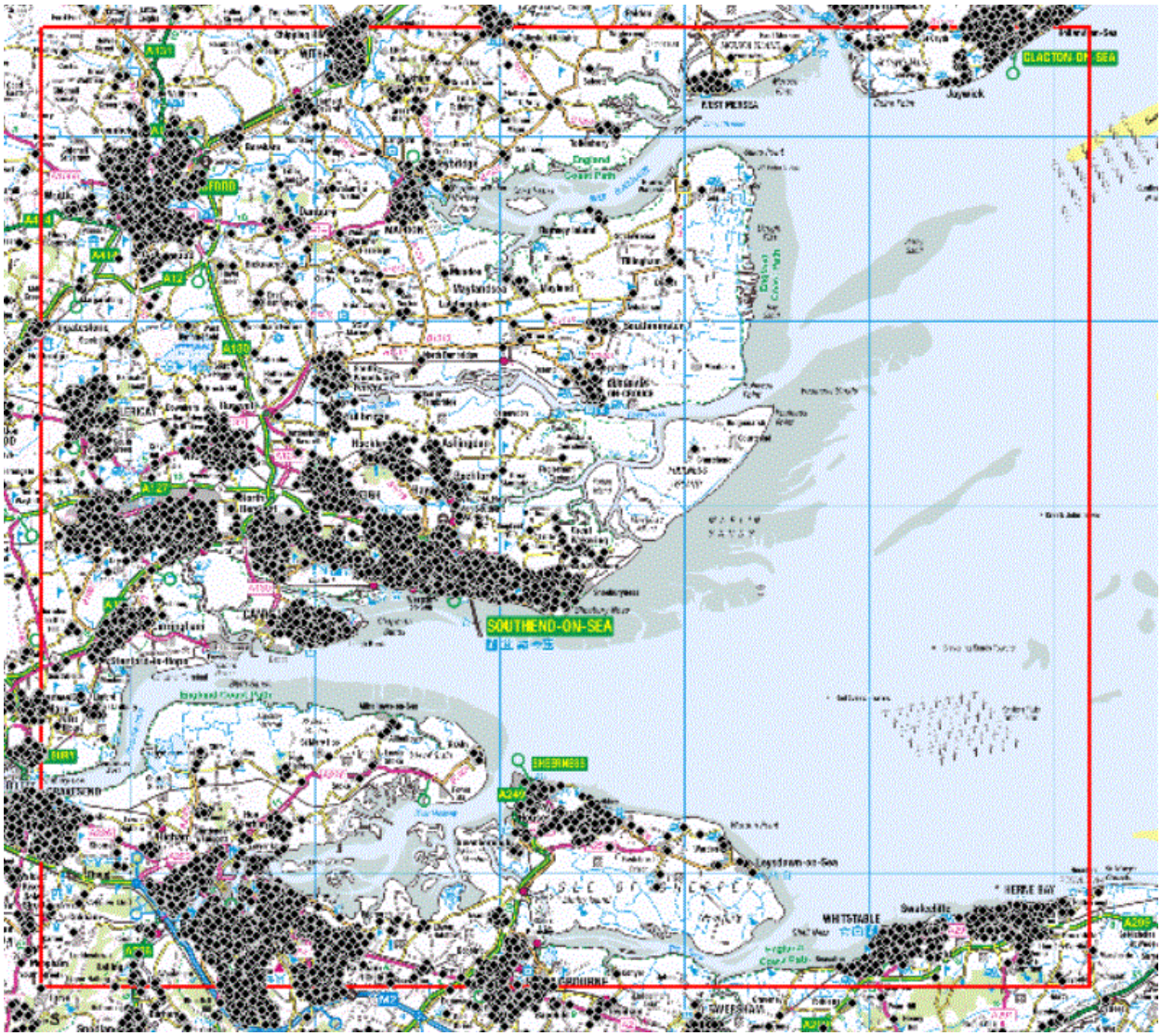


Figure 13: Population Density Map inside the Potentially Affected Area

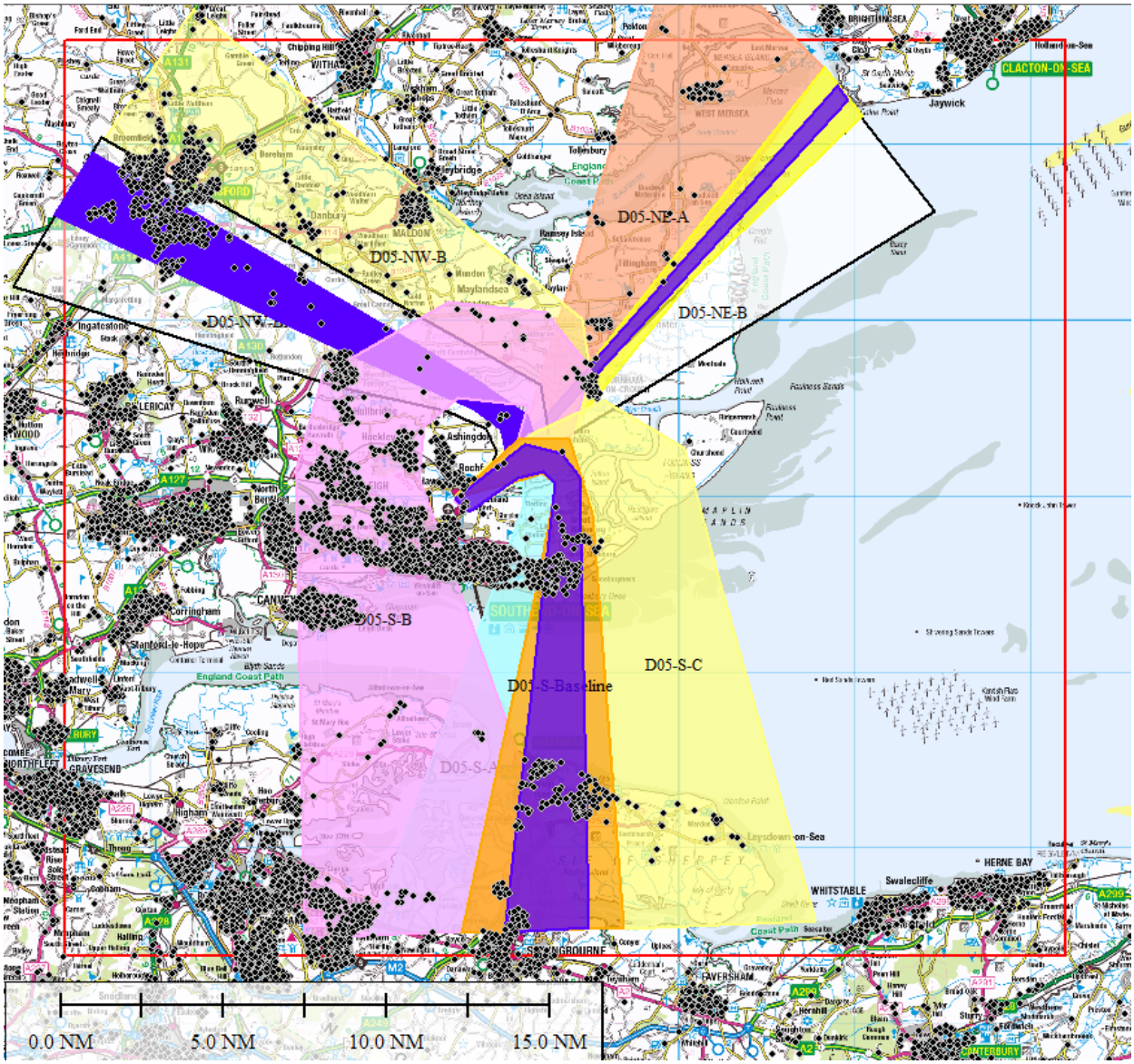


Figure 14: Population Density Map for Departures Runway 05

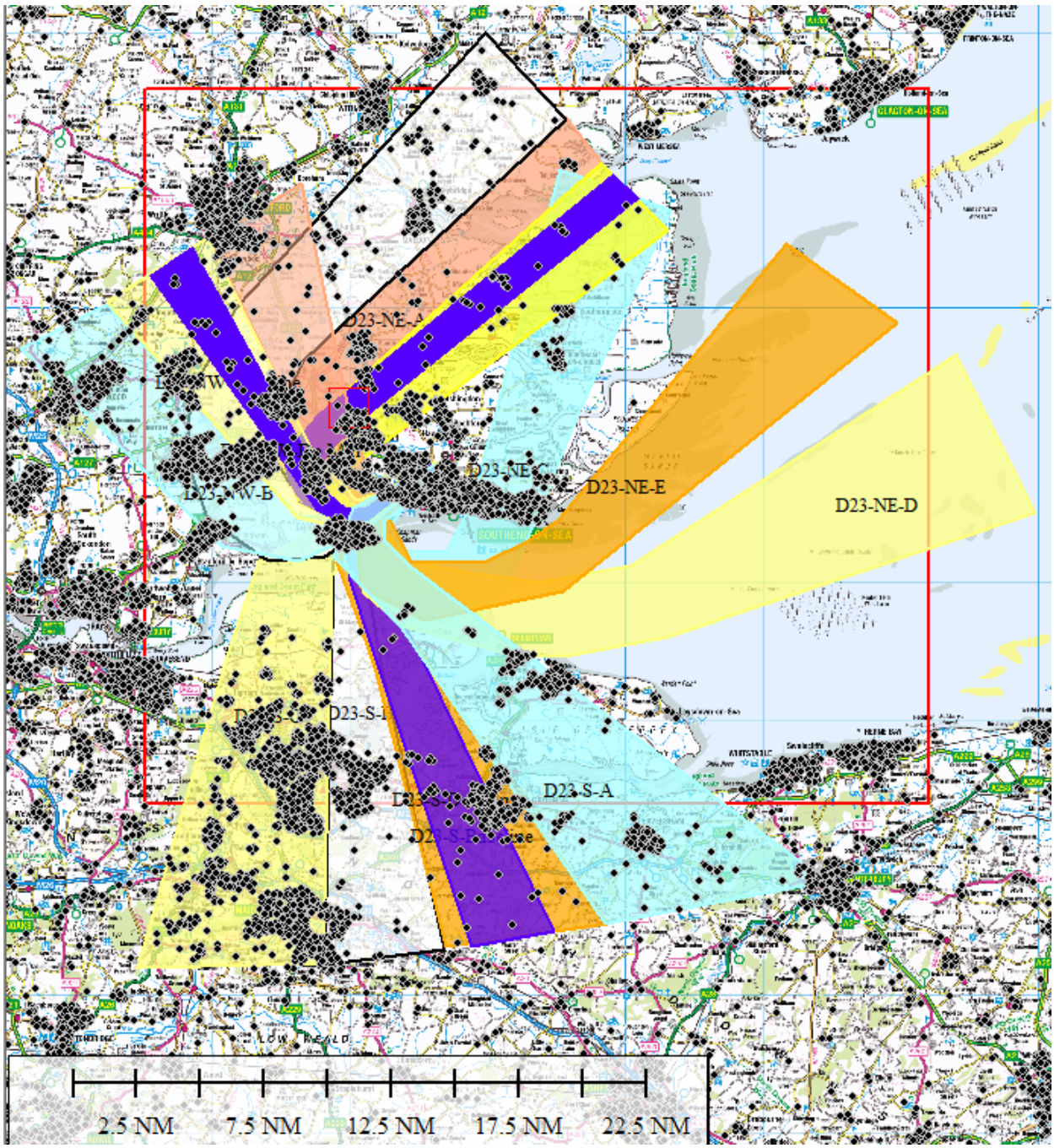


Figure 15: Population Density Map for Departures Runway 23

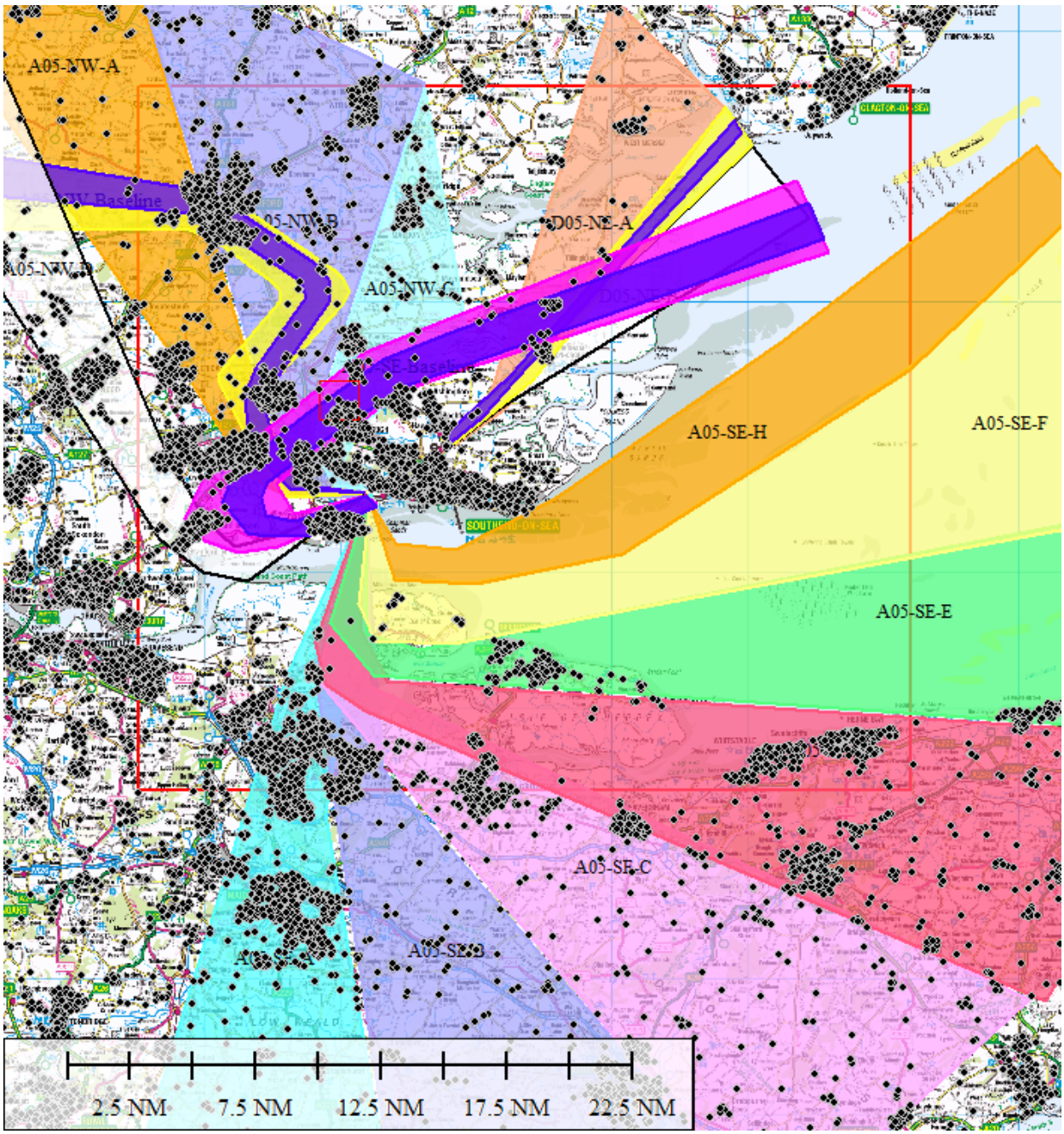


Figure 16: Population Density Map for Arrivals Runway 05

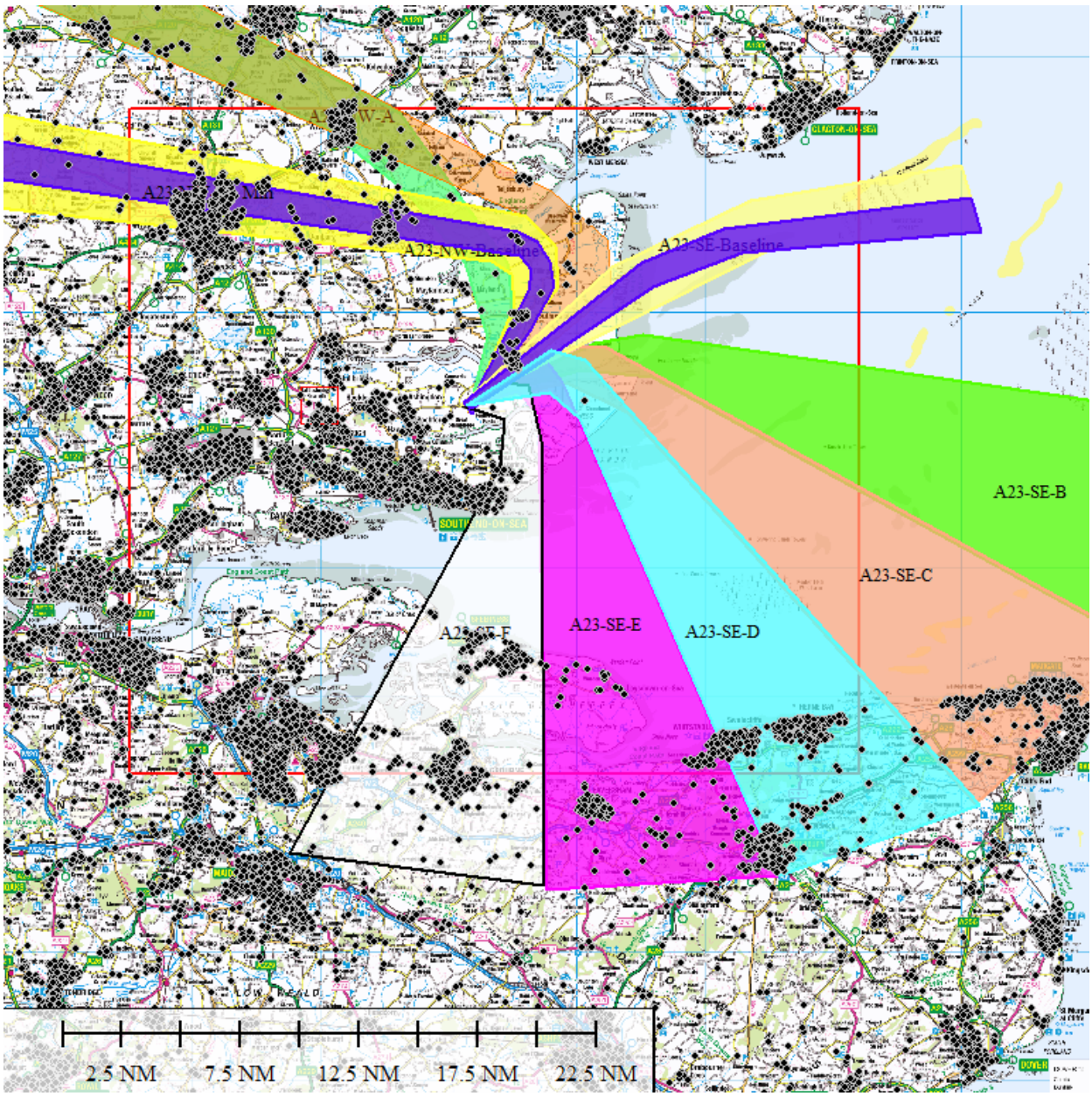


Figure 17: Population Density Map for Arrivals Runway 23

D. Planned Developments

Planned Developments[10] around London Southend Airport

Local Authority	Development Name	Development Details	Status
Braintree District Council https://www.braintree.gov.uk/planning-building-control/local-plan-2033	Land East of Great Notley, South of Braintree	Up to 1750 homes. Plus, education, and retail development	Required within Local Plan period (by 2033)
	Land East of Broad Road, Braintree	1000 homes. Plus, education, retail development	Required within Local Plan period (by 2033)
	Former Towerlands park site, Braintree	575 homes.	Required within Local Plan period (by 2033)
	Land at Feering	795 homes. Plus, education, local retail and community facilities.	Required within Local Plan period (by 2033)
	Wood End Farm, Witham	400 homes. Plus, education and NHS facilities	Required within Local Plan period (by 2033)
