Our Future Skies – Airspace Modernisation Airspace Change Process Documentation CAA ref ACP-2018-89 Stage 2 Develop & Assess

# Step 2B Options Appraisal (Phase 1 Initial) Including Safety Considerations



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### **1** Introduction

- 1.1.1 London City Airport (LCY) is currently progressing an airspace change which will make changes to the airport's arrival and departure routes alongside associated airspace structures.
- 1.1.2 This document should be read in conjunction with two complementary documents:
  - Step 2A(i) Airspace Design Options
  - Step 2A(ii) Design Principle Evaluation
- 1.1.3 The Step 2A(i) document provides detailed information on the combined programme of airspace modernisation which LCY sits within, and the comprehensive list of indicative design options which were developed through engagement with stakeholders.
- 1.1.4 The Step 2A(ii) document evaluates the comprehensive list of indicative design options against the design principles established at Stage 1 of the airspace change process. That document explains which of the indicative options progressed through that evaluation and which did not. See Section 7 on p.84 for a recap of the Design Principles for this proposal.

#### About this document

- 1.1.5 This document is titled Step 2B Options Appraisal (Phase 1 Initial) Including Safety Considerations. Its objective is to qualitatively appraise the indicative airspace design options progressed<sup>(1)</sup> at Step 2A(ii) in relation to an expected set of impacts<sup>(2)</sup> on listed audience groups, and includes an assessment of the baseline do-nothing option, even though this was discounted at Step 2A(ii).
- 1.1.6 It also provides brief, plain English safety statements which, as noted in Step 2A(i) and 2A(ii), are early indicative design options that will be further refined and coordinated with adjacent ANSPs in the next stage of the process.
- 1.1.7 The evidence supplied is qualitative and high level, the assessment criteria based on the opinions of subject matter experts, feedback derived from stakeholders and the evolving design work.
- 1.1.8 LCY published a traffic forecast in the 2020 Airport Master Plan<sup>(3)</sup>; this projection is not yet accurate enough to build quantitative airspace change options appraisals. Thus the qualitative initial appraisals for each indicative design option do not consider the traffic forecast. A suitable forecast is required as part of the quantitative analysis at Stage 3 and this will be provided.
- 1.1.9 It may be possible to organise arrival design options from each main direction into systems for respite, or that disperse traffic in another way. However at this stage in the process it would be disproportionate to assess every possible permutation of which route works with which other route, while also considering the equivalent permutations of departure options and how they work with arrivals as part of the same system.
- 1.1.10 Each option is therefore assessed in isolation, unless there is a specific reason to consider its relationship with another option or system of options. Combining these options into systems has the potential to mitigate overall noise impacts to a greater extent than assessed individually here, by providing respite and/or managed dispersal. These combined systems of individual routes would be developed under Stage 3 in collaboration with

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<sup>&</sup>lt;sup>1</sup> Design options that were discounted at Step 2A(ii) are not appraised here.

<sup>&</sup>lt;sup>2</sup> CAP1616 Edn 4 Appendix E Table E2 (also see overleaf).

<sup>&</sup>lt;sup>3</sup> For details see Step 2A(i) Design Options document, page 7 paragraph 2.3

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the sponsors of neighbouring airspace changes, their impacts analysed and described as part of the formal consultation.

- 1.1.11 This assessment compares design options with a 'frozen in time' baseline donothing option. The comparison only considers changes related to airspace design differences between the baseline and the option, and not external changes. For example, potential new housing or industrial developments may change community impacts over time for the baseline design and one (or more) of the design options; those potential future impacts are not considered at this stage.
- 1.1.12 The three primary documents 2A(i), 2A(ii) and 2B, along with supporting material, were submitted to the CAA late May 2022 for their consideration at the CAA Gateway Assessment on Friday 24<sup>th</sup> June 2022.
- 1.1.13 All published documents for all stages of the process can be found in the public CAA's Airspace Change portal (<u>link</u> to the page for this proposal).

#### 1.2 Assessment criteria summary

1.2.1 The table below briefly summarises LCY's approach to the key subjects for impact assessment, with one table per design option including the baseline do-nothing option already discounted. It is based on CAP1616 Table E2.

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life (includes impact on tranquillity due to AONB overflight)	Qualitative
	of changes to noise impacts compared with the f changes to tranquillity impacts, notably for	
	d with the do-nothing baseline	
Communities	Air quality	Qualitative
A qualitative assessment c	f changes to local air quality compared with	n the do-nothing baseline.
Wider society	Greenhouse gas impact	Qualitative
	f changes to greenhouse gas impacts comp	
Wider society	Capacity/ resilience	Qualitative
A qualitative assessment a baseline.	f changes to airspace capacity and resiliend	ce compared with the do-nothing
General Aviation	Access	Qualitative
A qualitative assessment c baseline.	f changes to GA access to controlled airspc	ace compared with the do-nothing
General Aviation/	Economic impact from increased	Qualitative
commercial airlines	effective capacity	
A qualitative assessment of capacity compared with	of changes to GA and commercial airline eco the do-nothing baseline.	onomic impacts from increased effective
General Aviation/ commercial airlines	Fuel Burn	Qualitative
A qualitative assessment of baseline.	f changes to GA and commercial airline fue	el burn compared with the do-nothing
Commercial airlines	Training costs	Qualitative
A qualitative assessment a	f changes to commercial airline training cos	ts compared with the do-nothing baseline
Commercial airlines	Other costs	Qualitative
A qualitative assessment of baseline.	f changes to other relevant commercial airli	ne costs compared with the do-nothing
Airport/ ANSP	Infrastructure costs	Qualitative
	f changes to ANSP infrastructure costs comp	
Airport/ ANSP	Operational costs	Qualitative
	f changes to ANSP operational costs compo	
Airport/ ANSP	Deployment costs	Qualitative
	f ANSP deployment costs compared with the	
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
	f how the design option strikes a balance, c CO2 compared with the do-nothing baseline	

