Airspace Change Proposal
Stage 2B

Initial Options Appraisal

London Southend Airport FASI(S)

ACP-2018-90

03 November 2023

CPJ-5641-RPT-035 V1.1

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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 blue text and the sections with changes 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

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.

Workshops were held on the 08 April 2022, which introduced the list of options to stakeholders and our assessment of options against the Design Principles they helped develop. Stakeholders were asked to provide feedback which was incorporated into the Design Principle Evaluation document which can also be found on the Airspace Change Portal and forms the second 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 FASI(S) 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	
ATC	Air Traffic Control	
ATCO	Air Traffic Control Officer	
CAA	Civil Aviation Authority	
CAS	Controlled Airspace	
CCO	Continuous Climb Operations	
CDA	Continuous Descent Arrival	
DA	Danger Area	
DFT	Department for Transport	
FAS	Future Airspace Strategy	
FASI-S	Future Airspace Implementation South	
FASI-N	Future Airspace Implementation North	
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	
NAP	Noise Abatement Procedure	

Abbreviation	Term	Description
NERL	NATS En-Route Limited	
NM	Nautical Mile	
NTK	Noise and Track Keeping	Taken over a three-month period in 2019- pre pandemic.
PBN	Performance-Based Navigation	
RAMSAR		Wetlands of international importance designated under the Ramsar Convention.
RNAV	Area Navigation	
RSPB	Royal Society of the Protection of Birds	
RW	Runway	
SID	Standard Instrument Departures	
SPA	Special Protection Area	
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.

1.1.2. Step 2B requires the change sponsor to conduct an Initial Options Appraisal on the options described in Step 2A. This Initial Options Appraisal is contained within this report.

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

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

1.1.4. The report begins by providing an outline of relevant 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 Initial Options Appraisal for each option.

1.2. Background

1.2.1. The Civil Aviation Authority (CAA) published its Airspace Modernisation Strategy (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 United Kingdom (UK) Airspace up to 2040, including modernisation.

1.2.2. The AMS, which replaced the Future Airspace Strategy (FAS), sets out the ways, the means and ends of modernising airspace through 15 initiatives intended to modernise the Design, Technology and Operations of airspace. Amongst other initiatives, this includes a fundamental redesign of the terminal route network using precise and flexible satellite navigation.

1.2.3. It describes what the AMS must deliver, drawn from relevant national and international policy and law. Paragraphs 1.2 – 1.4 set out factors that airspace modernisation must deliver, drawn from Section 70 of the Transport Act 2000 and relevant policy as:

- To increase aviation capacity in the South-East.
- Growth to be sustainable; and
- To make the best use of existing runways.

1.2.4. The UK's Airspace, particularly that of Southern England, was originally designed decades ago; it has evolved over time to manage the increasing volumes of climbing and descending aircraft travelling to and from the various airports all within close proximity. This complex

evolution has resulted in an environmentally inefficient and overly complicated design, that places a burden on Air Traffic Controllers (ATC) and limits airspace capacity. Prior to the worldwide pandemic, flights in southern England were forecast to double over the next 20 years. Whilst COVID-19 has undoubtedly had a significant impact upon the aviation and travel industries, if the airspace is not modernised, the benefits of reduced carbon emissions and noise reduction may not be realised.

1.2.5. The Airspace Change Organising Group (ACOG) was established in 2019, as a fully independent organisation at the request of the DFT and CAA, to coordinate the delivery of key aspects of the AMS.

1.2.6. ACOG's role is to coordinate the delivery of two major national airspace change programmes known as Future Airspace Implementation South (FASI-S) and Future Airspace Implementation North (FASI-N). FASI-S is a complete redesign of the existing airspace structure in southern England and LSA is one of 18 airports included within this programme.

1.2.7. ACOG in collaboration with NATS En-Route Ltd (NERL) and each of the Airports, must deliver a Masterplan that provides detailed information on the Airspace Design options. The Masterplan must consider potential areas of overlap between individual Airspace Change Proposals (ACPs), the compromises and trade-offs that may need to be made to integrate them effectively.

1.2.8. LSA and the other airports must ensure that their modernisation proposals are aligned with neighbouring airports and connect efficiently with the Upper Airspace. The FASI(S) airports are responsible for modernising or upgrading their individual arrival and departure routes up to 7,000ft. NERL are responsible for redesigning the route network above 7,000ft. Therefore, it is possible that despite the new LSA Standard Instrument Departures (SIDs) and the Instrument Approach Procedures (IAPs) not having been implemented yet, alterations may be required to comply with the Overarching Airspace Plan for the region. These dependencies will begin to become clearer as we progress through Stage 2 and work within the Cumulative Analysis Framework (CAF), facilitated by ACOG.

1.2.9. For more information, including a brief video, on the importance of modernising UK airspace, see https://www.ourfutureskies.uk/why-modernise/.

1.3. Performance-Based Navigation (PBN)

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 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 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) SIDs and IAPs. In addition, the 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.

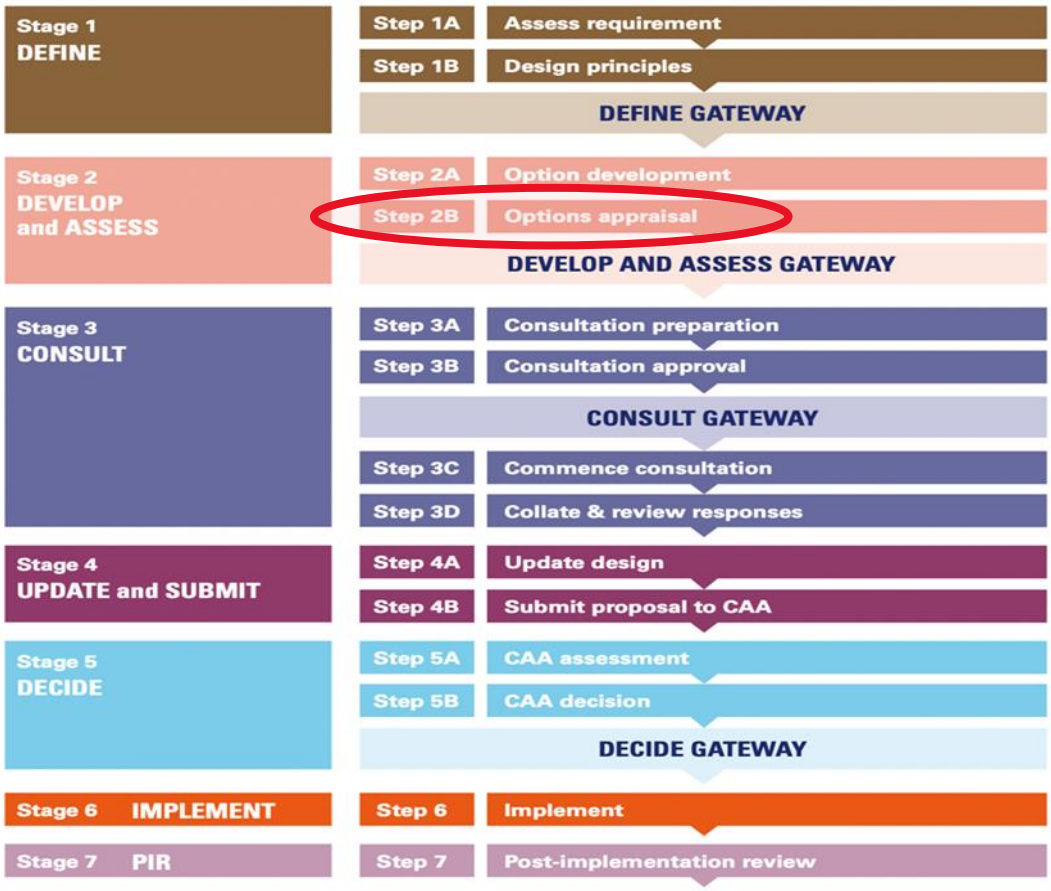


Figure 1: The CAP 1616 Process

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. LSA's 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 Initial Options Appraisal (IOA) on the options developed during Stage 2A. This document contains the IOA for the individual options assessed in Stage 2A.

1.9. Stakeholder Updates

1.9.1. An online update session was held on the 29 November 2022 to inform stakeholders of the progress of this ACP. A presentation was given, which can be found on the Airspace Change Portal. The content of this update session included:

- Overview of FASI(S) ACP and update on ACP progress.
- Stage 2A.
- Stage 2B.
- Gateway and Timeline.
- Next steps.
- Opportunity for Questions.

1.9.2. Further information on stakeholder engagement can be found in Section 3 of the document titled 'Options Development and Design Principle Evaluation' which is available on the ACP Portal.

2. Options for Assessment

This section describes the departure and arrivals for both runways. Each section begins with a detailed description of the baseline for each direction, or suite of options. This is followed by a list of options, including the baseline.

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

2.2. Departures runway 05 – Northeast

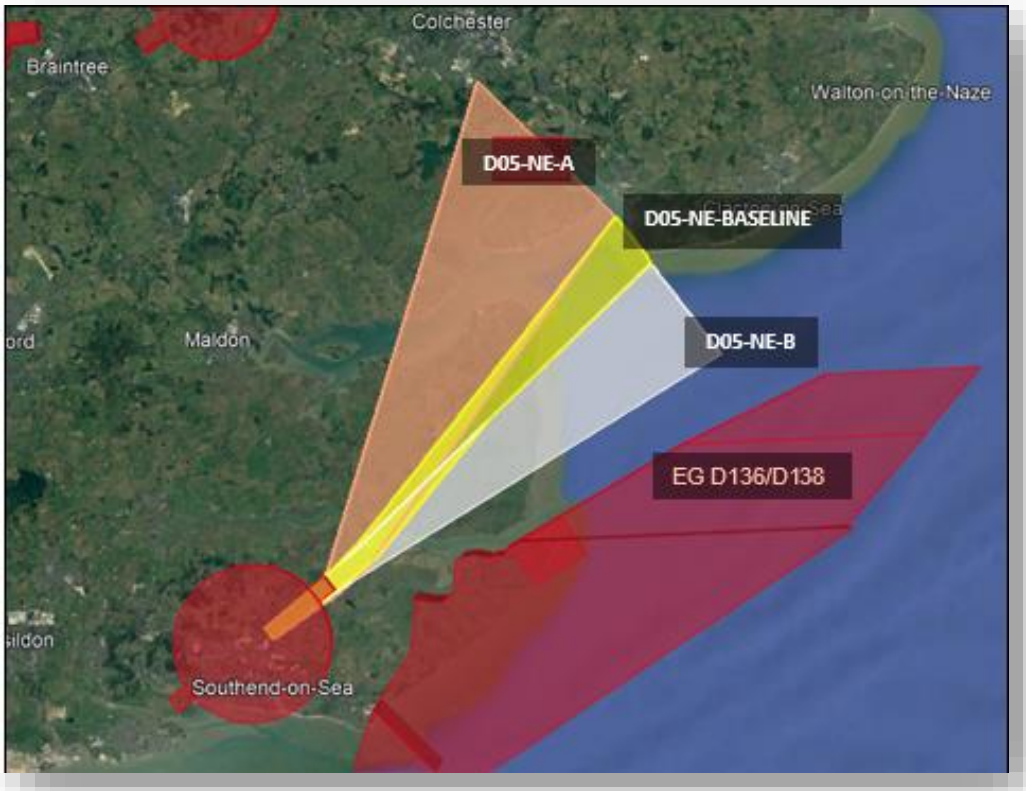


Figure 2: Departures Runway 05 - Northeast

Baseline

Departures to the Northeast off Runway 05 typically route straight ahead with a slight deviation to the left of track. Our baseline is defined as option D05-NE-BASELINE. This has been established from NTK data, current procedures, and operational expertise. (For more information on the baselines please see the document titled 'ACP Options Development and Design Principle Evaluation' which is available on the ACP Portal).

Options

- D05-NE-BASELINE.
- D05-NE-A.
- D05-NE-B.

2.3. Departure Runway 05 – Northwest

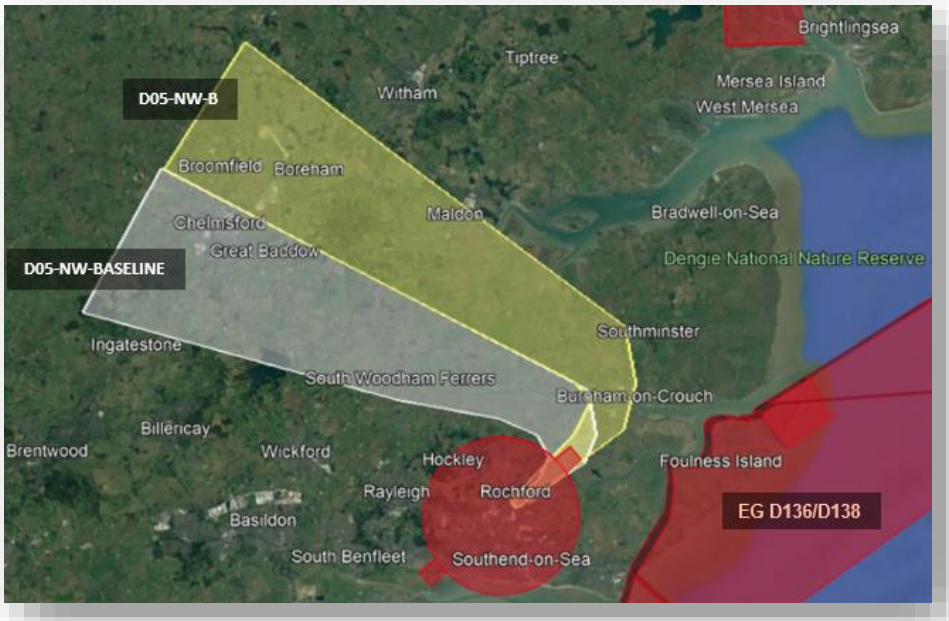


Figure 3: Departures Runway 05 - Northwest

Baseline

Departures to the Northwest off Runway 05, turn after adherence to the Noise Abatement Procedures (NAPs) directly to the Northwest, these tracks disperse quite broadly once North-abeam the Airport. Our baseline is defined as option D05-NW-BASELINE. This has been established from the NTK data, current procedures, and operational expertise. Originally this option was defined as D05-NW-A and has now been renamed to more clearly define our baseline option. (For more information on the baselines please see the document titled 'ACP Options Development and Design Principle Evaluation' which is available on the ACP Portal).

Options

- D05-NW-BASELINE.
- D05-NW-B.