	North West Braintree, Panfield Lane	825 homes. Plus, education, retail development	Required within Local Plan period (by 2033)
Brentwood Council Https://www.brentwood.gov.uk/adopted-local-plan	Dunston Hills Garden Village	1650 homes (by 2033), 2350 more (beyond 2033). Plus, community, retail, health, education development	Being planned. Initial delivery before 2033.
	Land at West Horndon Industrial Estate	580 homes, 60-bed residential care home. Plus, retail, commercial	Being planned. Initial delivery 2026/27 to 2032/33.

[10] Development sites with 10 or more dwellings planned.

		and leisure provision	
	Land north of Shenfield, known as Officer's Meadow	825 homes, primary school, nursery, 60-bed residential care home	Being planned. Delivery anticipated between 2023/24 and 2030/31.
	Ford Headquarters and Council Depot	133 homes, 60-bed residential care home	Being planned. Delivery anticipated between 2023/24 and 2024/25
	Land off Nags Head Road	125 homes	Being planned. Delivery anticipated between 2022/23 and 2025/26
	Sow and Grow Nursery, Pilgrims Hatch	38 homes	To be delivered in 2022/23
	Land off Warley Hill, Warley	43 homes	To be delivered between 2022/23 and 2023/24
	Brentwood Railway Station car park	200 homes	To be delivered between 2029/30 and 2032/33
	Westbury Road Car park	45 homes	To be delivered in 2023/24
	Land at Hunter House	48 homes	Anticipated to be delivered between 2025/26 and 2026/27
	Chatham Way car park	31 homes	Anticipated to be delivered in 2026/27