# 2 Option 0: Baseline (do nothing)

This option is provided for comparison purposes; it was discounted during Step 2A(ii).

Group	Impact	s; it was alscounted during Step 2A(II). Level of Analysis
Communities	Noise impact on health and qu	
	of life (includes impact on trans	quility
	due to AONB overflight)	
		flown. There would be no opportunities to
	otherwise alter flightpaths. It this bo	seline system was retained, the noise impact
would not change.		
		dispersed manner below 7,000ft, which may
-	anquillity. If this baseline system we	as retained, this impact on tranquillity would
not change.		
Communities	Air quality	Qualitative
	would be flown below 1,000ft <sup>(4)</sup> .	
If this baseline system	was retained, arrivals would not ch	nange flightpath below 1,000ft, departures
would not change flig	ghtpath below 1,000ft, and local ai	r quality impacts would not change.
Wider society	Greenhouse gas impact	Qualitative
The same route lengt		pical altitudes would be attained along the
		could not be shortened, altitudes could not
	nouse gas impacts would not chang	
Wider society	Capacity/ resilience	Qualitative
	pportunity to improve airspace cap	
		ntinue to flow from the east regardless of
		f the airport on take-off, capacity and
resilience impacts wo		The diport of take-on, capacity and
General Aviation	Access	Qualitative
		currently observed (generally this is at or
		would continue to access the same areas in a
	ccess impacts would not change.	
General Aviation/	Economic impact from increas	ed Qualitative
commercial airlines	effective capacity	
		acity. If this baseline system was retained, all
		of origin, departures would continue to
		bacts would not change, and there would be
	mic impact for either GA or comme	
General Aviation/	Fuel Burn	Qualitative
commercial airlines		
The same route lengt	hs would be flown and the same ty	pical altitudes would be attained along the
track. If this baseline	system was retained, track lengths	could not be shortened, altitudes could not
increase, and fuel bu	rn impacts would not change for e	ither GA or commercial operators.
Commercial airlines	Training costs	Qualitative
Flight procedures cho	ange worldwide with each AIRAC c	cycle and airlines would update their
		ine system was retained, the same flight
	e used and training cost impacts wa	· · · · · · · · · · · · · · · · · · ·
Commercial airlines	Other costs	Qualitative
		are appropriate for inclusion in this appraisal.
	was retained, those other costs wa	
Airport/ ANSP	Infrastructure costs	Qualitative
		rstem was retained, the same infrastructure
		ditional costs beyond typical maintenance.
Airport/ ANSP	Operational costs	Qualitative
The operation is used	daily. If this baseline system was re-	tained the same energian would continue
		tained, the same operation would continue
in the same way, with	n no additional operational costs.	
in the same way, with Airport/ ANSP	n no additional operational costs. Deployment costs	tained, the same operation would continue Qualitative leployment, hence no associated costs.

<sup>&</sup>lt;sup>4</sup> Government guidance states that aircraft flying above 1,000ft are unlikely to have a significant impact on local air quality, therefore only flightpath changes below 1,000ft may have an impact.

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All	Performance against the vision and	Qualitative
	parameters/strategic objectives of	
	the AMS	
This baseline system would not meet the strategic objectives of the AMS.		

#### Qualitative safety assessment

A qualitative high-level safety appraisal for the proposed option 0 (do nothing) indicates that if the baseline system was retained, the existing level of safety performance undertaken within the current operation would be at least maintained. However, if there was no change to the current operation the potential increase in traffic as forecast and published in the 2020 master plan p.47 (link) could begin to constrain capacity, which in turn, could increase controller workload and traffic complexity within the LTMA leading to potential safety issues in the future.