2.4. Departure Runway 05 – South/Southeast

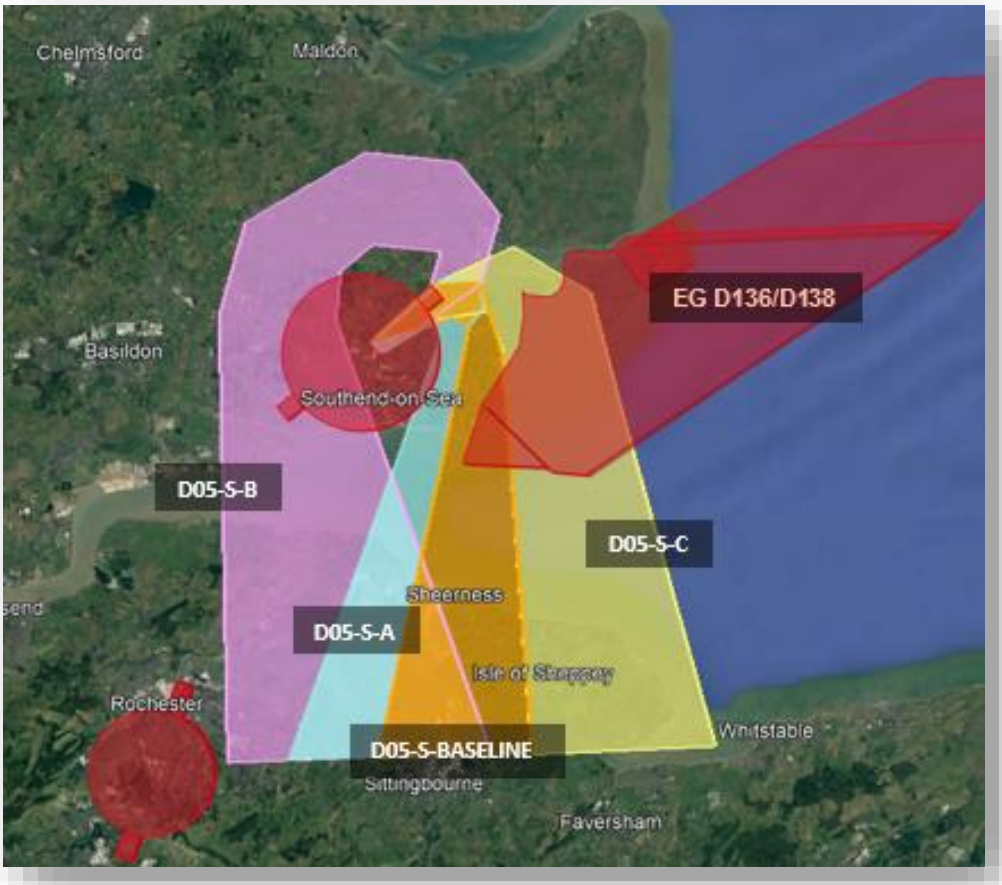


Figure 4: Departures Runway 05 - South/Southeast

Baseline

The Departures to the South off Runway 05 turn once they have adhered to the NAPs and route directly to the South. Our baseline is defined as option D05-S-BASELINE. This has been established from the NTK data, current procedures, and operational expertise. (For more information on the baselines please see the document titled 'ACP Options Development and Design Principle Evaluation' which is available on the ACP Portal).

Options

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

2.5. Departures Runway 23- Northeast

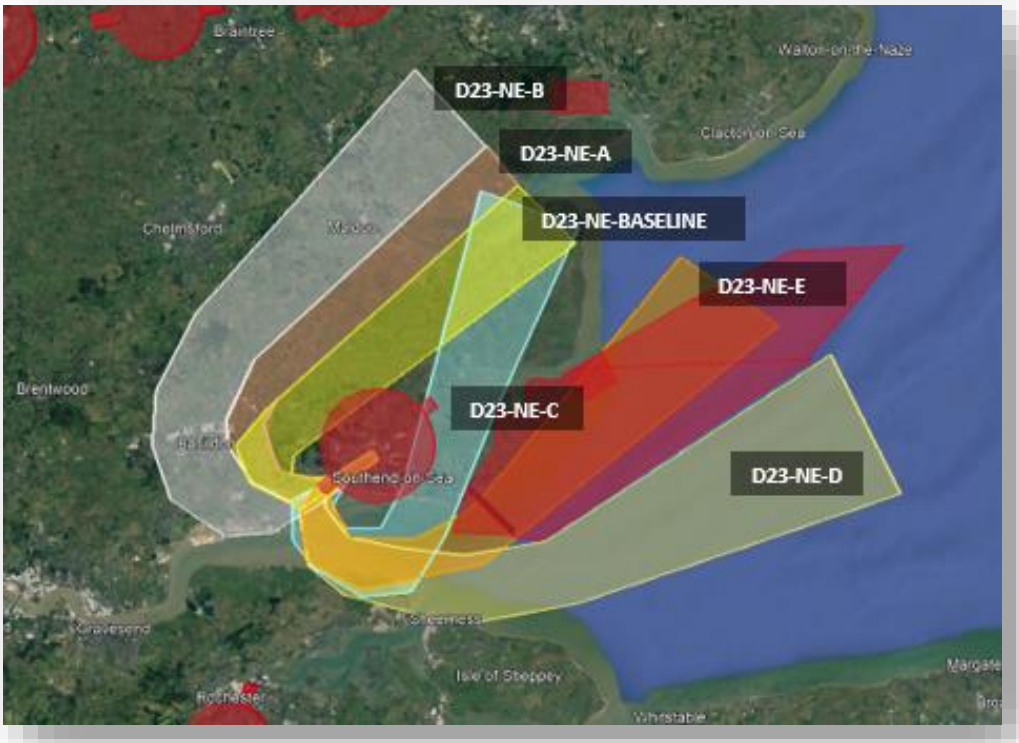


Figure 5: Departures Runway 23 - Northeast

Baseline

Departures bound for the Northeast off Runway 23 turn to comply with the NAPs and remain in a tight and direct Northeasterly swathe. Our baseline is defined as option D23-NE-BASELINE. This has been established from the NTK data, current procedures, and operational expertise. (For more information on the baselines please see the document titled 'ACP Options Development and Design Principle Evaluation' which is available on the ACP Portal).

Options

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

2.6. Departures Runway 23 – Northwest

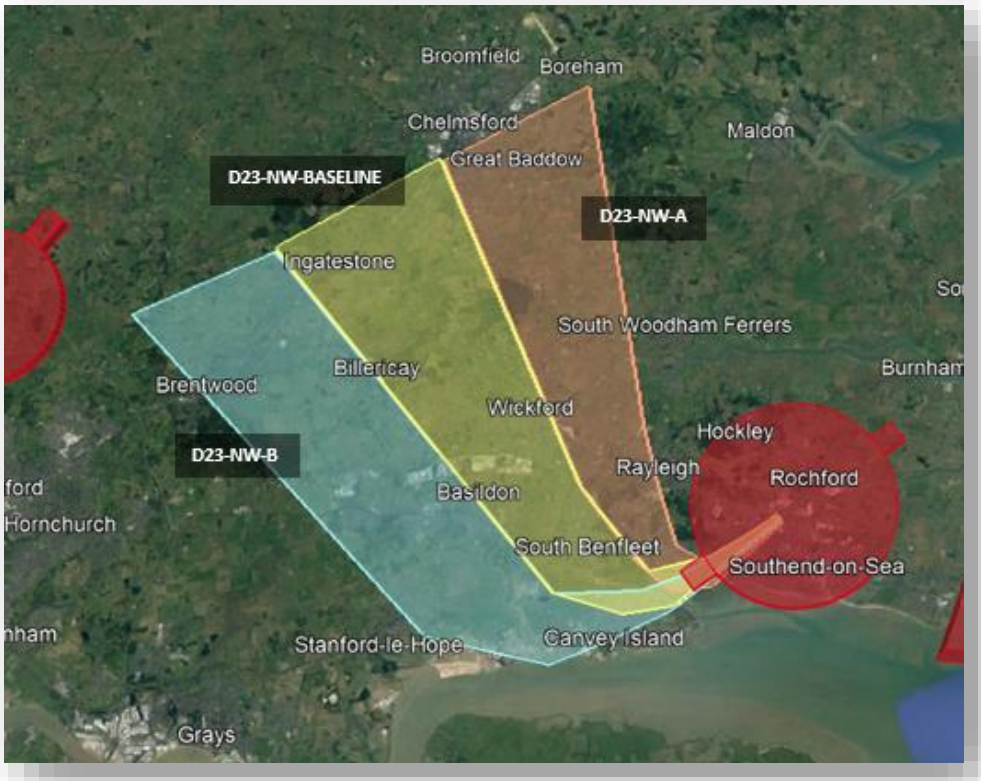


Figure 6: Departures Runway 23 - Northwest

Baseline

Departures to the Northwest off Runway 23 turn to comply with the NAPs and do not fan out broadly until aircraft are 15-20NMs Northwest of LSA. Our baseline is defined as option D23-NW-BASELINE. This has been established from the NTK data, current procedures, and operational expertise. Originally this option was defined as D23-NW-C and has now been renamed to more clearly define our baseline option. (For more information on the baselines please see the document titled 'ACP Options Development and Design Principle Evaluation' which is available on the ACP Portal).

Options

- D23-NW-BASELINE.
- D23-NW-A.
- D23-NW-B.

2.7. Departures Runway 23 – South/Southeast

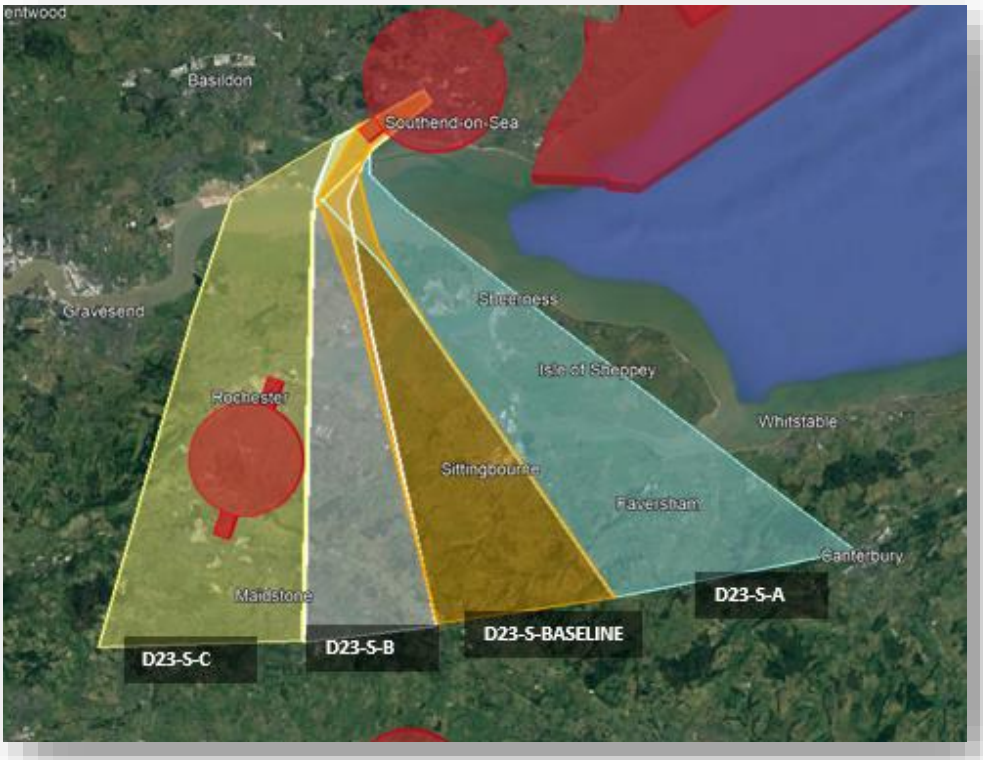


Figure 7: Departures Runway 23 - South/Southeast

Baseline

Departures to the South off Runway 23 turn South upon adherence to the NAPs and start to fan out approximately 10-15nms from take-off. Options have been assessed against these nominal tracks. Our baseline is defined as option D23-S-BASELINE. This has been established from the NTK data, current procedures, and operational expertise. (For more information on the baselines please see the document titled 'ACP Options Development and Design Principle Evaluation' which is available on the ACP Portal).

Options

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

2.8. Arrivals Runway 05 – Northwest

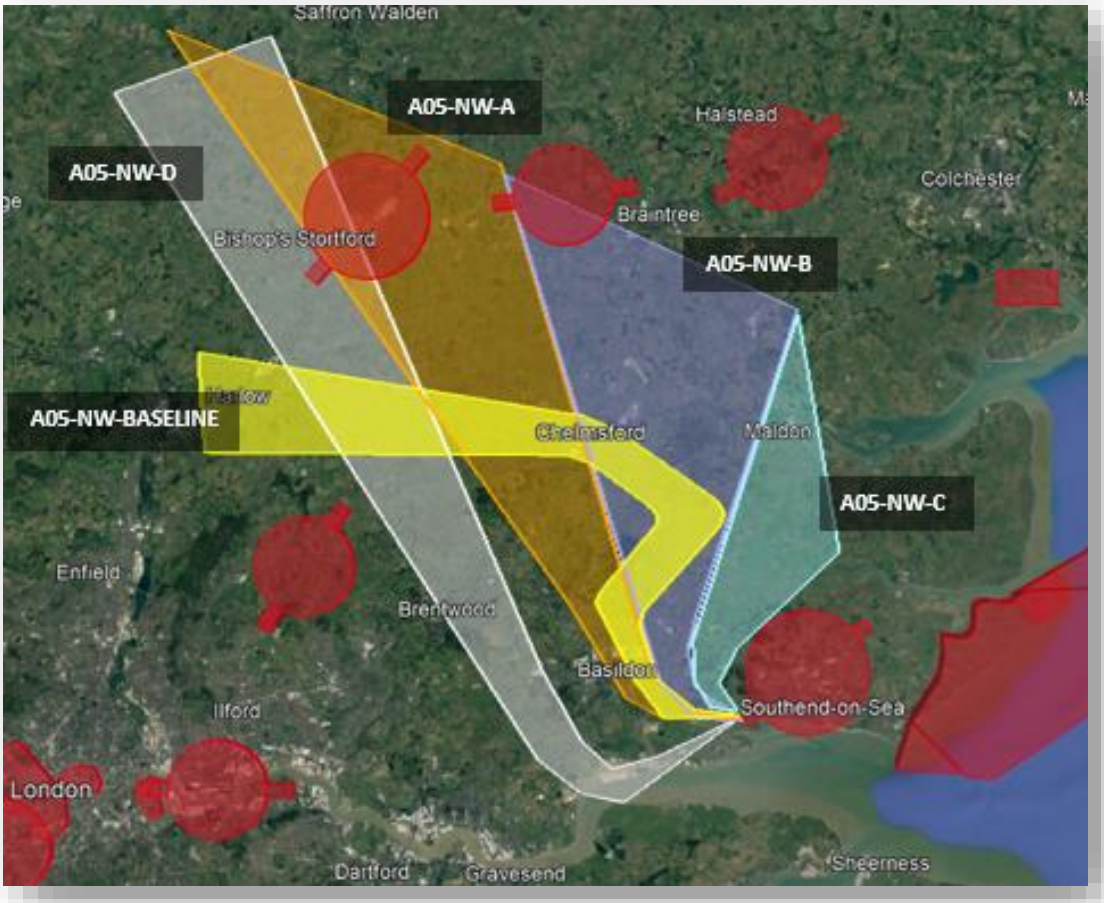


Figure 8: Arrivals Runway 05 - Northwest

Baseline

Aircraft generally follow the existing STAR initially then turn early to the south to join the final approach. Our baseline is defined as option A05-NW-BASELINE. This has been established from the NTK data, current procedures, and operational expertise. (For more information on the baselines please see the document titled 'ACP Options Development and Design Principle Evaluation' which is available on the ACP Portal).