	William Hunter Way Car Park	300 homes, retail use also	Anticipated to be delivered in 2026/27

	Wates Way Industrial Estate	46 homes, retail and commercial use	Anticipated to be delivered between 2022/23 and 2023/24
	Land off Doddinghurst Road, Pilgrims Hatch and Brentwood	200 homes	To be delivered between 2022/23 and 2025/26
	Land at Priests Land, Shenfield	75 homes	To be delivered between 2022/23 and 2023/24
	Land south of Ingatestone	161 homes	To be delivered between 2022/23 and 2023/24
	Land adjacent to the A12, Ingatestone	57 homes	To be delivered between 2022/23 and 2023/24
	Brizes Corner Field	23 homes	To be delivered between 2022/23 and 2023/24
	Land off Stocks Lane, Kelvedon Hatch	40 homes	To be delivered between 2022/23 and 2023/24
	Land north of Woollard Way	40 homes	To be delivered between 2022/23 and 2023/24
	Land north of Orchard Piece, Blacnmore	30 homes	To be delivered between 2022/23 and 2023/24
Chelmsford City Council https://www.chelmsford.gov.uk/media/id1jmniz/chelmsford-local-plan-may-2020-includes-a1-plans.pdf	South Woodham Ferrers	1000 homes. Plus school	Development to commence 2024/25
Canterbury District Council https://www.canterbury.gov.uk/sites/default/files/2022-10/Adopted%20Local%20Plan.pdf	St Martins Hospital, Canterbury	200 homes	No further information available

	Kingsmead Field, Canterbury	15 homes	No further information available