# 3 Arrival Options

### 3.1 Outer Routes (from 7,000ft-4,000ft) common to both runways

3.1.1 ARR-Common-Outer-NW-Shortcut

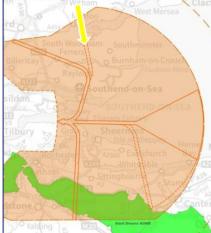
the Witham Witham To South Woosham Billericay Rayle South Woosham Billericay Rayle South Woosham Billericay Rayle South Rayle	Southminster Burnham-on-Croute Foutness Journ thend-on-Sea SOUTHEND Bile of theop Bile	y 09 and 27 common arrival, shortcut from the northwest
Group Communities	Impact Noise impact on he	Level of Analysis           alth and auality         Qualitative
Commonines	of life (includes impo	
	due to AONB overfli	
This design option w		would also not reduce the overflight of populated areas
elsewhere at these a	altitudes. Therefore, qual	itatively the anticipated noise impact would be greater
		-nothing option. This design option would not overfly an
	,000ft hence no change	
Communities	Air quality	Qualitative
0		ng higher than 1,000ft are unlikely to have a significant
impact on local air o		and an allow the standard from the standard standard and the base of the base
- · · ·	Jality impacts are predict	red under this design option (route would be entirely
above 1,000ft).	Creenbeure an im	pact Qualitative
Wider society	Greenhouse gas imp	
the existing arrival flo	ow over the Estuary. This of greenhouse gas impa	tly shorter arrival route from the northwest while joining significantly shorter flightplannable track distance would cts for each flight using this route when compared to the
Wider society	Capacity/ resilience	e Qualitative
improve capacity/re However, it would re flows from more tha clear how much imp	esilience and associated quire a delay absorption	structure in the upper network. The integration of arrival duce operational complexities, at this stage it is not upacity/resilience.
General Aviation	Access	Qualitative
		ned within existing CAS. Qualitatively there would be a
		d with the baseline do-nothing option.
General Aviation/ commercial airlines	Economic impact fr effective capacity	om increased Qualitative
		tial to contribute to increased effective capacity, which
would have a positiv	ve economic impact con	npared with the baseline do-nothing option. We do not
predict a change in General Aviation/	Fuel Burn	Qualitative
commercial airlines	I DEI DUITI	
Qualitatively this des burn impact on com		plannable track distance would result in a reduced fuel npared with the baseline do-nothing option.
Commercial airlines	0	Qualitative
	cordingly, training if requi	lwide with each AIRAC cycle and airlines would update red. This option is not anticipated to impose additional
Our Enture Shies	Airspace Modernisation	ACP-2018-89 Step 2B Options Appraisal (Phase 1 Initial)

Commercial airlines	Other costs	Qualitative			
No other airline costs ar	No other airline costs are foreseen.				
Airport/ ANSP	Infrastructure costs	Qualitative			
	expected to change Airport or ANSP in				
deployment phase which	ch will require some systems engineering	g amendments.			
Airport/ ANSP	Operational costs	Qualitative			
This design option is not	expected to change Airport or ANSP or	perational cost impacts.			
Airport/ ANSP	Deployment costs	Qualitative			
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.					
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative			
On balance, this design option has the potential to contribute to the AMS (enables capacity improvement, increased overall noise impact, reduced fuel/CO <sub>2</sub> ).					

#### **Qualitative Safety Assessment**

This proposed arrival route is common to runway 09 and 27 via a shortcut from the northwest which overlies Southend Airport. A qualitative safety appraisal indicates that this arrival option would need to deconflict with Southend and potentially Stansted Airport. This option would also require integration with multiple arrivals to 09 and 27 from the Point-Merge system which would require a safety hazard assessment.