Options

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

2.9. Arrivals Runway 05 –South and East

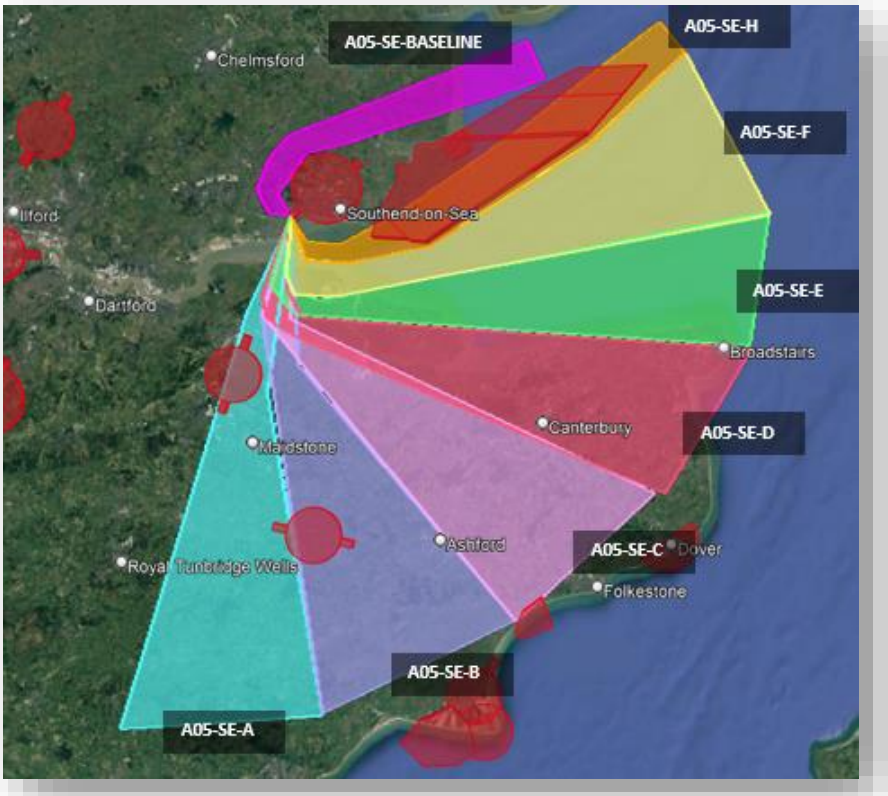


Figure 9: Arrival Runway 05 – South and East

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 A05-SE-BASELINE (originally named A05-SE-G and renamed for clarity). This has been established from the NTK data, current procedures, and operational expertise. (For more information on the baselines please see the document titled 'ACP Options Development and Design Principle Evaluation' which is available on the ACP Portal).

Options

- A05-SE-BASELINE.
- A05-SE-A.
- A05-SE-B.
- A05-SE-C.
- A05-SE-D.
- A05-SE-E.
- A05-SE-F.
- A05-SE-H.

2.10. Arrivals Runway 23 – Northwest

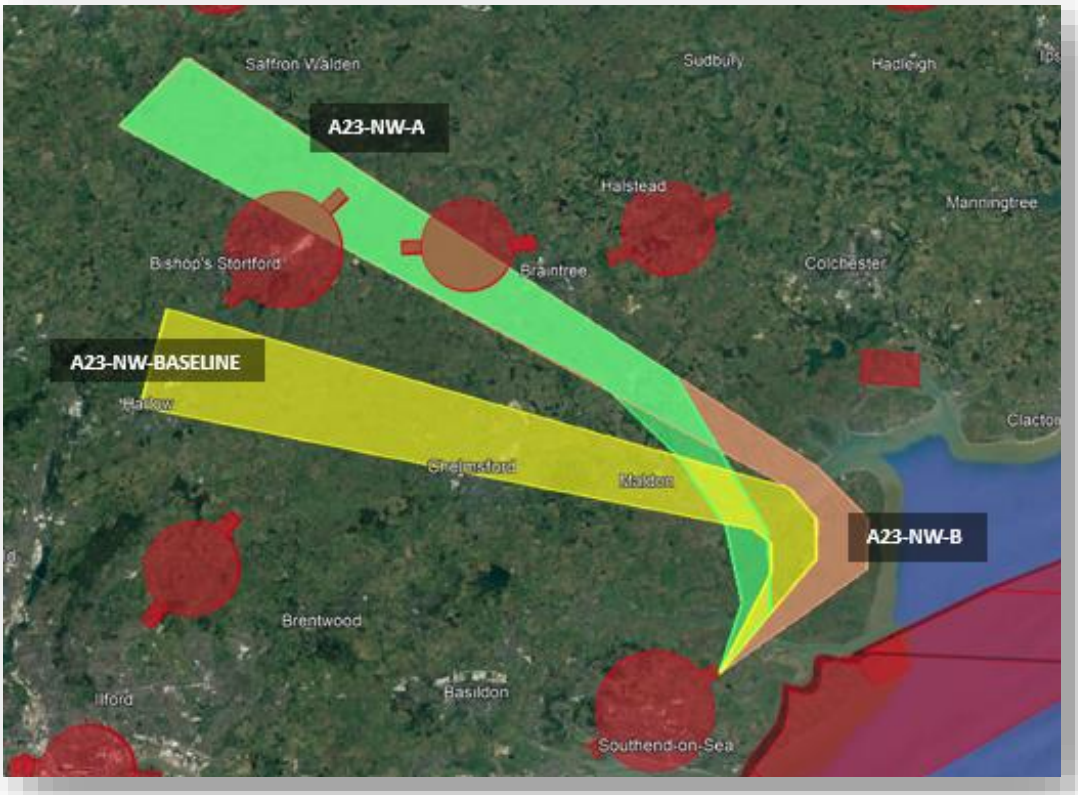


Figure 10: Arrivals Runway 23 - Northwest

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. This has been established from the NTK data, current procedures, and operational expertise. (For more information on the baselines please see the document titled 'ACP Options Development and Design Principle Evaluation' which is available on the ACP Portal).

Options

- A23-NW-BASELINE.
- A23-NW-A.
- A23-NW-B.

2.11. Arrivals Runway 23 – South and East

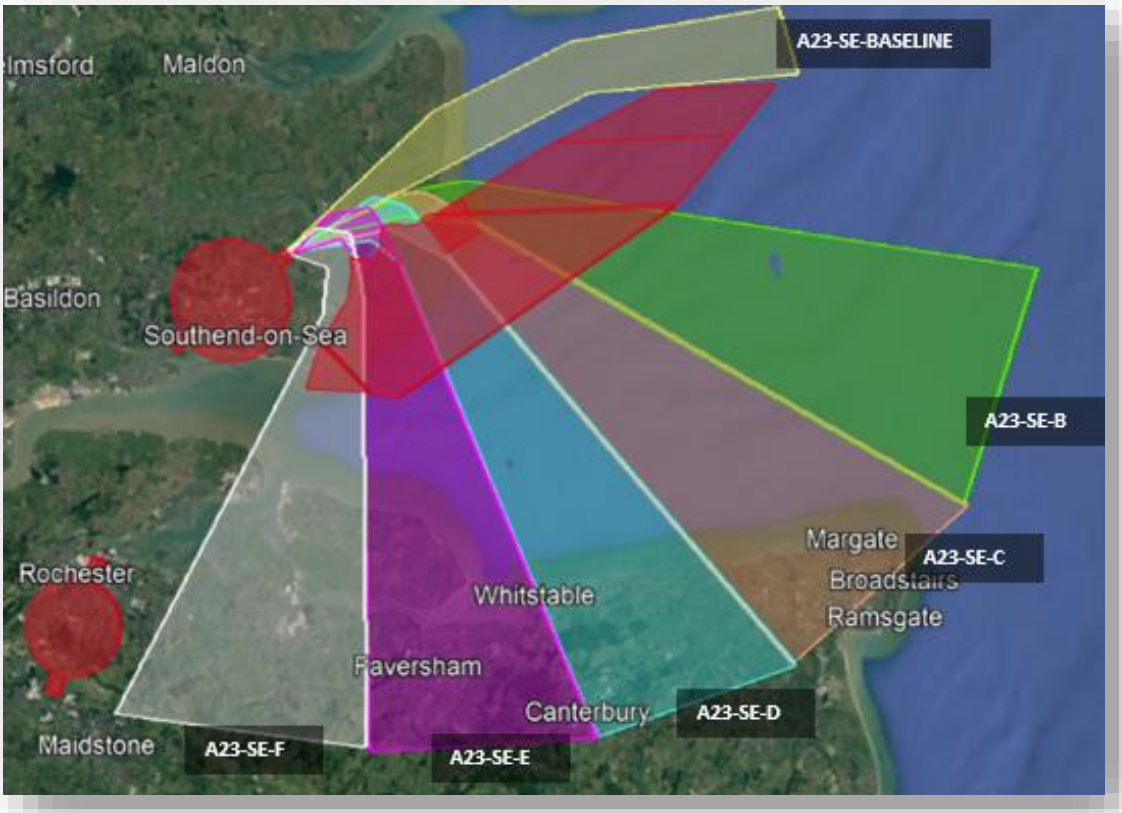


Figure 11: Arrivals Runway 23 - South and East

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 (originally named A05-SE-A and renamed for clarity). This has been established from the NTK data, current procedures, and operational expertise. (For more information on the baselines please see the document titled 'ACP Options Development and Design Principle Evaluation' which is available on the ACP Portal).

Options

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

3. Methodology

3.1. Initial Options Appraisal

3.1.1. This Initial Options Appraisal (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.

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 enroute 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 initial options appraisal does not consider traffic forecasts. Future traffic forecast are provided in the document titled 'Options Development and Design Principle Evaluation' in section 1.10 (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 Design Principle Evaluation [4] and LSA Design Principle Evaluation [5] these can be found on the Airspace Change 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[1]. **Annex C** contains population density maps which assisted in the assessment for each option. **Please note that there are no AQMAs in the vicinity of the airport.** 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[2].
	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. This has been done paying particular attention to the Royal Society of the Protection of Birds (RSPB), RAMSAR sites and AONBs in the vicinity of the option. Following feedback from Natural England (see **Annex A**) we have assessed each option and the sites of tranquillity where aircraft would be below 2000ft. We have done this by assessing each departure option within 6NM of the airfield (using an approximate climb gradient of 6%), and each arrival option within 10NM of the airfield (using the appropriate descent gradient for the runway). This is depicted by the orange track in the centre of each swathe, in each of the screenshots. **Annex B** contains a tranquillity and biodiversity map which assisted in the assessment for each option.

[1] 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.
[2] 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[3].
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 Air Navigation Service Provider (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.

Table 1: IOA Methodology

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

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.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality.
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 same areas of the Crouch and Roach Estuaries Special Protection Area (SPA) will be overflown. There would be no change in impact on AONBs or tranquillity. 
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.

Table 2: D05-NE-BASELINE

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. After the Baseline route turns left, similar communities would be overflown, although this option would generally be closer to populated areas.
	Air Quality	This design option would initially overfly the same communities as the Baseline after take-off 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.
	Tranquillity	Aircraft currently overfly the Crouch and Roach Estuaries SPA. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will be very little, if any, increased impact to AONBs or sites of tranquillity. 
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 is broadly similar to the Baseline. Limited opportunity for increased 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.

Table 3: 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 left, 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 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. The intention for this option is to facilitate free-flow for Departures from the Airport which enables significant increases in both capacity and resilience.

Group	Impact	Qualitative Assessment
	Tranquillity	Aircraft currently overfly the Crouch and Roach Estuaries Special Protection Area (SPA). Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will be very little, if any, increased impact to sites of tranquillity. Should the final route fall to the eastern edge of option D05-NE-B, then Wallasea Island could see a marginal increase in overflights below 2000ft. There would be no change in impact on AONBs. 
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	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, this option has minimal difference from today's Baseline operation.

Table 4: D05-NE-B

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

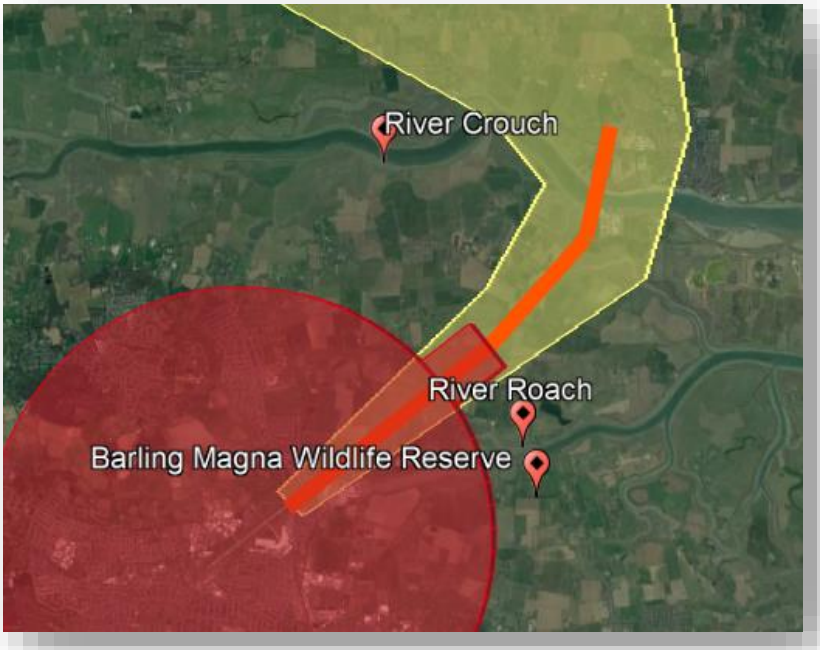
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality.
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 same areas of the Crouch Estuary Special Protection Area (SPA) will be overflown. There would be no change in impact on AONBs or tranquillity. 
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.

Group	Impact	Qualitative Assessment
	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.

Table 5: D05-NW-BASELINE

4.8. 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 design option would initially overfly the same communities as the Baseline after take-off with no change in impact to local air quality.
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.

Group	Impact	Qualitative Assessment
	Tranquillity	Aircraft currently overfly the Crouch Estuary SPA. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will be no increased impact to sites of tranquillity. Option D05-NW-B could see a decrease in the impact of overflights on the Crouch Estuary as a smaller portion will be overflow. This swathe crosses the river and then turns towards the Northwest rather than tracking along the river as traffic does in the Baseline. There would be no change in impact on AONBs. 
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.

Table 6: D05-NW-B

4.10. 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.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality.
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 same areas of the Roach Estuary SPA and Barling Magna Wildlife Reserve will be overflown. There would be no change in impact on tranquillity. There would be no change in impact on AONBs. 
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.

Group	Impact	Qualitative Assessment
	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.

Table 7: D05-S-BASELINE

4.11. D05-S-A

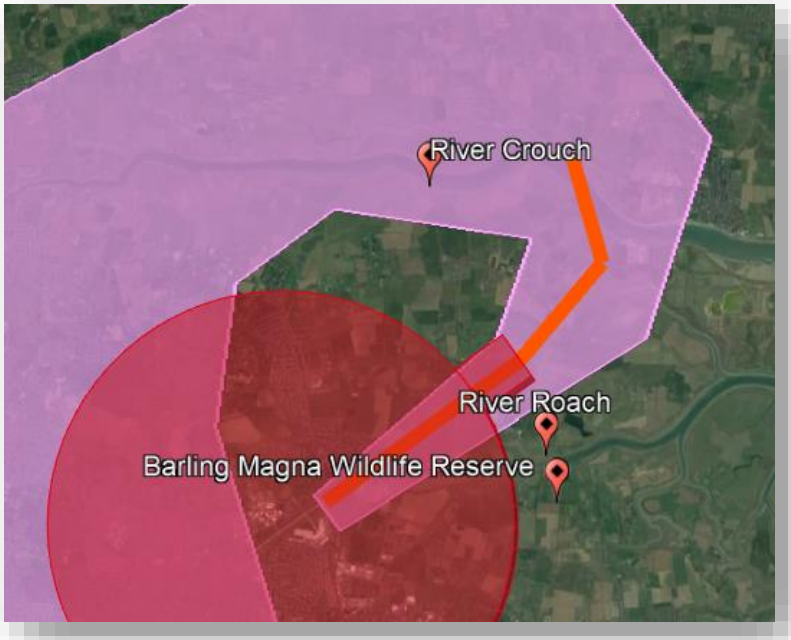
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly similar communities as the Baseline after take-off.
	Air Quality	This design option would overfly similar communities as the Baseline after take-off with no change in impact to local air quality.
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 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 Danger Areas (DA) be closed.
	Tranquillity	Aircraft currently overfly the Roach Estuary SPA and Barling Magna Wildlife Reserve. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will no increased impact to sites of tranquillity. There would be no change in impact on AONBs. 
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	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.