	Land at Bullockstone Road, Herne Bay	190 homes	No further information available
	Herne Bay Golf Driving Range and land adjacent	80 homes	No further information available
	Land at Spires, Bredlands Lane, Hersden	80 homes	No further information available
	Barham Court Farm, Church Lane, Barham	25 homes	No further information available
	Land at Baker's Lane, Chartham	20 homes	No further information available
	Land adjacent to Cranmer and Aspinall Close, Bekesbourne	14 homes	No further information available
	Land rear of 51 Rough Common Road, Rough Common	28 homes	No further information available
Swale Borough Council https://services.swale.gov.uk/media/files/localplan/adoptedlocalplanfinalwebversion.pdf	Stones Farm, Sittingbourne	550-600 homes	No further information available
	Land at Crown Quay Lane, Sittingbourne	Minimum 650 homes	No further information available
	Milton Pipes, Mill Way, Sittingbourne	240 homes	No further information available
	Plover Road, Minster, Isle of Sheppey	97 homes	No further information available
	Land west of Barton Hill Drive, Minster	Minimum 620 homes	No further information available
	Land at Belgrave Road, Halfway	140 homes	No further information available
	Land at Western Link, Faversham	Minimum 250 homes	No further information available
	Land north of Graveney Road, Faversham	90 homes	No further information available
	Iwade expansion	572 homes	No further information available