#### 3.1.2 ARR-Common-Outer-N-Shortcut



Runway 09 and 27 common arrival, shortcut from the north

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality	Qualitative
	of life (includes impact on tranquillity	
	due to AONB overflight)	
<u> </u>	uld overfly Southend. It would also not re	<b>e</b>
	titudes. Therefore, qualitatively the antici	
	ed with the baseline do-nothing option.	<b>.</b>
	00ft hence no change in tranquillity impo	
Communities	Air quality	Qualitative
-	e states that aircraft flying higher than 1,0	000ft are unlikely to have a significant
mpact on local air qu		
	ality impacts are predicted under this des	ign option (route would be entirely
above 1,000ft).		
Nider society	Greenhouse gas impact	Qualitative
	uld provide a shorter arrival route from the	
	stuary. This shorter flightplannable track of	
	cts for each flight using this route when c	compared to the baseline do-nothing
option.		
Vider society	Capacity/ resilience	Qualitative
	uld introduce a new systemised route fror	m the north which has the potential to
	ilience and associated impacts.	energy and the training the second former of second s
	uire a delay absorption structure in the u	· · · · ·
	one direction may introduce operationa	
General Aviation	act this may have on capacity/resilience.	
		Qualitativa
	Access	Qualitative
This design option is ar	nticipated to be contained within existing	g CAS. Qualitatively there would be a
This design option is ar similar access impact	nticipated to be contained within existing on GA traffic compared with the baselin	g CAS. Qualitatively there would be a be do-nothing option.
his design option is ar iimilar access impact <b>General Aviation/</b>	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased	g CAS. Qualitatively there would be a
This design option is ar similar access impact General Aviation/ commercial airlines	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity	g CAS. Qualitatively there would be a le do-nothing option. Qualitative
his design option is ar imilar access impact General Aviation/ commercial airlines Qualitatively this desig	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute	g CAS. Qualitatively there would be a le do-nothing option. Qualitative to increased effective capacity, which
his design option is ar imilar access impact General Aviation/ commercial airlines Qualitatively this desig would have a positive	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b	g CAS. Qualitatively there would be a le do-nothing option. Qualitative to increased effective capacity, whicl
This design option is an similar access impact General Aviation/ commercial airlines Qualitatively this desig would have a positive predict a change in G	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b GA impacts.	g CAS. Qualitatively there would be a be do-nothing option. Qualitative to increased effective capacity, which paseline do-nothing option. We do not
This design option is an similar access impact General Aviation/ commercial airlines Qualitatively this desig would have a positive predict a change in G General Aviation/	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b	g CAS. Qualitatively there would be a le do-nothing option. Qualitative to increased effective capacity, which
This design option is ar similar access impact General Aviation/ commercial airlines Qualitatively this desig would have a positive predict a change in G General Aviation/ commercial airlines	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b GA impacts. Fuel Burn	g CAS. Qualitatively there would be a ne do-nothing option. Qualitative to increased effective capacity, which paseline do-nothing option. We do not Qualitative
This design option is ar similar access impact General Aviation/ commercial airlines Qualitatively this desig would have a positive predict a change in G General Aviation/ commercial airlines Qualitatively this desig	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b GA impacts. Fuel Burn on option's shorter flightplannable track of	g CAS. Qualitatively there would be a ne do-nothing option. Qualitative to increased effective capacity, which paseline do-nothing option. We do not Qualitative distance would result in a reduced fuel
This design option is an imilar access impact General Aviation/ commercial airlines Qualitatively this design would have a positive predict a change in G General Aviation/ commercial airlines Qualitatively this design pourn impact on comm	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b GA impacts. Fuel Burn on option's shorter flightplannable track con nercial traffic when compared with the b	g CAS. Qualitatively there would be a ne do-nothing option. Qualitative to increased effective capacity, which paseline do-nothing option. We do no Qualitative distance would result in a reduced fuel
his design option is ar imilar access impact General Aviation/ commercial airlines Qualitatively this desig would have a positive predict a change in G General Aviation/ commercial airlines Qualitatively this desig purn impact on commo predict a change in G	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b GA impacts. Fuel Burn on option's shorter flightplannable track con nercial traffic when compared with the b GA impacts.	g CAS. Qualitatively there would be a le do-nothing option. Qualitative to increased effective capacity, which baseline do-nothing option. We do no Qualitative distance would result in a reduced fuel baseline do-nothing option. We do no
This design option is an similar access impact General Aviation/ commercial airlines Qualitatively this desig would have a positive oredict a change in G General Aviation/ commercial airlines Qualitatively this desig ourn impact on commo oredict a change in G Commercial airlines	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b GA impacts. Fuel Burn on option's shorter flightplannable track of nercial traffic when compared with the b GA impacts. Training costs	g CAS. Qualitatively there would be a le do-nothing option. Qualitative to increased effective capacity, which baseline do-nothing option. We do not Qualitative distance would result in a reduced fuel baseline do-nothing option. We do not Qualitative
This design option is an similar access impact General Aviation/ commercial airlines Qualitatively this desig would have a positive oredict a change in G General Aviation/ commercial airlines Qualitatively this desig ourn impact on commo oredict a change in G Commercial airlines Qualitatively, flight pro	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b GA impacts. Fuel Burn on option's shorter flightplannable track of nercial traffic when compared with the b GA impacts. Training costs ocedures change worldwide with each A	g CAS. Qualitatively there would be a le do-nothing option. Qualitative to increased effective capacity, which baseline do-nothing option. We do nor Qualitative distance would result in a reduced fuel baseline do-nothing option. We do nor Qualitative AIRAC cycle and airlines would update
This design option is an imilar access impact General Aviation/ Commercial airlines Qualitatively this design would have a positive predict a change in G General Aviation/ Commercial airlines Qualitatively this design pourn impact on commo predict a change in G Commercial airlines Qualitatively, flight pro- their procedures according	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b GA impacts. Fuel Burn on option's shorter flightplannable track of nercial traffic when compared with the b GA impacts. Training costs ocedures change worldwide with each A prdingly, training if required. This option is	g CAS. Qualitatively there would be a le do-nothing option. Qualitative to increased effective capacity, which baseline do-nothing option. We do nor Qualitative distance would result in a reduced fuel baseline do-nothing option. We do nor Qualitative AIRAC cycle and airlines would update
This design option is an imilar access impact General Aviation/ commercial airlines Qualitatively this desig would have a positive predict a change in G General Aviation/ commercial airlines Qualitatively this desig pourn impact on commo predict a change in G Commercial airlines Qualitatively, flight pro	nticipated to be contained within existing on GA traffic compared with the baselin Economic impact from increased effective capacity on option has the potential to contribute e economic impact compared with the b GA impacts. Fuel Burn on option's shorter flightplannable track of nercial traffic when compared with the b GA impacts. Training costs ocedures change worldwide with each A prdingly, training if required. This option is	g CAS. Qualitatively there would be a le do-nothing option. Qualitative to increased effective capacity, which baseline do-nothing option. We do not Qualitative distance would result in a reduced fuel baseline do-nothing option. We do not Qualitative AIRAC cycle and airlines would update