Table 8: D05-S-A

4.13. D05-S-B

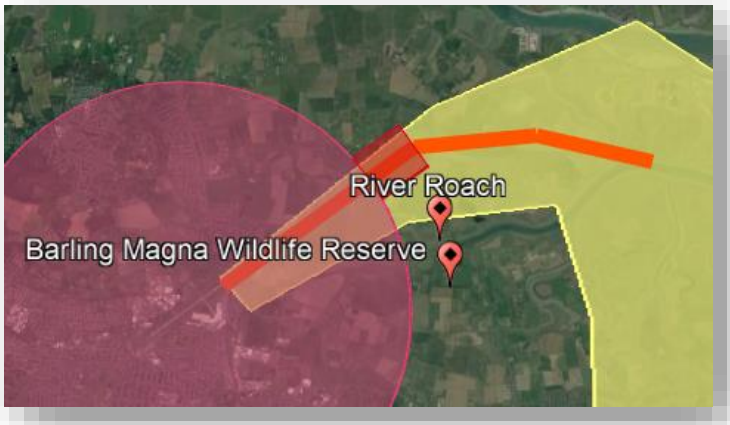
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the routes turn. After this point, this design option would overfly different communities to the Baseline. The newly overflown areas would generally be of a lower population density when initially compared to those overflown in 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 design option would initially overfly the same communities as the Baseline after take-off with no change in impact to local air quality.
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 CO^2 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.

Group	Impact	Qualitative Assessment
	Tranquillity	Aircraft currently overfly the Roach Estuary SPA. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there could be significant increases of overflight to the Crouch Estuary SPA. Canvey Marshes and Thames Estuary and Marshes would also see a marginal increase; however, traffic is expected to be above 2000ft when overflying these sites due to the extra track miles afforded to this swathe. These areas were not previously overflown. There would be a decrease in impact on the Roach Estuary SPA and Barling Magna Wildlife Reserve from the Baseline, but an increase to a large portion of the Crouch Estuary as the option tracks along the river. There would be no change in impact on AONBs. 
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 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.

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.
	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.

Table 9: D05-S-B

4.14. D05-S-C

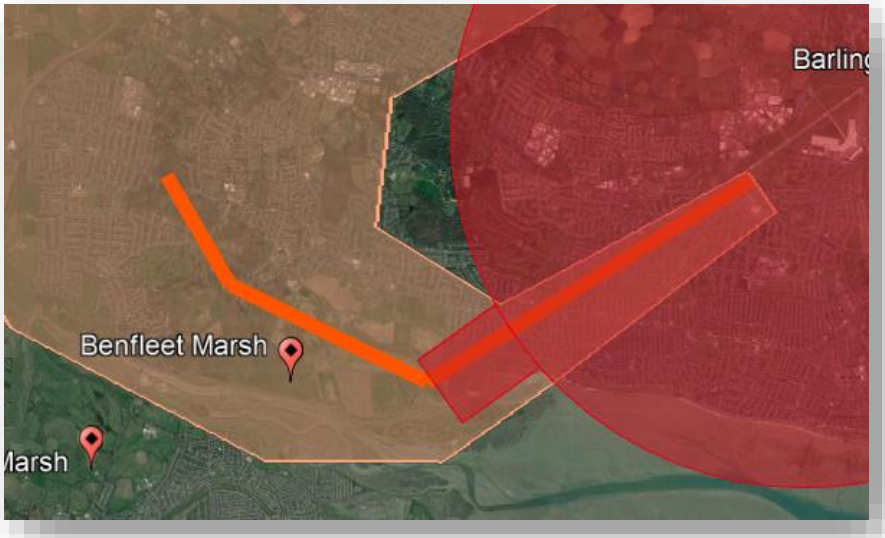
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns right. After this point, this design option would overfly different communities to 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 with no change in impact to local air quality.
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 closed.
	Tranquillity	Aircraft currently overfly the Roach Estuary SPA and Barling Magna Wildlife Reserve. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there may be an increased impact to Wallasea Island and Foulness SPA with this option and a potential increase in disturbance to the Roach Estuary as this option tracks along a greater portion of the river. There would be no change in impact on AONBs. 

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 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.

Table 10: D05-S-C

5. Initial Options Appraisal – Departures Runway 23

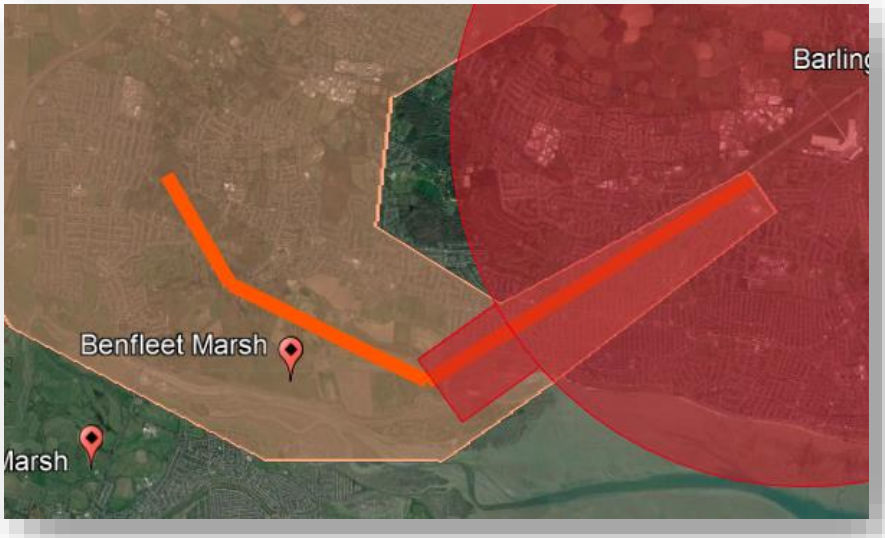
5.1. D23-NE-BASELINE

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.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality.
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	Benfleet and Canvey Marshes will be overflown. There would be no change in impact on tranquillity or AONBs. 
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.

Table 11: D23-NE-BASELINE

5.2. 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 is similar to today's Baseline so limited opportunity for increased capacity or resilience is anticipated.
	Tranquillity	Aircraft currently overfly Benfleet and Canvey Marshes. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will no increased impact to sites of tranquillity or AONBs. 
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 is similar to today's Baseline so limited opportunity for increased effective capacity or benefit to economic impact is anticipated.
	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.
	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.

Table 12: D23-NE-A

5.3. 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 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 and London City, could mean an increase in complexity which could contribute to reduced capacity and resilience, if not procedurally separated.
	Tranquillity	Aircraft currently overfly Benfleet and Canvey Marshes. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will no increased impact to sites of tranquillity or AONBs with this option from the Baseline. 
General aviation	Access	This option would potentially require an increase in controlled airspace to contain the procedures.

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.
	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.

Table 13: D23-NE-B

5.4. 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 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 closed.

Group	Impact	Qualitative Assessment
	Tranquillity	Aircraft currently overfly Benfleet and Canvey Marshes. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there may be a slight increase in overflight of Canvey Marsh and The South Thames Estuary and Marshes would see an increase where there previously hasn't been any traffic. There would be no change in impact on AONBs. 
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.
	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.
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	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.

Table 14: D23-NE-C

5.5. 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 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, however it there could be potential for conflict with the current London City point merge should it remain.

Group	Impact	Qualitative Assessment
	Tranquillity	Aircraft currently overfly Benfleet and Canvey Marshes. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there may be a slight increase in overflight of Canvey Marsh and The South Thames Estuary and Marshes would see an increase where there previously hasn't been any traffic. There would be no change in impact on AONBs. 
General aviation	Access	This option would require an increase in controlled airspace.
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	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.

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.

Table 15: D23-NE-D

5.6. D23-NE-E

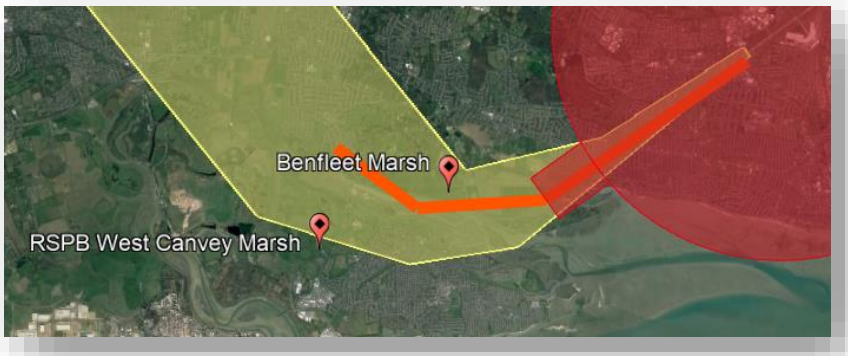
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns right. After this point, this design option would overfly different communities to 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 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.

Group	Impact	Qualitative Assessment
	Tranquillity	Aircraft currently overfly Benfleet and Canvey Marshes. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there may be a slight increase in overflight of Canvey Marsh and The South Thames Estuary and Marshes would see an increase where there previously hasn't been any traffic. Benfleet and Southend Marshes SPA, Thames Estuary & Marshes SPA, Outer Thames Estuary SPA and Medway Estuary SPA and Ramsar site, could all see an increase in disturbance. There would be no change in impact on AONBs. 
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 Danger Areas (DA) 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.

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	Additional safety work would need to be done to make this a viable option. The entire swathe routes through the Shoeburyness Danger Areas (DA). This option could be used as a potential respite route for when the DA are inactive.

Table 16: D23-NE-E

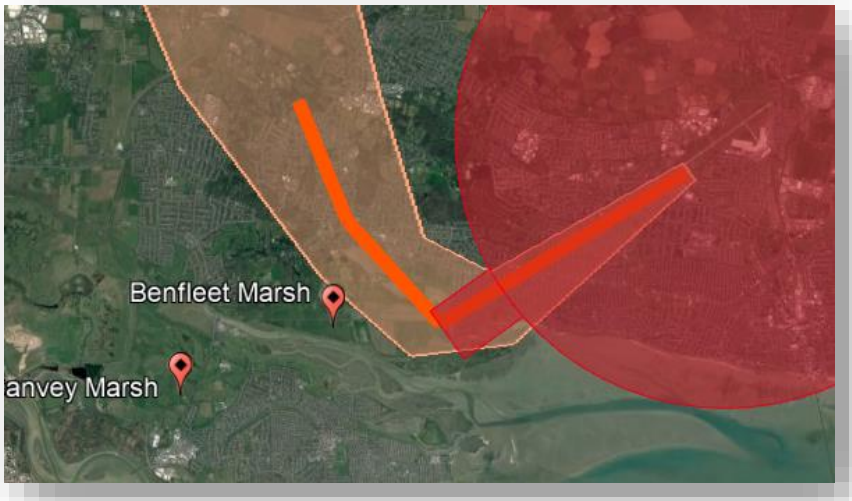
5.8. D23-NW-BASELINE (previously D23-NW-C)

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.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality.
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	Benfleet and Canvey Marshes will be overflown. There would be no change in impact on tranquillity or AONBs. 
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.

Group	Impact	Qualitative Assessment
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.

Table 17: D23-NW-BASELINE

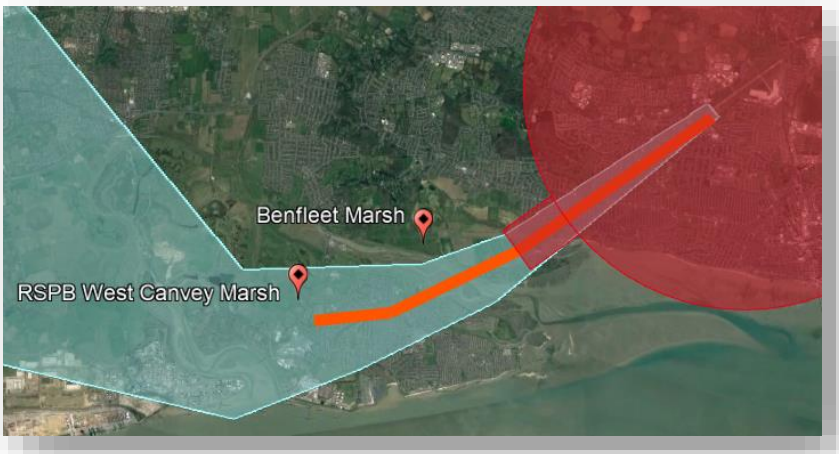
5.9. D23-NW-A

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 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	Aircraft currently overfly Benfleet and Canvey Marshes. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will no increased impact to sites of tranquillity with this option from the Baseline, there is potential for a decrease in disturbance. There would be no change in impact on AONBs. 

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.

Table 18: D23-NW-A

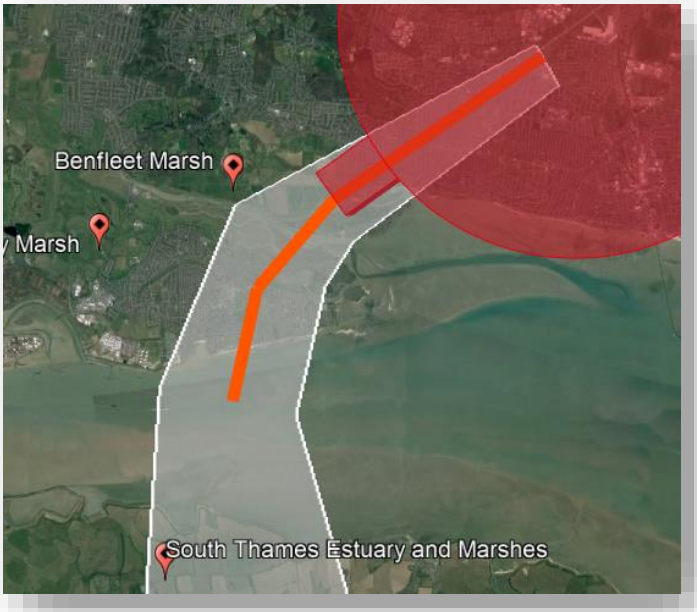
5.10. D23-NW-B

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 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	Aircraft currently overfly Benfleet and Canvey Marshes. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there could be an increased impact to sites of tranquillity as the swathe covers a larger area of the Marshes and is closer to the Thames Estuary. There would be no change in impact on AONBs. 
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.

Group	Impact	Qualitative Assessment
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 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.

Table 19: D23-NW-B

5.12. 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.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality.
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 same areas of Benfleet and Thames Estuary and Marshes will be overflown. There would be no change in impact on tranquillity or AONBs. 
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.

Group	Impact	Qualitative Assessment
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.

Table 20: D23-S-BASELINE

5.13. 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 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	Aircraft currently overfly Benfleet and Thames Estuary and Marshes. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will no increased impact to sites of tranquillity with this option from the Baseline. There could be a change in impact to the Kent Downs AONB at high level. 
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.

Table 21: D23-S-A

5.14. 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 the current Baseline so limited opportunity for increased capacity or resilience is anticipated.
	Tranquillity	Aircraft currently overfly Benfleet and Thames Estuary and Marshes. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will no increased impact to sites of tranquillity with this option from the Baseline. There could be a change in impact to the Kent Downs AONB at high level. 
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 is the current 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.