	Land north of High Street, Newington	Minimum 115 homes	No further information available
	Land east of Station Road, Teynham	Minimum 107 homes	No further information available
Gravesham District Council https://www.gravesham.gov.uk/local-plan-policy/local-plan	Clifton Slipways, Gravesend	106 homes	Planning permission expiry 04/12/23
	Site of Battle of Britain, Northfleet	20 homes	Planning permission expiry 09/12/23
	44-46 The Grove, Gravesend	12 homes	Planning permission expiry 29/04/24
	Land rear of Bridge Bar and Club, Gravesend	14 homes	Planning permission expiry 14/02/25
	24 Stone St, Gravesend	19 homes	Planning permission expiry 11/06/24
Sevenoaks District Council https://www.sevenoaks.gov.uk/info/20069129/current_local_plan	Hitcehn Hatch Land	17 homes	Allocated for development purposes until 2026
	Cramptons Road Water Works	50 homes	Allocated for development purposes until 2026
	Sevenoaks Gasholder Station	39 homes	Allocated for development purposes until 2026
	School House, Oak Lane and Hopgarden Lane	19 homes	Allocated for development purposes until 2026
	Johnsons, Oak Land and Hopgarden Lane	18 homes	Allocated for development purposes until 2026
	Greatness Mill, Mill Lane	20 homes	Allocated for development purposes until 2026
	Bevan Place, Swanley	46 homes	Allocated for development purposes until 2026

	Bus Garage/Kingdom Hall, Swanley	30 homes	Allocated for development purposes until 2026
	Land west of Cherry Avenue	50 homes	Allocated for development purposes until 2026
	57 Top Dartford Road, Hextable	14 homes	Allocated for development purposes until 2026
	Foxs Garage, Badgers Mount	15 homes	Allocated for development purposes until 2026
	Land adjacent to London Road, Westerham	30 homes	Allocated for development purposes until 2026
	Currant Hill Allotments, Westerham	20 homes	Allocated for development purposes until 2026
	Land at Croft Road, Westerham	15 homes	Allocated for development purposes until 2026
	Warren Court, Halstead	25 homes	Allocated for development purposes until 2026
	Land west of Enterprise Way, Edenbridge	276 homes	Allocated for development purposes until 2026
Maidstone Borough Council https://localplan.maidstone.gov.uk/home/adopted-local-plan	Bridge Nursery, Maidstone	140 homes	Allocated Local Plan 2017
	East of Hermitage Land, Maidstone	500 homes, education and community facilities	Allocated Local Plan 2017
	West of Hermitage Lane, Maidstone	330 homes. Allotments	Allocated Local Plan 2017
	Oakapple Lane, Barming	187 homes	Allocated Local Plan 2017
	Langley Park, Boughton Monchelsea	600 homes. Allotments, school, local retail	Allocated Local Plan 2017

	North of Sutton Road, Otham	286 homes	Allocated Local Plan 2017
	North of Bicknor Wood, Otham	190 homes	Allocated Local Plan 2017
	West of Church Road, Otham	440 homes	Allocated Local Plan 2017
	Bicknor Farm, Otham	335 homes	Allocated Local Plan 2017
	South of Sutton Road, Langley	800 homes. School	Allocated Local Plan 2017
	Springfield, Maidstone	692 homes	Allocated Local Plan 2017
	180-188 Union Street, Maidstone	30 homes	Allocated Local Plan 2017
	Medway St, Maidstone	40 homes	Allocated Local Plan 2017
	American Golf, Maidstone	60 homes	Allocated Local Plan 2017
	6 Tonbridge Road, Maidstone	15 homes	Allocated Local Plan 2017
	Slencrest House, Maidstone	10 homes	Allocated Local Plan 2017
	Laguna, Maidstone	76 homes	Allocated Local Plan 2017
	Wren's Cross, Maidstone	60 homes	Allocated Local Plan 2017
	Barty Farm, Thurnham	122 homes	Allocated Local Plan 2017
	North Street, Barming	35 homes	Allocated Local Plan 2017
	Postley Road, Tovil	62 homes	Allocated Local Plan 2017
	Bridge Industrial Centre, Tovil	15 homes	Allocated Local Plan 2017
	Tovil Working Men's Club, Tovil	20 homes	Allocated Local Plan 2017

	Kent Police HQ, Maidstone	112 homes	Allocated Local Plan 2017
	Kent Police training school, Maidstone	90 homes	Allocated Local Plan 2017
	West of Eclipse, Maidstone	50 homes	Allocated Local Plan 2017
	Bearsted Station goods yard, Bearsted	20 homes	Allocated Local Plan 2017
	Cross Keys, Bearsted	50 homes	Allocated Local Plan 2017
	South of Ashford Road, Harrietsham	113 homes	Allocated Local Plan 2017
	Mayfield Nursery, Harrietsham	49 homes	Allocated Local Plan 2017
	Church Road, Harrietsham	80 homes	Allocated Local Plan 2017
	Ulcombe Road and Mill Bank, Headcorn	220 homes	Allocated Local Plan 2017
	Grigg Lane and Lenham Road, Headcorn	86 homes	Allocated Local Plan 2017
	South of Grigg Lane, Headcorn	55 homes	Allocated Local Plan 2017
	North of Lenham Road, Headcorn	48 homes	Allocated Local Plan 2017
	Tanyard Farm, Lenham	145 homes	Allocated Local Plan 2017
	Glebe gardens, Lenham	10 homes	Allocated Local Plan 2017
	Howland Road, Marden	44 homes	Allocated Local Plan 2017
	Stanley Farm, Marden	85 homes	Allocated Local Plan 2017
	The Parsonage, Marden	144 homes	Allocated Local Plan 2017
	Marden Cricket and Hockey Club, Marden	124 homes	Allocated Local Plan 2017