Airport/ ANSP	Infrastructure costs	Qualitative			
This design option is	This design option is not expected to change Airport or ANSP infrastructure impacts, beyond the initial				
deployment phase	which will require some systems er	ngineering amendments.			
Airport/ ANSP	Operational costs	Qualitative			
This design option is	not expected to change Airport o	or ANSP operational cost impacts.			
Airport/ ANSP	Deployment costs	Qualitative			
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.					
All	Performance against the visi parameters/strategic object the AMS				
On balance, this design option has the potential to contribute to the AMS (enables capacity improvement, increased overall noise impact, reduced fuel/CO <sub>2</sub> ).					

#### **Qualitative Safety Assessment**

This proposed arrival route common to runway 09 and 27 provides a shorter arrival route from the north. The qualitative safety appraisal indicates that this arrival option would need to deconflict with Southend and potentially Stansted Airport. This option would also require integration with arrivals to 09 and 27 from the Point-Merge system which would require a safety hazard assessment.

#### 3.1.3 ARR-Common-Outer-PM



Runway 09 and 27 common arrival, outer point merge (This is a structural component of the baseline do-nothing airspace system, which is already optimised, therefore has been retained)

Valding Z. MED	Kert Divers ADVB	
Group	Impact	Level of Analysis
Communities	of life (included) due to AONB	
anticipated noise in option, which itself i 7,000ft-4,000ft henc	npact would be br s optimised for this e no change in tra	
Communities	Air quality	Qualitative
impact on local air	quality. uality impacts are	craft flying higher than 1,000ft are unlikely to have a significant predicted under this design option (route would be entirely
Wider society	Greenhouse	gas impact Qualitative
would be attained	along the track. Th ch flight when com	urrent) route length would be flown and similar typical altitudes nerefore, there would be no change in greenhouse gas npared to the baseline do-nothing option, which itself is
Wider society	Capacity/ re	silience Qualitative
		urrent) route element would be flown which, while already al capacity/resilience and associated impacts.
General Aviation	Access	Qualitative
		) route element which would be contained within existing CAS. access impact on GA traffic compared with the baseline do-
General Aviation/ commercial airlines	effective cap	
already optimised, v	would not enable a	the same (current) route element would be flown which, while additional capacity hence no improved economic impacts ng option. We do not predict a change in GA impacts.
General Aviation/	Fuel Burn	Qualitative
commercial airlines		
already optimised, v	would not reduce of	the same (current) route element would be flown which, while commercial airline fuel burn impacts compared with the of predict a change in GA impacts.
<b>Commercial airlines</b>	Training costs	Qualitative
their procedures ac	cordingly, training	e worldwide with each AIRAC cycle and airlines would update if required. This option is the same (current) route element and Il training cost impacts for airlines.
<b>Commercial airlines</b>	Other costs	Qualitative
No other airline cost	ts are foreseen.	
Airport/ ANSP	Infrastructure	
<b>.</b>		change Airport or ANSP infrastructure impacts. The same on which would not require systems engineering amendments.

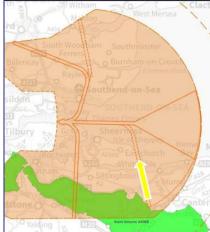
Airport/ ANSP	Operational costs	Qualitative			
This design option is not	This design option is not expected to change Airport or ANSP operational cost impacts.				
Airport/ ANSP	Deployment costs	Qualitative			
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.					
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative			
On balance, this design option has the potential to contribute to the AMS (no capacity improvement but already optimised, same overall noise impact but already optimised, same fuel/CO <sub>2</sub> impacts but					
put already optimised, s	same overall noise impact but already c	plimisea, same iver/CO2 impacts but			

already optimised).

#### **Qualitative Safety Assessment**

This proposed design option for runway 09 and 27 is the same as the baseline Point-Merge system that overflies the Thames Estuary from 7000ft to 4000ft. The qualitative safety assessment for this option indicates similar levels of safety assurance to today's operation.