Table 22: D23-S-B

5.15. D23-S-C

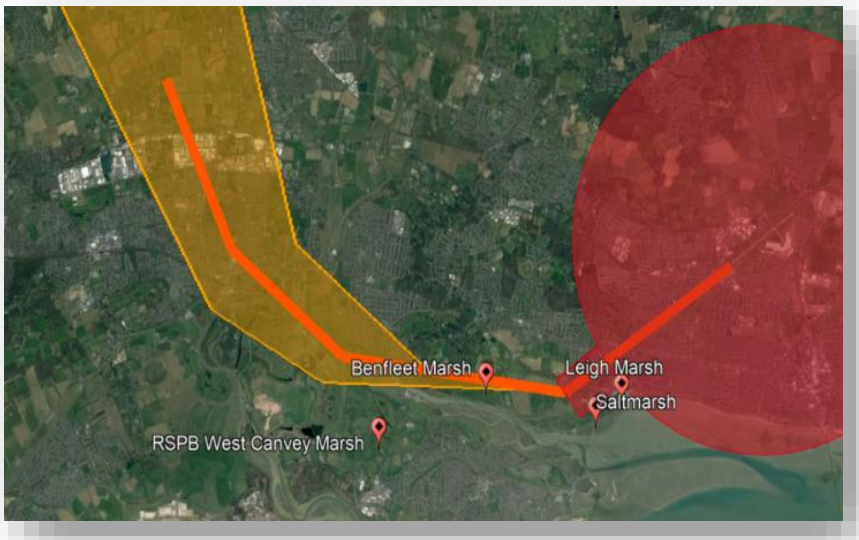
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would initially overfly the same communities as the Baseline after take-off, until the Baseline route turns left. After this point, this design option would overfly different communities to the 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 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.
	Tranquillity	Aircraft currently overfly Benfleet and Thames Estuary and Marshes. Using our 6NM assessment track (to establish where aircraft will be below 2000ft) we can see that there may be a slight increased impact to the Canvey Marshes with this option, with the impact to the Thames Estuary and Marshes remaining. There could be a change in impact to the Kent Downs AONB at high level. 
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.

Table 23: D23-S-C

6. Initial Options Appraisal – Arrivals Runway 05

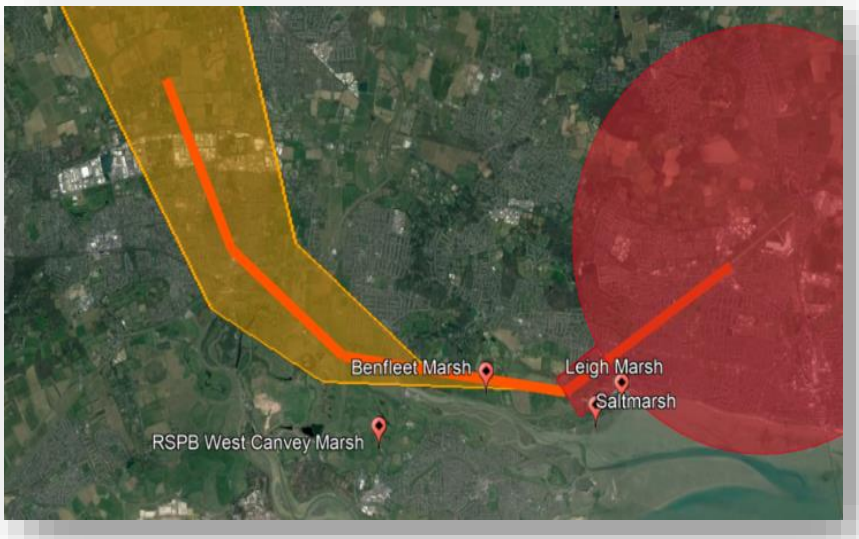
6.1. A05-NW-BASELINE

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality.
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	Canvey and Benfleet Marshes will be overflown. There would be no change in impact on tranquillity or AONBs. 
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.

Table 24: A05-NW-BASELINE

6.2. 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 km 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 km 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	The Baseline for this option currently overflies Canvey and Benfleet Marshes. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there would be no obvious increase in the sites of tranquillity overflown with this option. There would be no change in impact on AONBs. 

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	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.
	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.

Table 25: A05-NW-A

6.3. 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 km 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 km 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.

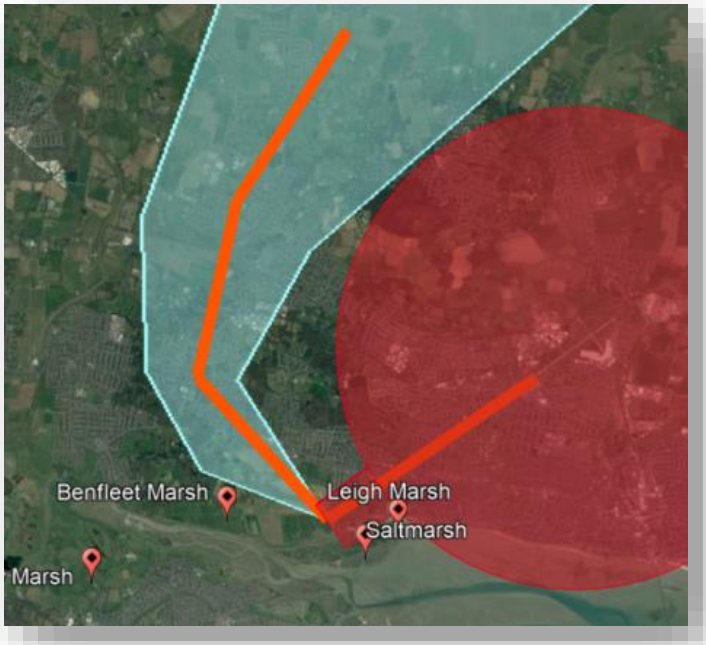
Group	Impact	Qualitative Assessment
	Tranquillity	The Baseline for this option currently overflies Canvey and Benfleet Marshes. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there would be no obvious increase in the sites of tranquillity overflown with this option. We could even see a reduction in flights over Canvey Marshes. There would be no change in impact on AONBs. 
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.

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	No initial safety concerns with this option.

Table 26: A05-NW-B

6.4. 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 5 km 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 km 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.

Group	Impact	Qualitative Assessment
	Tranquillity	The Baseline for this option currently overflies Canvey and Benfleet Marshes. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there would be no obvious increase in the sites of tranquillity overflown with this option. We could even see a reduction in flights over both Canvey and Benfleet Marshes. There would be no change in impact on AONBs. 
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	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.

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.

Table 27: A05-NW-C

6.5. A05-NW-D

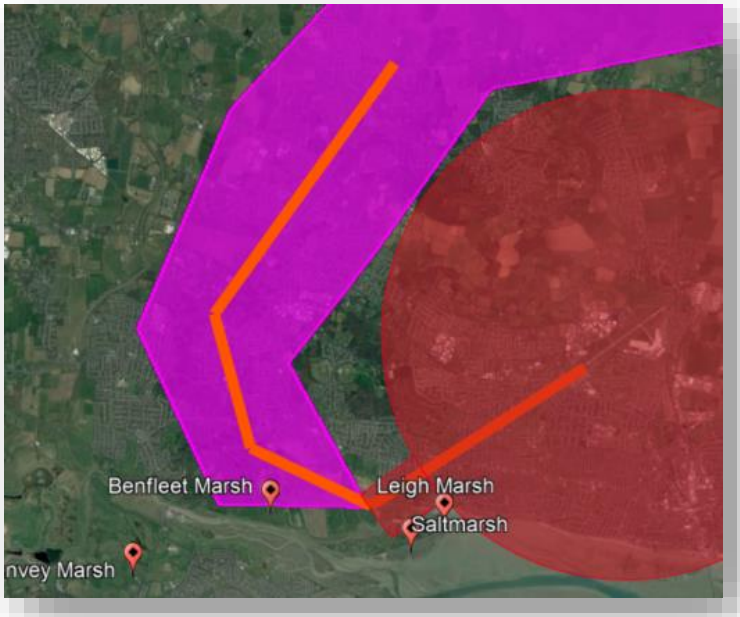
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 km of touchdown). Before that, this design option would overfly different communities to the Baseline. 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 km 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.

Group	Impact	Qualitative Assessment
	Tranquillity	The Baseline for this option currently overflies Canvey and Benfleet Marshes. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there would be an increase in disturbance to the Thames Estuary with this option. There would be no change in impact on AONBs. 
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.
	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.

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	No initial safety concerns with this option.

Table 28: A05-NW-D

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

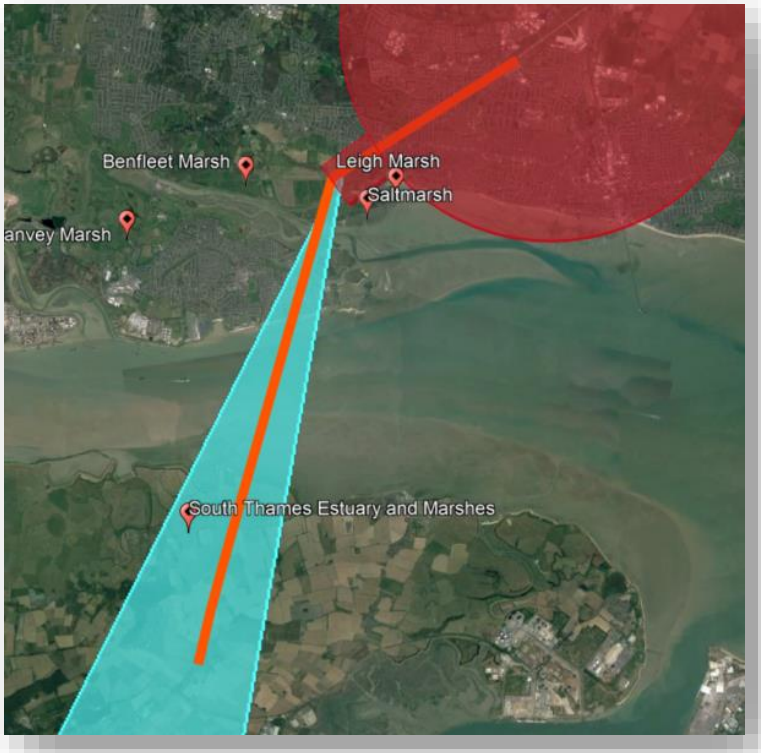
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality.
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	Canvey and Benfleet Marshes will be overflown. There would be no change in impact on tranquillity or AONBs. 
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.

Table 29: A05-SE-BASELINE

6.8. 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 km 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 km 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 Baseline for this option currently overflies Canvey and Benfleet Marshes. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there would potentially be a reduction in overflight of Canvey Marsh, but the Thames Estuary and Marshes could see an increase. Overall, there could be a slight increase in impact to sites of tranquillity overflown with this option as the flight paths will cross the Thames estuary at low level. There could be a change in impact to the Kent Downs AONB at high level. 
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.
	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.
	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.

Table 30: A05-SE-A

6.9. 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 km 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 km 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 Baseline for this option currently overflies Canvey and Benfleet Marshes. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there would potentially be a reduction in overflight of Canvey Marsh, but the Thames Estuary and Marshes could see an increase. Overall, there could be a slight increase in impact to sites of tranquillity overflown with this option as the flight paths will cross the Thames estuary at low level. There could be a change in impact to the Kent Downs AONB at high level. 
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 for benefits 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.

Table 31: A05-SE-B

6.10. 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 km 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 km 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 Baseline for this option currently overflies Canvey and Benfleet Marshes. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there would potentially be a reduction in overflight of Canvey Marsh, but the Thames Estuary and Marshes could see an increase. Overall, there could be a slight increase in impact to sites of tranquillity overflown with this option as the flight paths will cross the Thames Estuary at low level. Kent Downs AONB would also be overflown at higher altitudes. 
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.

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.
	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.

Table 32: A05-SE-C

6.11. 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 km 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 km 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.

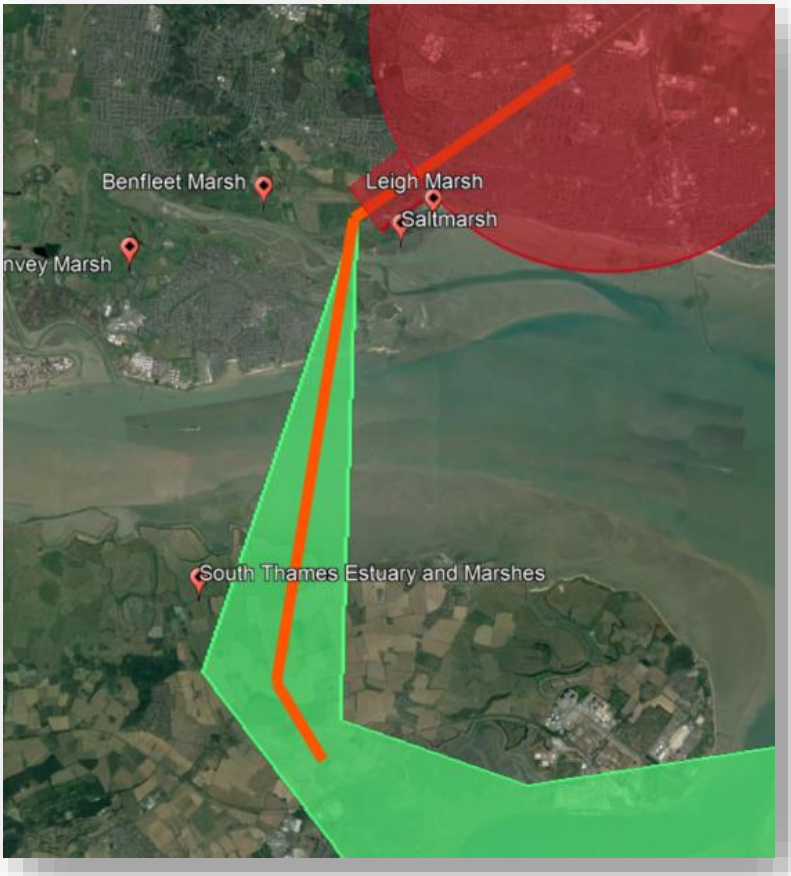
Group	Impact	Qualitative Assessment
	Tranquillity	The Baseline for this option currently overflies Canvey and Benfleet Marshes. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there would potentially be a reduction in overflight of Canvey Marsh, but the Thames Estuary and Marshes could see an increase. Overall, there could be a slight increase in impact to sites of tranquillity overflown with this option as the flight paths will cross the Thames estuary at low level. There could be a change in impact to the Kent Downs AONB at high level. 
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.

Table 33: A05-SE-D

6.12. 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 km 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 km 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.

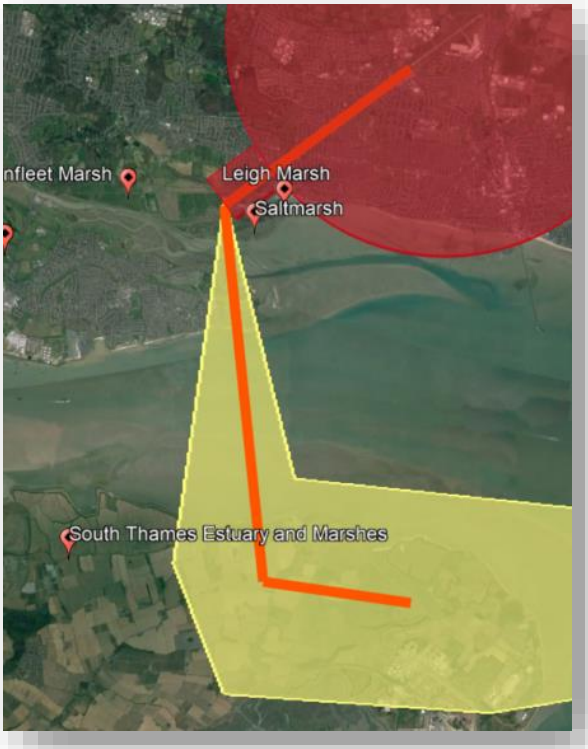
Group	Impact	Qualitative Assessment
	Tranquillity	The Baseline for this option currently overflies Canvey and Benfleet Marshes. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there would potentially be a reduction in overflight of Canvey Marsh, but the Thames Estuary and Marshes could see an increase. Overall, there could be a slight increase in impact to sites of tranquillity overflown with this option as the flight paths will cross the Thames estuary at low level. There would be no change in impact on AONBs. 
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.