	South of the Parsonage, Marden	50 homes	Allocated Local Plan 2017
	Hen and Duckhurst Farm, Staplehurst	250 homes	Allocated Local Plan 2017
	Fishers Farm, Staplehurst	400 homes	Allocated Local Plan 2017
	North of Henhurst Farm, Staplehurst	60 homes	Allocated Local Plan 2017
	Hubbards Lane and Haste Hill Road, Loose	20 homes	Allocated Local Plan 2017
	Jn Church St and Heath Rd, Boughton Monchelsea	40 homes	Allocated Local Plan 2017
	Lyewood Farm, Boughton Monchelsea	25 homes	Allocated Local Plan 2017
	Linden Farm. Coxheath	74 homes	Allocated Local Plan 2017
	Heathfield, Coxheath	110 homes	Allocated Local Plan 2017
	Forstal Lane, Coxheath	195 homes	Allocated Local Plan 2017
	North of Heath Rd, Coxheath	55 homes	Allocated Local Plan 2017
	Clockhouse Farm, Coxheath	72 homes. Care home	Allocated Local Plan 2017
	East of Eyhorne St, Hollingbourne	10 homes	Allocated Local Plan 2017
	Adjacent to The Windmill PH, Hollingbourne	15 homes	Allocated Local Plan 2017
	Brandy's Bay, Sutton Valence	40 homes	Allocated Local Plan 2017
	Vicarage Rd, Yalding	65 homes	Allocated Local Plan 2017
	Bentletts Yard, Laddingford	10 homes	Allocated Local Plan 2017

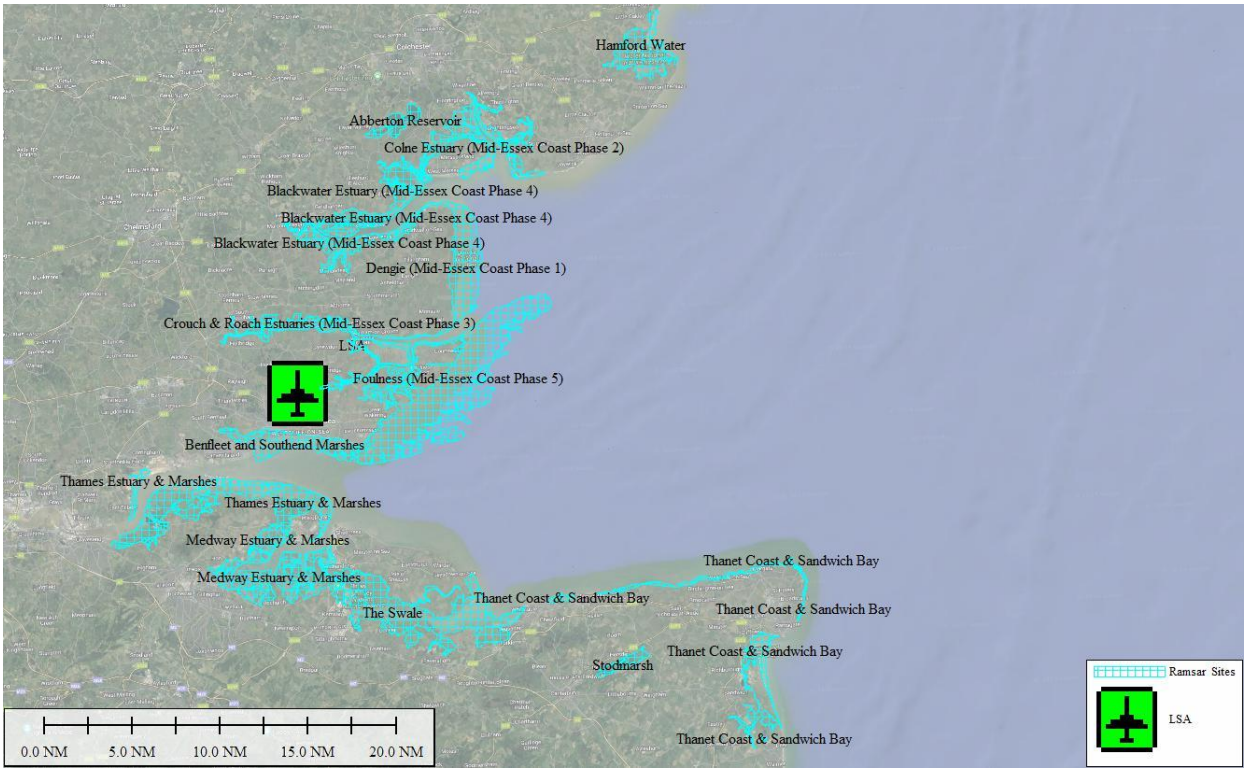
	Maidstone Town Centre	940 homes	Allocated Local Plan 2017
	Invicta Park Barracks, Maidstone	1300 homes	Allocated Local Plan 2017
	Lenham	1000 homes	Allocated Local Plan 2017
Tonbridge and Malling Borough Council https://www.tmbc.gov.uk/local-plan	Jubilee Way, West Malling	210 homes	Completion by 2027/28
	Gibson Dr, West Malling	140 homes	Completion by 2026/27
	Between 1 Tower View and 35 Kings Hill Avenue,	75 homes	Completion by 2023/24
	Between 23 Kings Hill Ave and 8 Abbey Wood Rd, West Malling	70 homes	Completion by 2023/24
	Former Peters Pit and Peters Works, Rochester	173 homes	Completion by 2026/27
	1F Peters Pit and Peters Works, Rochester	142 homes	Completion by 2024/25
	Worrall Dr, Rochester	120 homes	Completion by 2022/23
	Land south of London Rd and east of Hermitage Lane, Aylesford	840 homes	Completion by 2035/36
	Between Bradbourne Lane and Kiln Barn Rd, Aylesford	300 homes	Completion by 2030/31
	West of Winterfield Lane, West Malling	250 homes	Completion by 2028/29
	Oakhill House, Tonbridge	165 homes	Completion by 2027/28
	Land SW of London Rd, Allington, Maidstone	106 homes	Completion by 2026/27
	E of Clare Park Estate, West Malling	110 homes	Completion by 2023/24
	Pickfords, Aylesford	79 homes	Completion by 2026/27
	S part of West Kent College, Tonbridge	51 homes	Completion by 2023/24