#### 3.1.4 ARR-Common-Outer-S-PM



Runway 09 and 27 common arrival, outer southern point merge

Group         Impact         Qualitative           Communities         Noise impact on health and quality of the (includes impact on tranquility due to AONB overflight)         Qualitative           This design option would overfly northern Kent. It would also not reduce the overflight of populated areas elsewhere at these altitudes. Therefore, qualitatively the anticipated noise impact would be greater overall when compared with the baseline do-nothing option.         Some areas of the Kent Downs AONB may also be overflown at higher altitudes by this route which would have a negative impact on tranquility.           Communities         Air quality         Qualitative           Government guidance states that aircraft flying higher than 1.000ft are unlikely to have a significant impact on local at quality.         Air quality.           Arriving aircraft would still descend through 1.000ft on final approach, about 1.7 nautical miles (3.2km) from touchdown at either end of the runway. This is close to landing, in the very final stages of the approach, so the air quality impact would not change when compared with the baseline do-nothing option.           Wider society         Greenhouse gas impact         Qualitative           This design option would provide a shorter arrival route from the south while joining the existing arrival flow over the Estuay. This shorter flightplannable track distance would result in a reduction of greenhouse gas impacts for each flight using this route when compared to the baseline do-nothing option.           Wider society         Capacity/ resilience         Qualitative           This design option is anticipated to be cont	Yalding 7 Main	Kent Devens ACNE	
of life (includes impact on tranquility due to AONB overflight) This design option would overfly northerm Kent. It would also not reduce the overflight of populated areas elsewhere at these altitudes. Therefore, qualitatively the anticipated noise impact would be greater overall when compared with the baseline do-nothing option. Some areas of the Kent Downs AONB may also be overflown at higher altitudes by this route which would have a negative impact on tranquility. Communities A ir quality Qualitative Government guidance states that alticraft flying higher than 1,000ft are unlikely to have a significant impact on local air quality. Arriving alteraft would still descend through 1,000ft on final approach, about 1.7 nautical miles (3.2km) from touchdown at either end of the runway. This is close to landing, in the very final stages of the approach, so the air quality impact would not change when compared with the baseline do-nothing option. Wider soclety Greenhouse gas impact Qualitative This design option would provide a shorter arrival route from the south while joining the existing arrival flow over the Estuary. This shorter flightplannable track distance would result in a reduction of greenhouse gas impacts for each flight using this route when compared to the baseline do-nothing option. Wider soclety Capacity/ resilience Qualitative This design option initially routes over a new area and acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity/resilience and associated impacts. General Aviation Access Qualitative This design option initially routes over a new area and acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity/resilience and associated impacts. General Aviation Economic impact from increased Qualitative Commercial alvines to be contained within existing CAS. Qualitative this design option acts as an extension of the existing point-mer	Group	Impact	Level of Analysis
areas elsewhere at these attitudes. Therefore, qualitatively the anticipated noise impact would be greater overall when compared with the baseline do-nothing option. Some areas of the Kent Downs AONB may also be overflown at higher attitudes by this route which would have a negative impact on tranquility. Communities Air quality Qualitative Government guidance states that alicraft flying higher than 1,000ft are unlikely to have a significant impact on local air quality. Arriving aircraft would still descend through 1,000ft on final approach, about 1.7 nautical miles (3.2km) from touchdown at either end of the runway. This is close to landing, in the very final stages of the approach, so the air quality impact would not change when compared with the baseline do-nothing option. Wider society Greenhouse gas impact Qualitative This design option would provide a shorter arrival route from the south while joining the existing arrival flow over the Estuary. This shorter flightplannable track distance would result in a reduction of greenhouse gas impacts for each flight using this route when compared to the baseline do-nothing option. Wider society Capacity/resilience Qualitative This design option initially routes over a new area and acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity/resilience and associated impacts. General Aviation Access Qualitative This design option is anticipated to be contained within existing CAS. Qualitative there would be a similar access impact on GA traffic compared with the baseline do-nothing option. General Aviation/ Economic impacts compared with the baseline do-nothing option. General Aviation/ Economic impacts compared with the baseline do-nothing option. General Aviation/ Economic impacts compared with the baseline do-nothing option. General Aviation/ Economic impacts compared with the baseline do-nothing option. General Aviation/ Economic impacts compared with the baseline do-nothing option. Gen		of life (includes impact on tranquill due to AONB overflight)	ity
Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant impact on local air quality.         Arriving aircraft would still descend through 1,000ft on final approach, about 1.7 nautical miles (3.2km) from touchdown at either end of the runway. This is close to landing, in the very final stages of the approach, so the air quality impact would not change when compared with the baseline do-nothing option.         Wider society       Greenhouse gas impact       Qualitative         This design option would provide a shorter arrival route from the south while joining the existing arrival flow over the Estuary. This shorter flightplannable track distance would result in a reduction of greenhouse gas impacts for each flight using this route when compared to the baseline do-nothing option.         Wider society       Capacity/ resilience       Qualitative         This design option initially routes over a new area and acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity/resilience and associated impacts.       Qualitative         General Aviation       Access       Qualitative         This design option is anticipated to be contained within existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity/resilience anilar access impact on GA traffic compared with the baseline do-nothing option.         General Aviation       Access       Qualitative         Commercial airlines       effective capacity       Qualitative         Qualitatively this design option acts	areas elsewhere at t greater overall when Some areas of the Ke	hese altitudes. Therefore, qualitatively t compared with the baseline do-nothir ent Downs AONB may also be overflow	the anticipated noise impact would be ng option.
impact on local air quality. Arriving aircraft would still descend through 1,000ft on final approach, about 1.7 nautical miles (3.2km) from touchdown at either end of the runway. This is close to landing, in the very final stages of the approach, so the air quality impact would not change when compared with the baseline do-nothing option. Wider society Greenhouse gas impact Qualitative This design option would provide a shorter arrival route from the south while joining the existing arrival flow over the Estuary. This shorter flightplannable track distance would result in a reduction of greenhouse gas impacts for each flight using this route when compared to the baseline do-nothing option. Wider society Capacity/ resilience Qualitative This design option initially routes over a new area and acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity/resilience and associated impacts. General Aviation Access Qualitative This design option is anticipated to be contained within existing CAS. Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option. General Aviation/ Economic impact from increased Qualitative already optimised, this would be unlikely to enable additional capacity/ there would be a already optimised, this would be unlikely to enable additional capacity hence no improved economic impacts compared with the baseline do-nothing option. General Aviation/ Fuel Bum Qualitative Qualitatively this design option acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity hence no improved economic impacts compared with the baseline do-nothing option. We do not predict a change in GA impacts. Commercial airlines Qualitatively this design option's shorter flightplannable track distance would result in a reduced fuel burn impact on commercial traffic when compared with the base			