Table 34: A05-SE-E

6.13. 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 km 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 km 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.

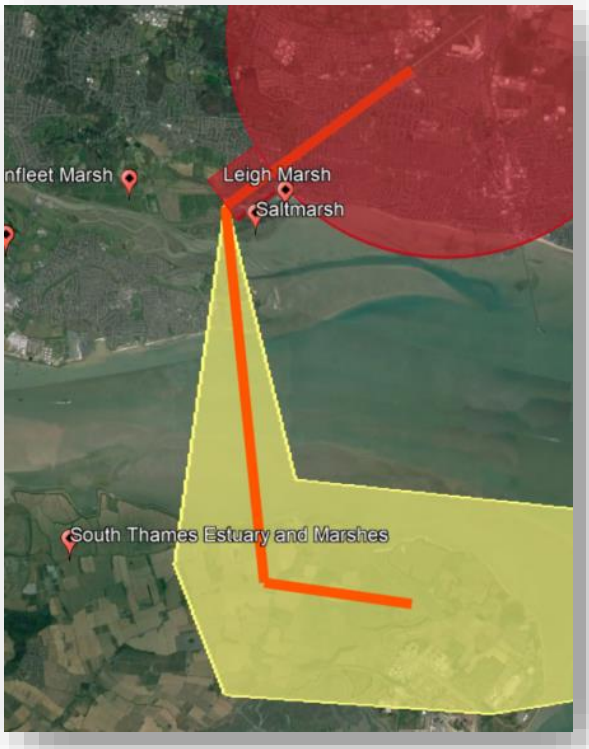
Group	Impact	Qualitative Assessment
	Tranquillity	The Baseline for this option currently overflies Canvey and Benfleet Marshes. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there would potentially be a reduction in overflight of Canvey Marsh, but the Thames Estuary and Marshes could see an increase. Overall, there could be a slight increase in impact to sites of tranquillity overflown with this option as the flight paths will cross the Thames estuary at low level. There would be no change in impact on AONBs. 
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	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.
	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.

Table 35: A05-SE-F

6.14. 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 km 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 km 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.

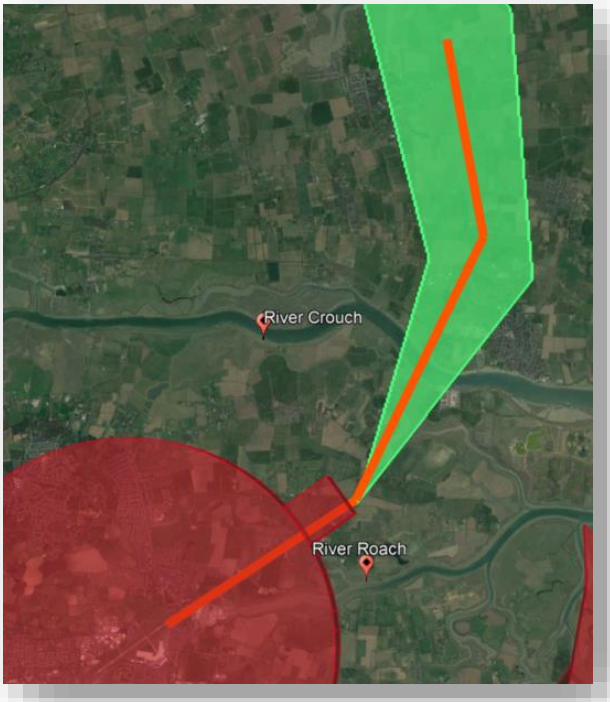
Group	Impact	Qualitative Assessment
	Tranquillity	Aircraft currently overfly Benfleet and Canvey Marshes. There may be a slight increase in overflight of Canvey Marsh and The South Thames Estuary and Marshes would see an increase where there previously hasn't been any traffic should this option be chosen. There would be no change in impact on AONBs. 
General aviation	Access	This option would require an increase in controlled airspace.
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.

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	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 Danger Areas (DA). This option could be used as a potential respite route for when the DA are inactive.

Table 36: A05-SE-H

7. Initial Options Appraisal – Arrivals Runway 23

7.1. A23-NW-BASELINE

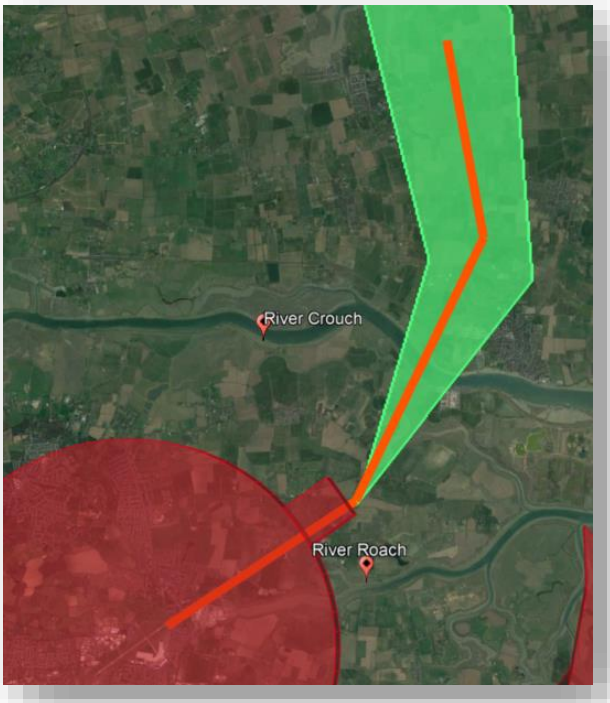
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality.
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 same areas of the Crouch and Blackwater Estuaries will be overflown. There would be no change in impact on tranquillity or AONBs. 

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.

Table 37: A23-NW-BASELINE

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 km 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 km 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.

Group	Impact	Qualitative Assessment
	Tranquillity	The Baseline for this option currently overflies the Crouch and Blackwater Estuaries. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will be very little, if any, increased impact to sites of tranquillity. There would be no change in impact on AONBs. 
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.

Table 38: A23-NW-A

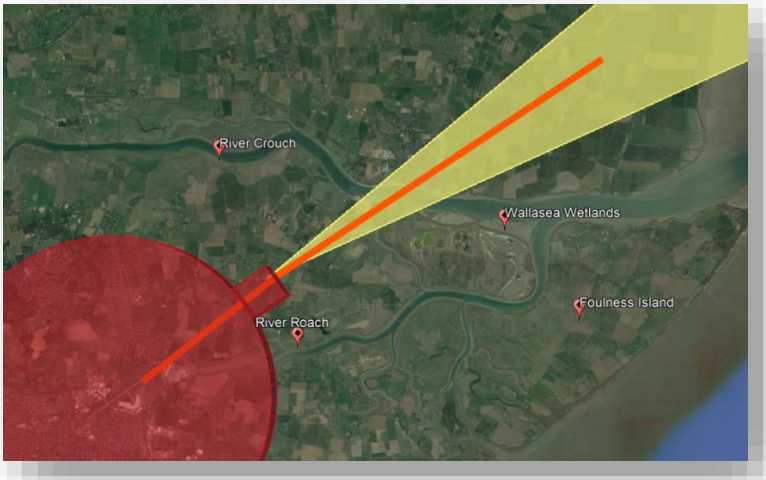
7.4. A23-NW-B

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 km 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 km 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	The Baseline for this option currently overflies the Crouch and Blackwater Estuaries. Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there will be very little, if any, increased impact to sites of tranquillity. There would be no change in impact on AONBs. 
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	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.

Table 39: A23-NW-B

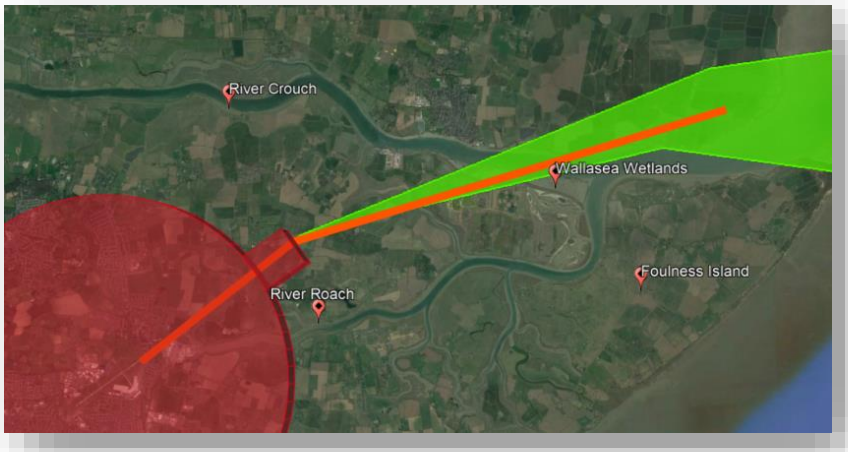
7.5. A23-SE-BASELINE (previously A23-SE-A)

Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This option would continue to overfly the same communities after take-off with no change to noise impact.
	Air Quality	This option would continue to overfly the same communities after take-off with no change in impact to local air quality.
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 same areas of the Crouch and Roach Estuaries and the Dengie Nature Reserve (although at a high altitude) will be overflown. There would be no change in impact on tranquillity or AONBs. 
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.

Group	Impact	Qualitative Assessment
	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.

Table 40: A23-SE-BASELINE

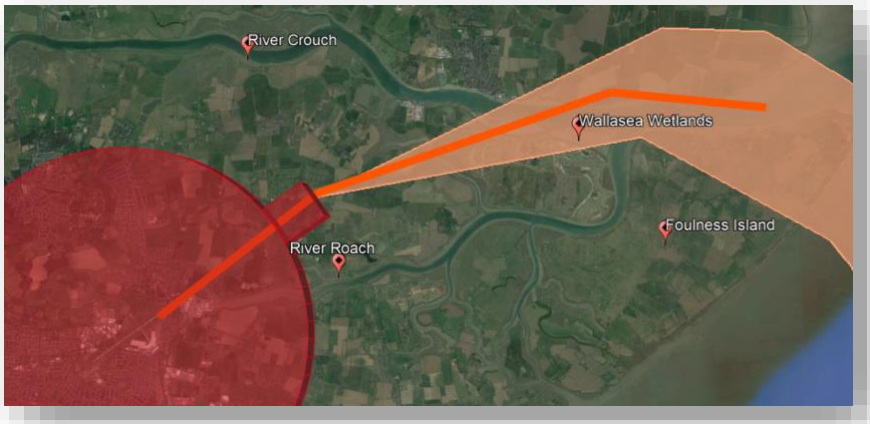
7.6. A23-SE-B

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 km 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 km 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	The Baseline for this option currently overflies the Crouch and Roach Estuaries and the Dengie Nature Reserve (although at a high altitude). Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there could be a potential increase in traffic over Wallasea Island. Overall, there could be a slight increase in impact to sites of tranquillity overflown with this option. There would be no change in impact on AONBs. 

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.

Table 41: A23-SE-B

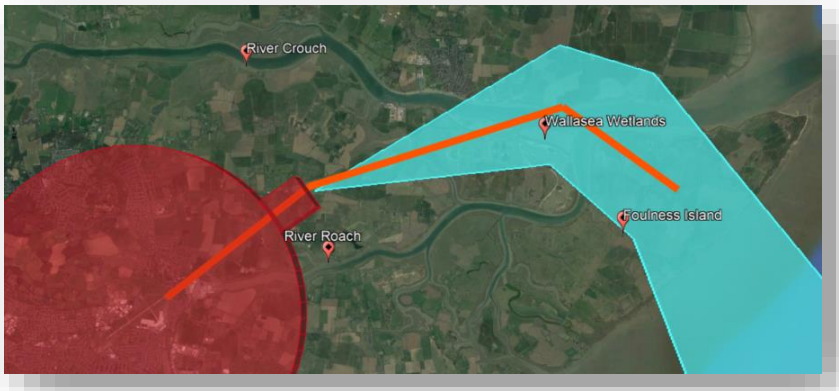
7.7. A23-SE-C

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 km 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 km 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	The Baseline for this option currently overflies the Crouch and Roach Estuaries and the Dengie Nature Reserve (although at a high altitude). Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there could be a potential increase in traffic over Wallasea Island. Overall, there could be a slight increase in impact to sites of tranquillity overflown with this option. There would be no change in impact on AONBs. 

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.

Table 42: A23-SE-C

7.8. A23-SE-D

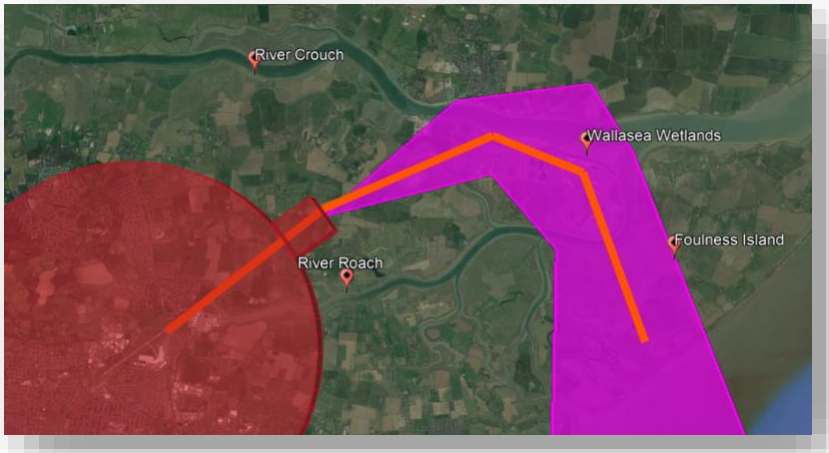
Group	Impact	Qualitative Assessment
Communities	Noise impact on health and quality of life	This design option would overfly the same communities as the Baseline for the final stage of the approach (within 5 km of touchdown). Before that, this design option would overfly different communities to the Baseline. 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 km 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	The Baseline for this option currently overflies the Crouch and Roach Estuaries and the Dengie Nature Reserve (although at a high altitude). Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there could be a potential increase in traffic over Wallasea Island and the Foulness SPA. Overall, there could be a slight increase in impact to sites of tranquillity overflown with this option. There would be no change in impact on AONBs. 

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.

Table 43: A23-SE-D

7.9. 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 km of touchdown). Before that, this design option would overly 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 km 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.

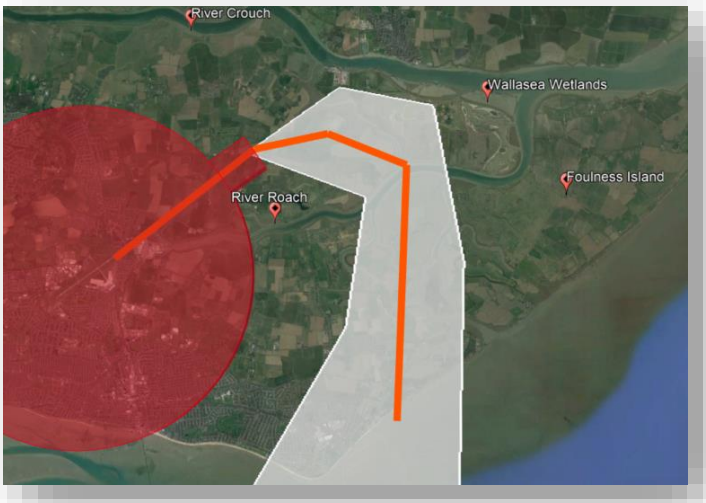
Group	Impact	Qualitative Assessment
	Tranquillity	The Baseline for this option currently overflies the Crouch and Roach Estuaries and the Dengie Nature Reserve (although at a high altitude). Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there could be an increase in traffic over Wallasea Island and Wetlands and the Foulness SPA. Tracks over the Crouch Estuary would decrease but the Roach Estuary could see an increase in disturbance. Overall, there could be an increase in impact to sites of tranquillity overflown at low level with this option. There would be no change in impact on AONBs. 
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	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.