	E of King Hill, West Malling	86 homes	Completion by 2023/24
	Wharf House, Tonbridge	38 homes	Completion by 2024/25
	St Georges Court, Wrotham, Sevenoaks	38 homes	Completion by 2024/25
	1-4 River Walk, Tonbridge	36 homes	Completion by 2024/25
	Tonbridge Chambers, Tonbridge	24 homes	Completion by 2023/24
	W of Hermitage Ln, Quarry Wood Industrial Estate, Aylesford	40 homes	Completion by 2023/24
	1 High St, Tonbridge	12 homes	Completion by 2024/25
Dartford Borough Council https://www.dartford.gov.uk/policy-1/adopted-local-plans	Dartford Town Centre	Up to 1030 homes. Health and social care facility, adult social services hub, GP surgery	Allocated up to 2026
	Northern Gateway	Up to 2040 homes. Primary school, GP surgery	Allocated up to 2026
	Ebbsfleet Valley	Up to 5250 homes + further provision post 2026. Secondary school, up to 4 primary schools, GP surgeries	Allocated up to 2026
	Thames Waterfront	Up to 3750 homes + further provision post 2026. 2 primary schools, GP surgery	Allocated up to 2026
Thanet District Council https://www.thanet.gov.uk/wp-content/uploads/2018/03/LP-adjusted.pdf	Manston Green	Up to 785 homes	Allocated up to 2031
	Birchington	Up to 1600 homes	Allocated up to 2031

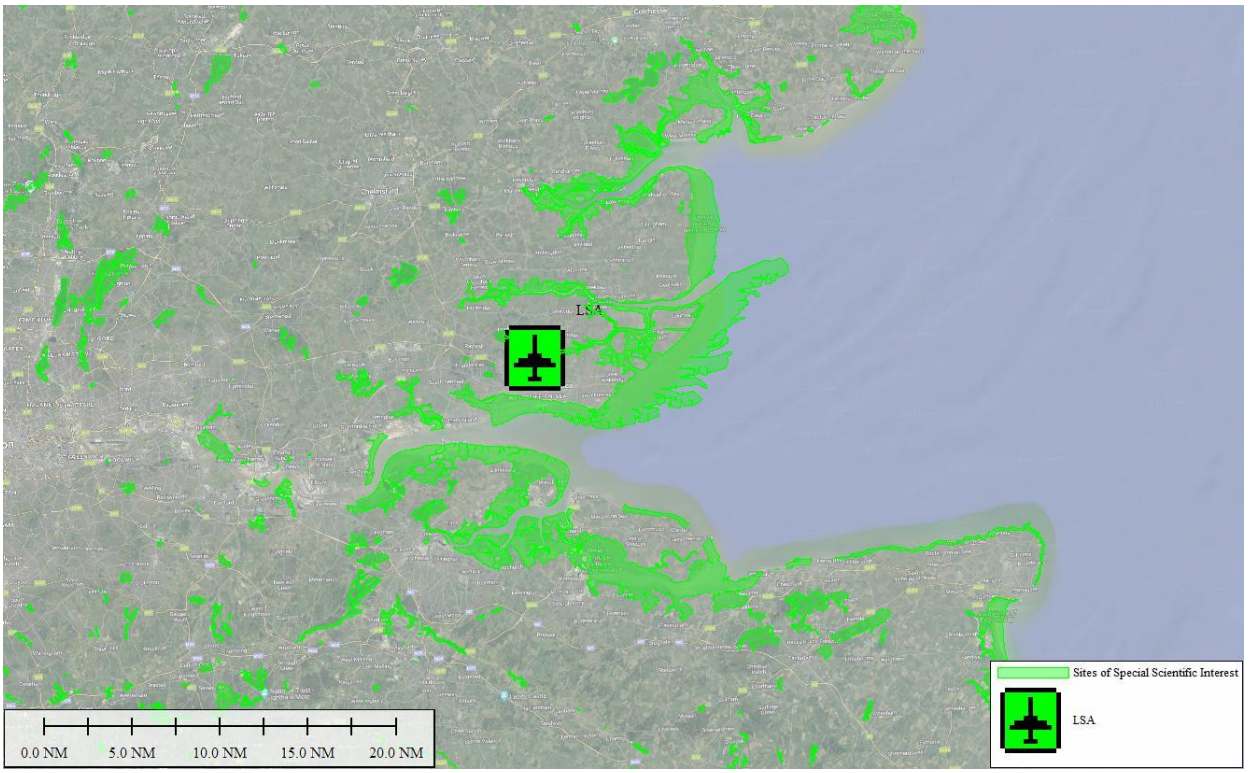
	Westgate-on-Sea	Up to 2000 homes	Allocated up to 2031
	Westwood	Up to 1450 homes	Allocated up to 2031
	Land fronting Nash and Haine Rds	Up to 1020 homes	Allocated up to 2031
	Land at Manston Court/Haine Rd	Up to 1400 homes	Allocated up to 2031
	Land north and south of Shottendane Rd	Up to 550 homes	Allocated up to 2031
Maldon District Council https://www.maldon.gov.uk/downloads/file/19424/local_development_scheme_-_july_2023			Unable to obtain up-to-date planned development information
Rochford Council https://www.rochford.gov.uk/LDS2325			New Local Plan in preparation
Southend City Council https://www.southend.gov.uk/saved-planning-policies/southend-sea-borough-local-plan			New Local Plan in preparation
Medway Council https://www.medway.gov.uk/info/200149/planning_policy/146/current_planning_policies/3			New Local Plan in preparation
Basildon Council https://www.basildon.gov.uk/article/701/Adopted-Local-Plan			2007 Local Plan online. New Local Plan out for consultation
Castle Point Borough Council https://www.castlepoint.gov.uk/adopted-local-plan/			New Local Plan out for consultation