Wider society         Greenhouse gas impact         Qualitative           This design option would provide a shorter arrival route from the south while joining the existing arrival flow over the Estuary. This shorter flightplannable track distance would result in a reduction of greenhouse gas impacts for each flight using this route when compared to the baseline do-nothing option.           Wider society         Capacity/ resilience         Qualitative           This design option initially routes over a new area and acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity/resilience and associated impacts.         Qualitative           General Aviation         Access         Qualitative           This design option is anticipated to be contained within existing CAS. Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option.         General Aviation           General Aviation/         Economic impact from increased         Qualitative           Qualitatively this design option acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity hence no improved economic impacts compared with the baseline do-nothing option.           General Aviation/         Even unlikely to enable additional capacity hence no improved economic impacts.           General Aviation/         Fuel Burn         Qualitative           Qualitatively this design option's shorter flightplannable track distance would result in a reduced fuel bun	impact on local air of Arriving aircraft woul from touchdown at e approach, so the air	juality. d still descend through 1,000ft on final c either end of the runway. This is close to	approach, about 1.7 nautical miles (3.2km) a landing, in the very final stages of the
This design option would provide a shorter arrival route from the south while joining the existing arrival flow over the Estuary. This shorter flightplannable track distance would result in a reduction of greenhouse gas impacts for each flight using this route when compared to the baseline do-nothing option.         Wider society       Capacity/ resilience       Qualitative         This design option initially routes over a new area and acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity/resilience and associated impacts.       Qualitative         General Aviation       Access       Qualitative         This design option is anticipated to be contained within existing CAS. Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option.       General Aviation/         Economic impact from increased       Qualitative         Qualitatively this design option acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity hence no improved economic impacts compared with the baseline do-nothing option.         General Aviation/       Economic masce as a extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity hence no improved economic impacts compared with the baseline do-nothing option. We do not predict a change in GA impacts.         General Aviation/       Fuel Burn       Qualitative         Qualitatively this design option's shorter flightplannable track distance would result in a reduced		Greenhouse aas impact	Qualitative
Wider societyCapacity/ resilienceQualitativeThis design option initially routes over a new area and acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity/resilience and associated impacts.General AviationAccessQualitativeThis design option is anticipated to be contained within existing CAS. Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option.General Aviation/Economic impact from increased effective capacityQualitativeQualitatively this design option acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity hence no improved economic impacts compared with the baseline do-nothing option.General Aviation/Fuel Burn QualitativeQualitatively this design option's shorter flightplannable track distance would result in a reduced fuel burn impact on commercial traffic when compared with the baseline do-nothing option.Qualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if required. This option is not anticipated to impose additional training costs Qualitative	flow over the Estuary greenhouse gas imp	ould provide a shorter arrival route from . This shorter flightplannable track dista	nce would result in a reduction of
structure. While already optimised, this would be unlikely to enable additional capacity/resilience and associated impacts. General Aviation Access Qualitative This design option is anticipated to be contained within existing CAS. Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option. General Aviation/ Economic impact from increased Qualitative commercial airlines effective capacity Qualitatively this design option acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity hence no improved economic impacts compared with the baseline do-nothing option. We do not predict a change in GA impacts. General Aviation/ Fuel Burn Qualitative commercial airlines Qualitatively this design option's shorter flightplannable track distance would result in a reduced fuel burn impact on commercial traffic when compared with the baseline do-nothing option. We do not predict a change in GA impacts. Commercial airlines Training costs Qualitative Qualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if required. This option is not anticipated to impose additional training cost impacts for airlines. Commercial airlines Other costs Qualitative	Wider society	Capacity/ resilience	Qualitative
This design option is anticipated to be contained within existing CAS. Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option.         General Aviation/       Economic impact from increased       Qualitative         commercial airlines       effective capacity         Qualitatively this design option acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity hence no improved economic impacts compared with the baseline do-nothing option. We do not predict a change in GA impacts.         General Aviation/       Fuel Burn       Qualitative         Qualitatively this design option's shorter flightplannable track distance would result in a reduced fuel burn impact on commercial traffic when compared with the baseline do-nothing option. We do not predict a change in GA impacts.         Commercial airlines       Training costs       Qualitative         Qualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if required. This option is not anticipated to impose additional training cost impacts for airlines.         Commercial airlines       Other costs       Qualitative	structure. While alree	ady optimised, this would be unlikely to	
similar access impact on GA traffic compared with the baseline do-nothing option.General Aviation/ commercial airlinesEconomic impact from increased effective capacityQualitativeQualitatively this design option acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity hence no improved economic impacts compared with the baseline do-nothing option. We do not predict a change in GA impacts.General Aviation/ commercial airlinesFuel BurnQualitativeQualitatively this design option's shorter flightplannable track distance would result in a reduced fuel burn impact on commercial traffic when compared with the baseline do-nothing option. We do not predict a change in GA impacts.QualitativeCommercial airlines Qualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if required. This option is not anticipated to impose additional training cost impacts for airlines.Commercial airlinesOther costsQualitative	<b>General Aviation</b>	Access	Qualitative
commercial airlineseffective capacityQualitatively this design option acts as an extension of the existing point-merge structure. While already optimised, this would be unlikely to enable additional capacity hence no improved economic impacts compared with the baseline do-nothing option. We do not predict a change in GA impacts.General Aviation/ commercial airlinesFuel BurnQualitatively this design option's shorter flightplannable track distance would result in a reduced fuel burn impact on commercial traffic when compared with the baseline do-nothing option. We do not predict a change in GA impacts.Commercial airlinesTraining costsQualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if required. This option is not anticipated to impose additional training cost impacts for airlines.Commercial airlinesOther costsQualitative	similar access impac	t on GA traffic compared with the base	eline do-nothing option.
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burn impact on commercial traffic when compared with the baseline do-nothing option. We do not predict a change in GA impacts.         Commercial airlines       Training costs         Qualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if required. This option is not anticipated to impose additional training cost impacts for airlines.         Commercial airlines       Other costs         Qualitative		Fuel Burn	Qualitative
Commercial airlinesTraining costsQualitativeQualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would update their procedures accordingly, training if required. This option is not anticipated to impose additional training cost impacts for airlines.QualitativeCommercial airlinesOther costsQualitative	burn impact on com	mercial traffic when compared with the	
Qualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would updatetheir procedures accordingly, training if required. This option is not anticipated to impose additionaltraining cost impacts for airlines.Commercial airlinesOther costsQualitative			Qualitative
Commercial airlines         Other costs         Qualitative	Qualitatively, flight p their procedures acc	rocedures change worldwide with eac cordingly, training if required. This option	h AIRAC cycle and airlines would update
			Qualitative