Table 44: A23-SE-E

7.10. 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 km 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 km 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 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.

Group	Impact	Qualitative Assessment
	Tranquillity	The Baseline for this option currently overflies the Crouch and Roach Estuaries and the Dengie Nature Reserve (although at a high altitude). Using our 10NM assessment track (to establish where aircraft will be below 2000ft) we can see that there could be an increase in traffic over the Roach Estuary, but a decrease in flights over the Crouch Estuary. Wallasea Island and Foulness SPA would not be affected with this option. Overall, there would be little change in impact to sites of tranquillity overflown at low level with this option. There could be a change in impact to the Kent Downs AONB at high level. 
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.

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	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.

Table 45: 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. All our analysis has been qualitative and there are some categories that require further 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 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 impact nor benefit.	
Qualitatively assessed as having potential for an overall net cost.	

Table 46: IOA Summary Key

8.2. Discounting

8.2.1. Having completed the Qualitative assessment of each option and subsequently scored these according to net benefit(green)/cost(red), we undertook the process of discounting. Once assessed, options were discounted according to those net benefits and net costs. [4]

8.2.2. Firstly, any option that would have a net cost(red) on safety was deemed unacceptable and discounted[5].

Remaining options were discounted when they were assessed as only having net costs(red) with no net benefits(green). This ensures the preferable options are taken forward.

[4] The AMS allows for design options discounted at Stage 2 to be reintroduced at Stage 3 if necessary, during the Masterplan integration process where multiple ACP sponsors are all at the same stage, and it will be possible for a wider holistic overview to be considered.

[5] In accordance with CAP1616 Appendix E guidance for safety assessment for the Initial options appraisal.

9. Results

Following the rationale of section 4, this section assesses each suite of options against the same criteria, and provides a Red, Amber or Green rating (see section 8.1 for explanation). Further, it states which option will be taken forward from each suite of options (see section 8.2 for discounting methodology). However, as discussed in section 9.5, preferred options have not yet been identified due to lack of detailed quantitative analysis.

9.1. Departures Runway 05

Northeast

Group	Impact	D05-NE-BASELINE	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			
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			

Group	Impact	D05-NE-BASELINE	D05-NE-A	D05-NE-B
All	Safety			
Option taken forward to Stage 3		Yes	No	Yes

Table 47: Runway 05 - Northeast - IOA Summary

Northwest

Group	Impact	D05-NW-BASELINE	D05-NW-B
Communities	Noise impact on health and quality of life		
	Air Quality		
Wider society	Greenhouse gas impact		
	Capacity/ resilience		
	Tranquillity		
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-NW-BASELINE	D05-NW-B
	Deployment costs		
All	Safety		
Option taken forward to Stage 3		Yes	Yes

Table 48: Runway 05 - Northwest - IOA Summary

South/Southeast

Group	Impact	D05-S-BASELINE	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				
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-S-BASELINE	D05-S-A	D05-S-B	D05-S-C
	Deployment costs				
All	Safety				
Option taken forward to Stage 3		Yes	Yes	No	No

Table 49: Runway 05 - South/Southeast - IOA Summary

9.2. Departures Runway 23

Northeast

Group	Impact	D23-NE-BASELINE	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						
General aviation	Access						
General aviation/ commercial airlines	Economic impact from increased effective capacity						
	Fuel burn						
	Training costs						

Group	Impact	D23-NE-BASELINE	D23-NE-A	D23-NE-B	D23-NE-C	D23-NE-D	D23-NE-E
Commercial airlines	Other costs						
Airport/ Air navigation service provider	Infrastructure costs						
	Operational costs						
	Deployment costs						
All	Safety						
Option taken forward to Stage 3		Yes	Yes	No	No	Yes	No

Table 50: Runway 23 - Northeast - IOA Summary

Northwest

Group	Impact	D23-NW-BASELINE	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			
General aviation	Access			

Group	Impact	D23-NW-BASELINE	D23-NW-A	D23-NW-B
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			
Option taken forward to Stage 3		Yes	Yes	No

Table 51: Runway 23 - Northwest - IOA Summary

South/Southeast

Group	Impact	D23-S-BASELINE	D23-S-A	D23-S-B	D23-S-C
Communities	Noise impact on health and quality of life				
	Air Quality				
	Greenhouse gas impact				

Group	Impact	D23-S-BASELINE	D23-S-A	D23-S-B	D23-S-C
Wider society	Capacity/ resilience				
	Tranquillity				
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				
Option taken forward to Stage 3		Yes	Yes	Yes	No

Table 52: Runway 23 - South/Southeast - IOA Summary

9.3. Arrivals Runway 05

Northwest

Group	Impact	A05-NW-BASELINE	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					
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					
Option taken forward to Stage 3		Yes	Yes	Yes	Yes	Yes

Table 53: Runway 05 - Northwest - IOA Summary

South/Southeast

Group	Impact	A05-SE-BASELINE	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								
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								
Option taken forward to Stage 3		Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

Table 54: Runway 05 - South/Southwest - IOA Summary

9.4. Arrivals Runway 23

Northwest

Group	Impact	A23-NW-BASELINE	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			
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			
Option taken forward to Stage 3		Yes	Yes	Yes

Table 55: Runway 23 - Northwest - IOA Summary

South/Southeast

Group	Impact	A23-SE-BASELINE	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						
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						
Option taken forward to Stage 3		Yes	No	No	No	No	No

Table 56: Runway 23 - South/Southeast - IOA Summary

9.5. Preferred Options

9.5.1. Due to the Methodology applied in this Initial Options Appraisal, 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 D standards as defined in CAP2091[6].
- WebTAG Assessments.
- Overflight assessments.
- Precise track miles calculations detailing fuel burn and CO^2 emission data using the BADA model.
- Detailed CAS requirement assessments.
- More detailed analysis of interdependencies with other airports and the en-route network.
- Monetarised commercial airline costs.
- Monetarised airport costs.

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

[6] LSA falls into noise modelling Category D. This category is defined as having a recommended minimum population exposed to 51dBLAeq, 16h or above (day) and 45dBLAeq, 8h or above (night) of 1600 to a maximum of 25000 . 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. 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

Request from LSA

The purpose of the meeting was to discus with you at what hights 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 to 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 km 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 km 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.

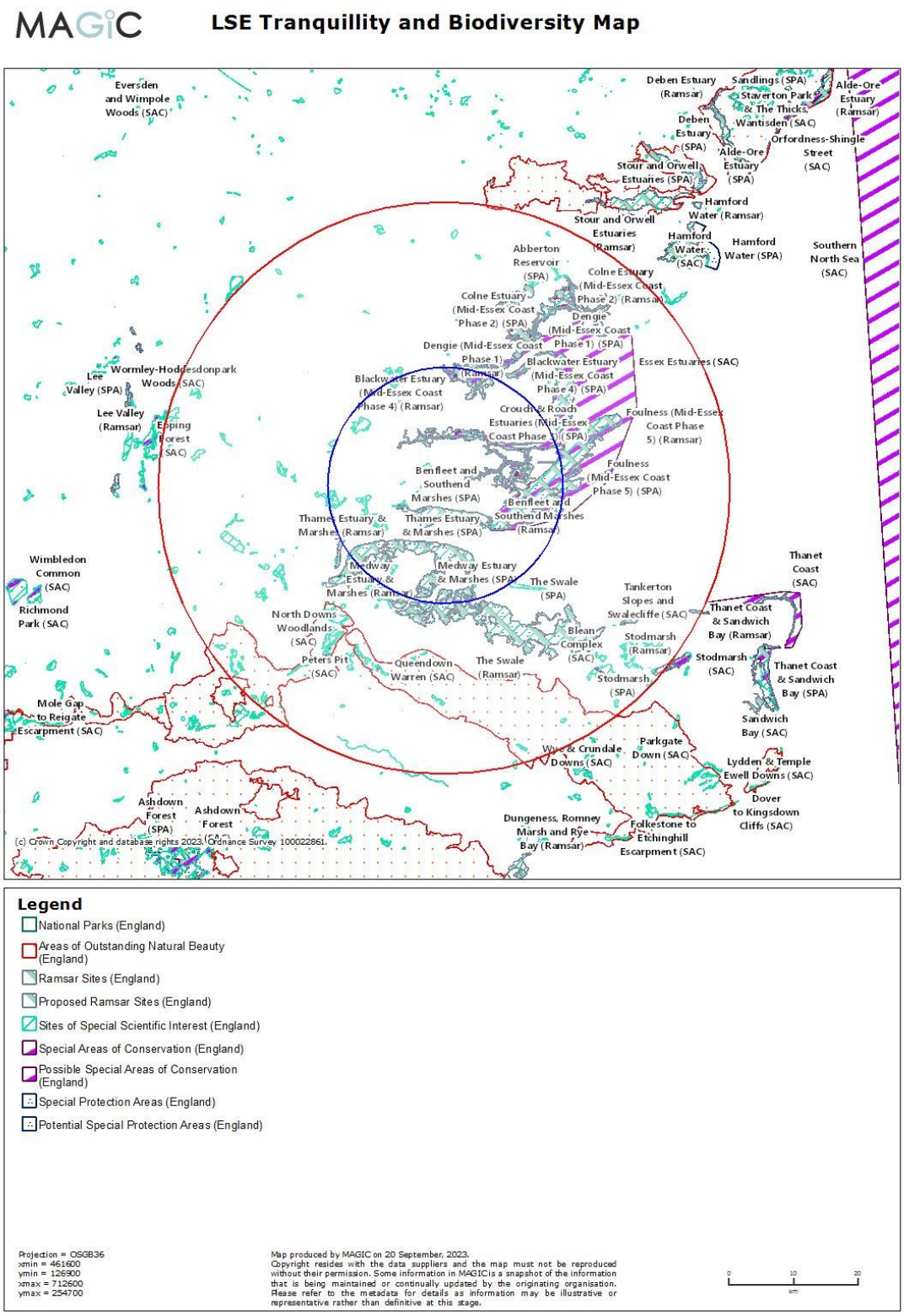
There will inevitably be a delay in understanding the full range of effects once operations are underway and aircraft movements increase and adjust in line with operational delivery demands, and therefore Natural England advises that a sufficiently precautionary approach is taken. Flight heights that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

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

NB. National parks and potential 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, area boundaries marked in red and filled with red spots on 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 and Roach Estuaries
- Blackwater Estuary
- Foulness
- Thames Estuary and Marshes
- Medway Estuary and Marshes
- Dengie Coast Phase

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.
- Crouch and Roach Estuaries.
- Thrift Wood, Wiidham.
- 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.

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 and 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 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)