E. European Sites

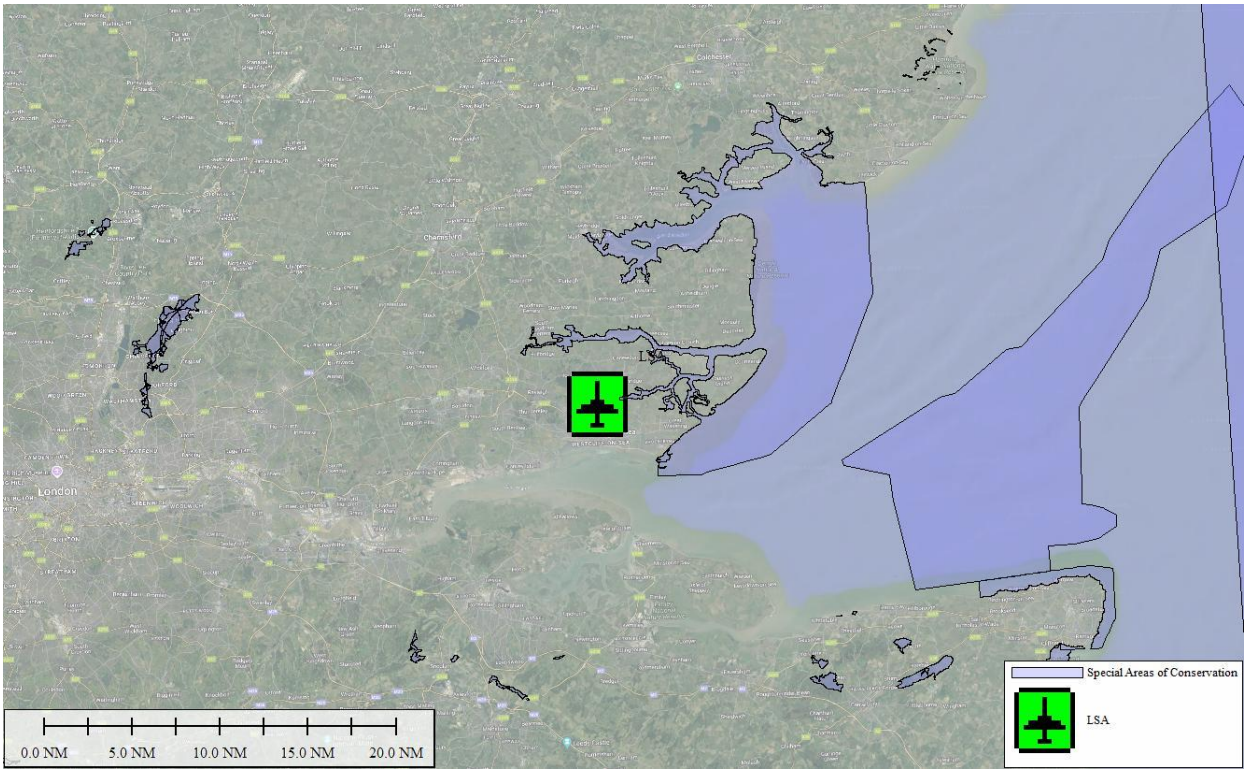
E.1. Ramsar Sites



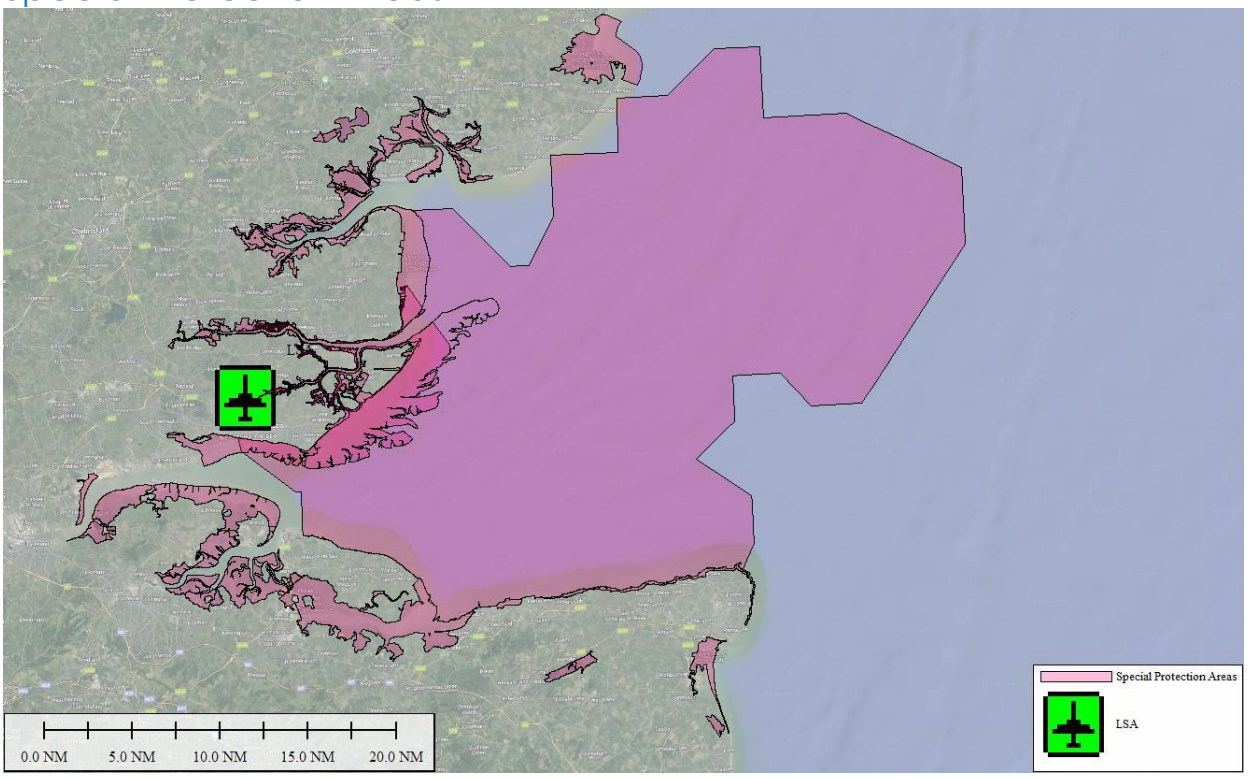
E.2. Sites of Special Scientific Interest



E.3. Special Areas of Conservation



E.4. Special Protection Areas



F. Air Quality Management Areas

F.1. AQMAs are locations designated by local authorities where air pollution levels exceed national air quality objectives, typically for pollutants such as nitrogen dioxide (NO_2) or particulate matter (PM_{10} and $PM_{2.5}$). These objectives are set to protect human health and the environment. AQMAs are part of the UK's strategy to manage and improve air quality, targeting specific areas where pollution poses a significant risk to health and the Environment.

F.2. The main AQMAs near to LSA are:

1. AQMA Area Southend on Sea Borough Council No 1 Order 2016
2. AQMA2 Victoria Avenue
3. Rayleigh AQMA

F.3. For more information about each AQMA visit:

1. AQMA Details - Defra, UK
2. AQMA Details - Defra, UK
3. AQMA Details - Defra, UK

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