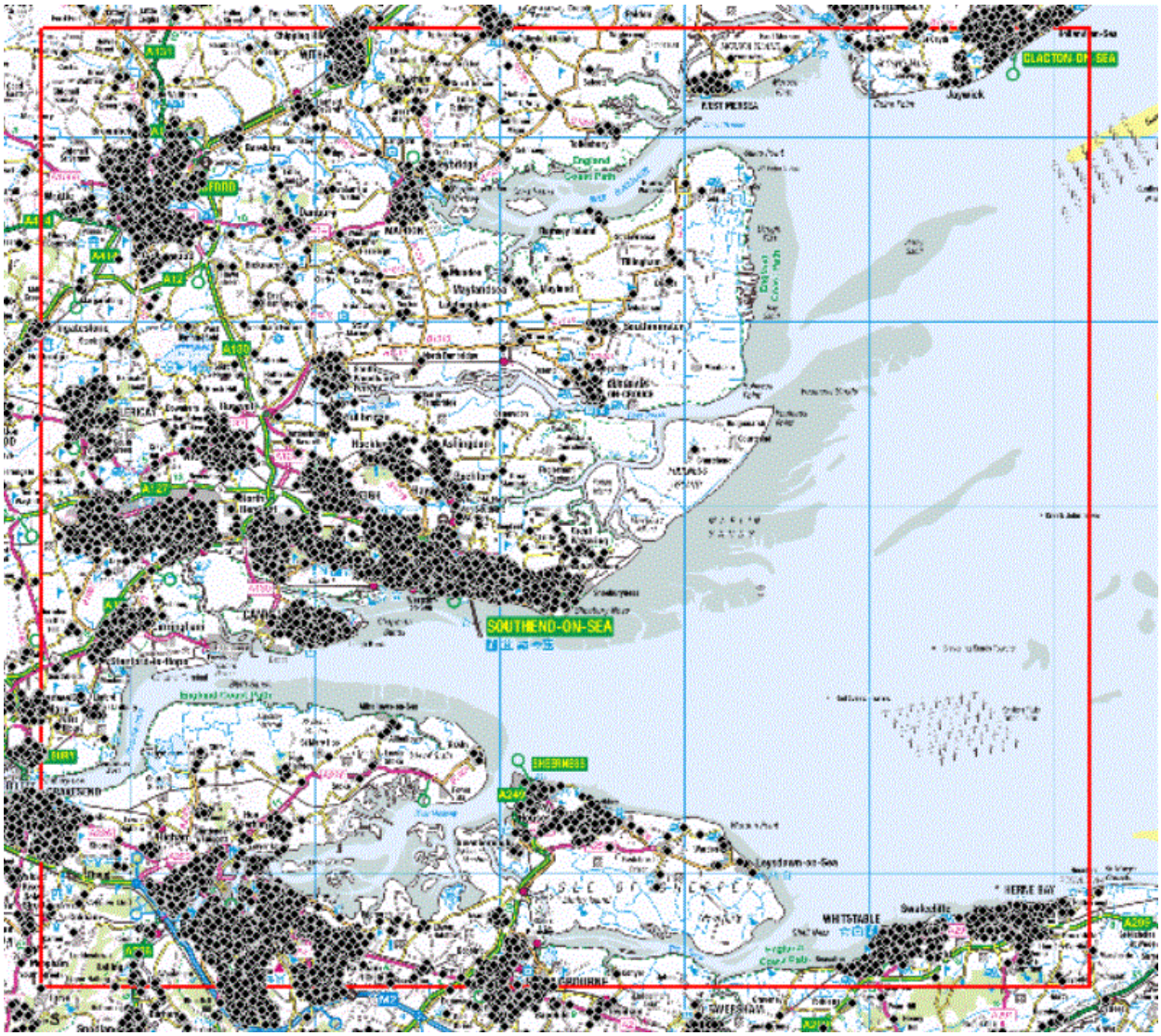


Figure 12: Population Density Map inside the Potentially Affected Area

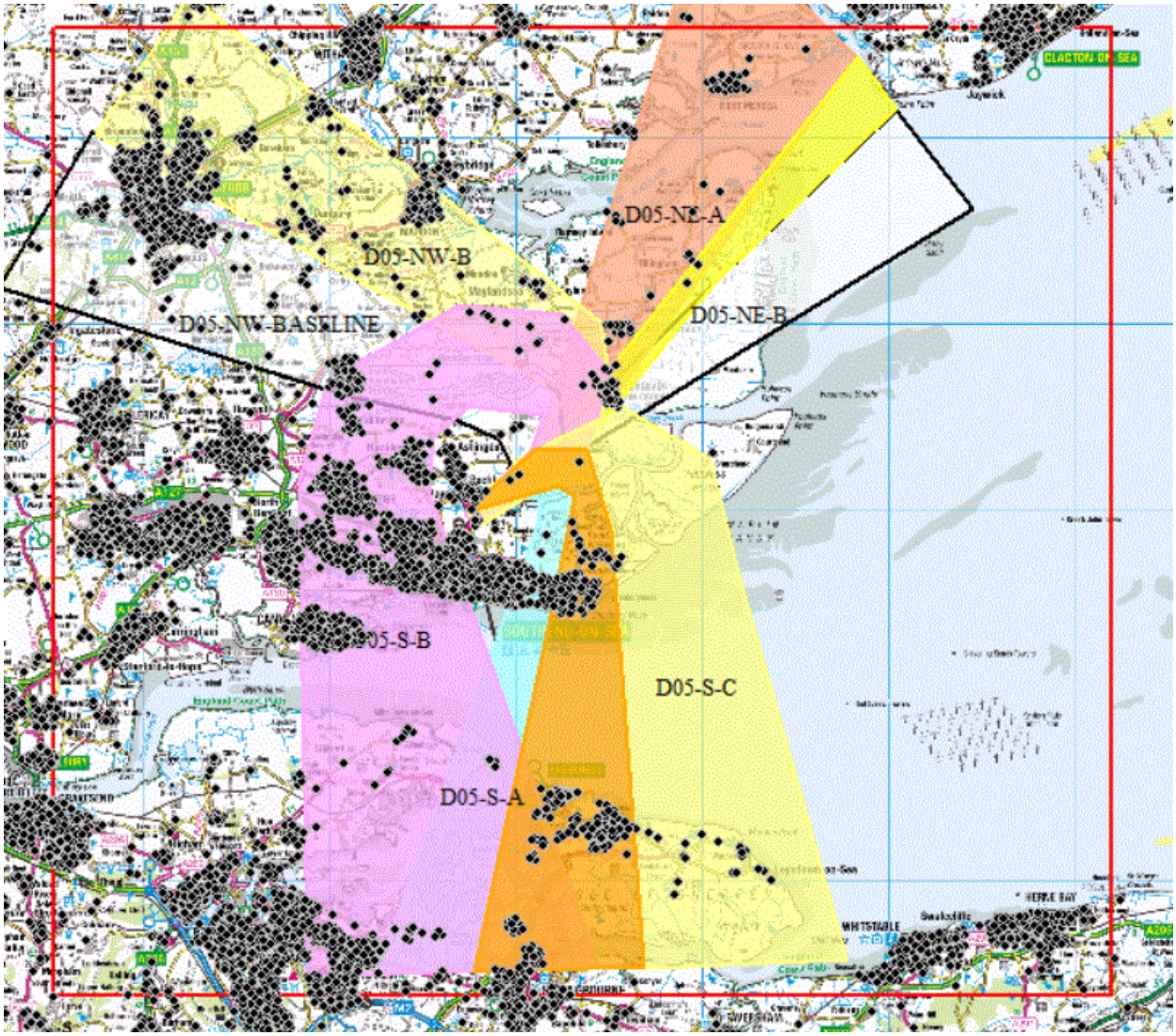


Figure 13: Population Density Map for Departures Runway 05

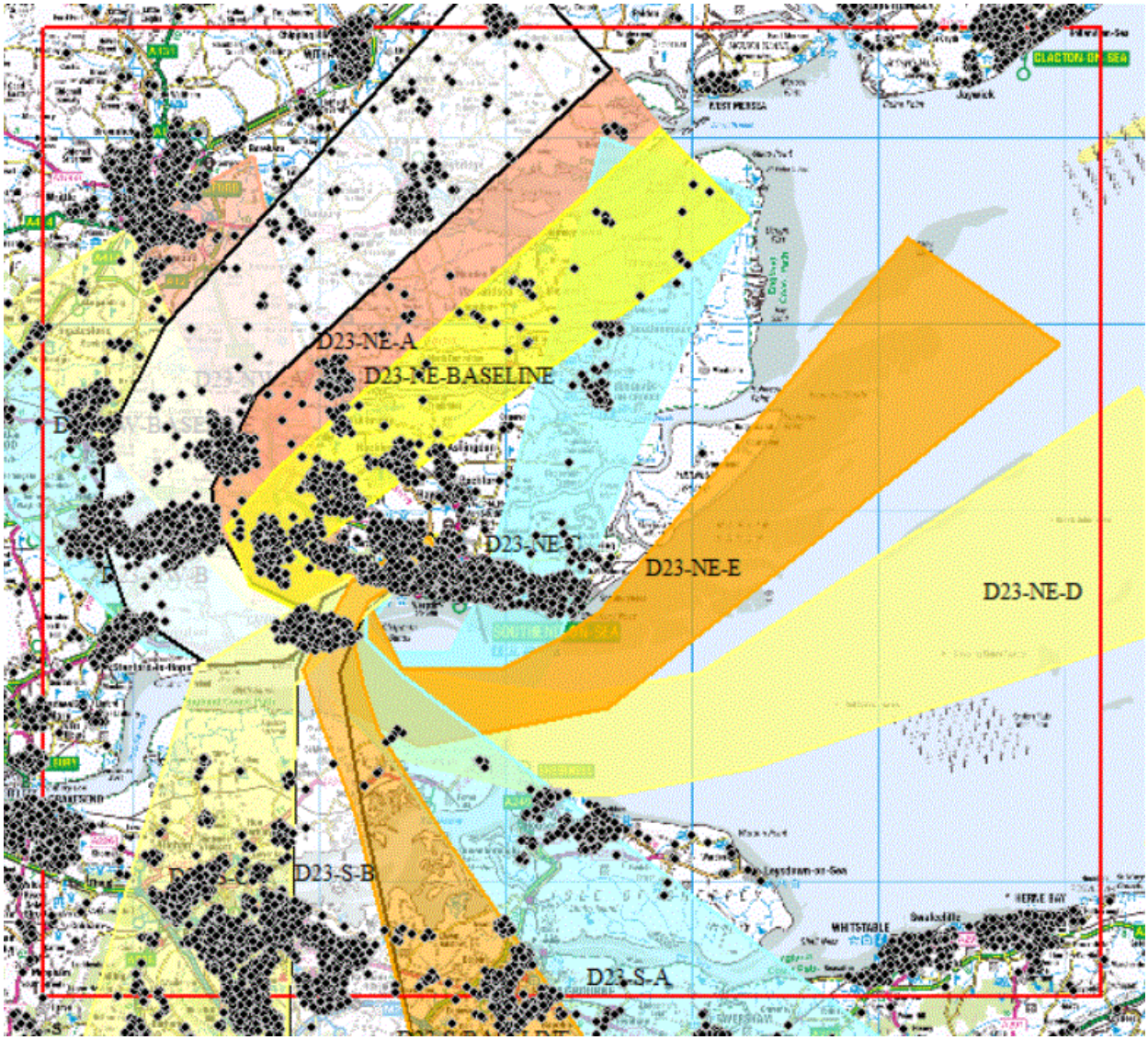


Figure 14: Population Density Map for Departures Runway 23

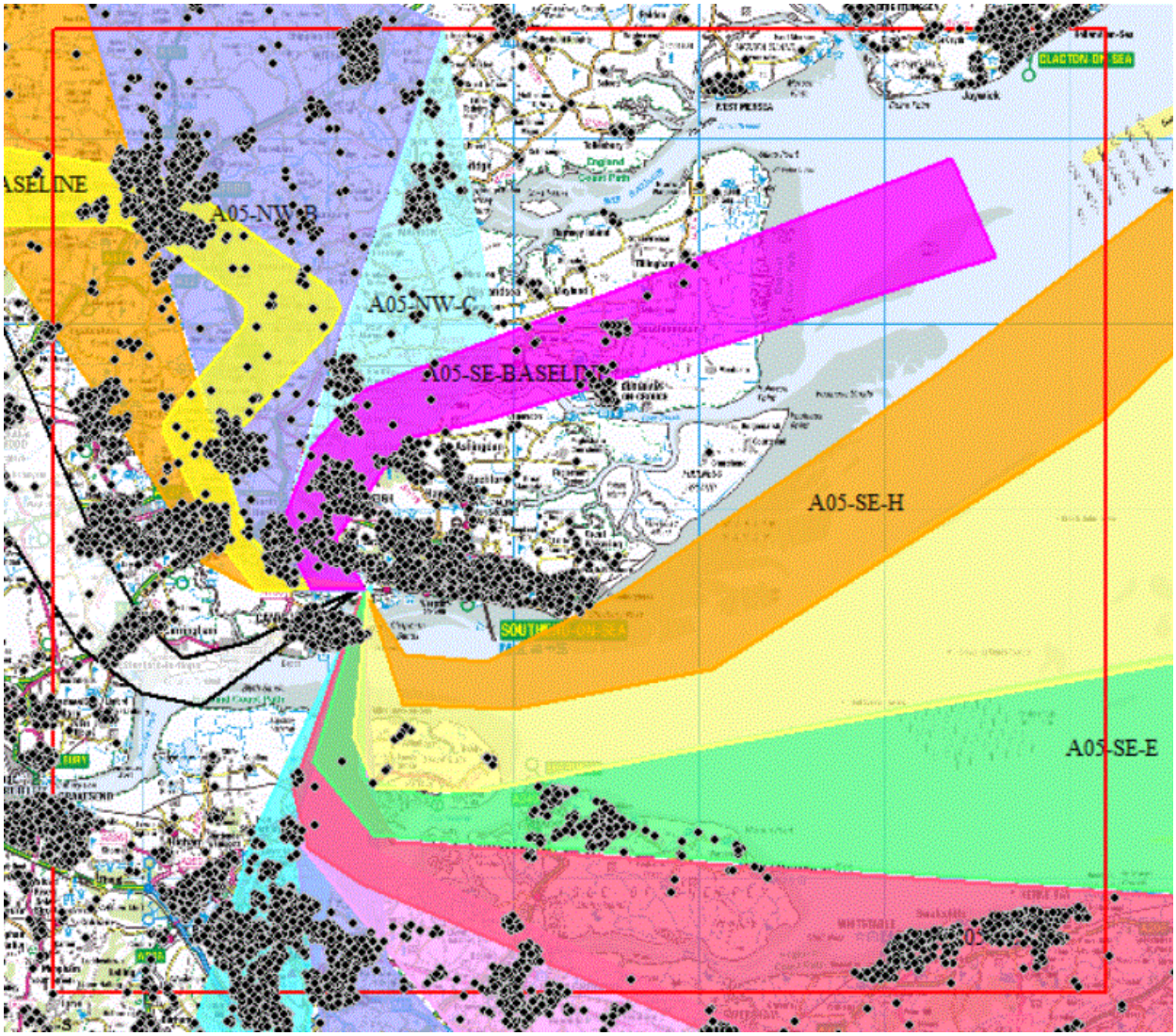


Figure 15: Population Density Map for Arrivals Runway 05

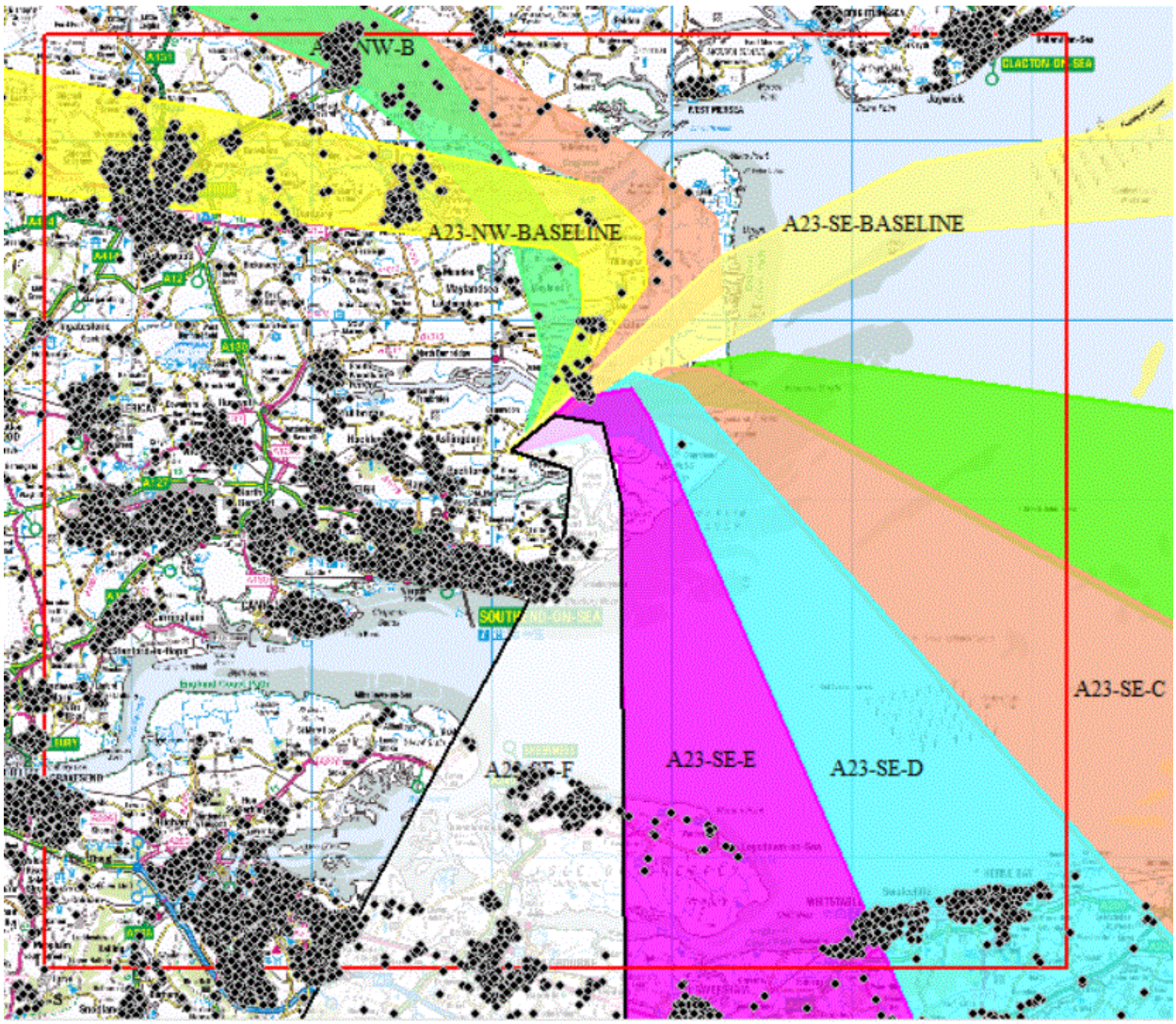


Figure 16: Population Density Map for Arrivals Runway 23

D. Planned Developments

Planned Developments[7] around London Southend Airport

Local Authority	Development Name	Development Details	Status
Braintree District Council	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	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 and leisure provision	Being planned. Initial delivery 2026/27 to 2032/33.
	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

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

	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, Blackmore	30 homes	To be delivered between 2022/23 and 2023/24
Chelmsford City Council	South Woodham Ferrers	1000 homes. Plus school	Development to commence 2024/25
Canterbury District Council	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	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	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	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	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	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	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	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			Unable to obtain up-to-date planned development information
Rochford Council			New Local Plan in preparation
Southend City Council			New Local Plan in preparation
Medway Council			New Local Plan in preparation
Basildon Council			2007 Local Plan online. New Local Plan out for consultation
Castle Point Borough Council			New Local Plan out for consultation

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