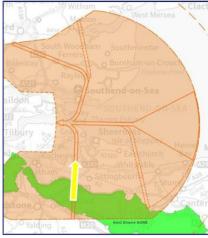
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Airport/ ANSP	Infrastructure costs	Qualitative	
		or ANSP infrastructure impacts, beyond the ini	itial
deployment phase which will require some systems engineering amendments.			
Airport/ ANSP	Operational costs	Qualitative	
This design option is no	ot expected to change Airport	or ANSP operational cost impacts.	
Airport/ ANSP	Deployment costs	Qualitative	
At this stage it is disproportionate to quantify deployment costs per design option as they would be			
used in arrival, departure and runway permutations not yet detailed. However, a system change for			
LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic			
simulators (including s	im prep, management and sto	fing), with additional engineering costs TBC.	
All	Performance against the vi		
	parameters/strategic object	ives of	
	the AMS		
On balance, this design option has the potential to contribute to the AMS (enables capacity			
improvement, increas	ed overall noise impact, reduc	ed fuel/CO2).	

#### **Qualitative Safety Assessment**

This proposed arrival route is common to runway 09 and 27 via a shorter arrival route from the south and southeast. The safety appraisal indicates that there could be the potential for interaction with Biggin Hill, Gatwick, Heathrow and Southend Airports which would need to be assessed. This option requires integration with arrivals to 09 and 27 from the point merge system which would require a safety hazard assessment.

#### 3.1.5 ARR-Common-Outer-S-Shortcut



Runway 09 and 27 common arrival, outer south shortcut

A SI IN A		
Group	Impact	Level of Analysis
Communities	Noise impact on he	
	of life (includes imp	
	due to AONB overf	
		nt. It would also not reduce the overflight of populated
		e, qualitatively the anticipated noise impact would be
		iseline do-nothing option.
	ive impact on tranquillit	Ilso be overflown at higher altitudes by this route which
Communities	Air quality	Qualitative
		ying higher than 1,000ft are unlikely to have a significant
impact on local air a		ang higher man 1,000h are onlikely to have a significarit
		ted under this design option (route would be entirely
above 1,000ft).		
Wider society	Greenhouse gas im	npact Qualitative
		rrival route from the south and southwest while joining the
		rter flightplannable track distance would result in a
		ch flight using this route when compared to the baseline
do-nothing option.		
Wider society	Capacity/ resilienc	
		stemised route from the south which has the potential to
1 1 1	silience and associated	
		n structure in the upper network. The integration of arrival
		oduce operational complexities, at this stage it is not
	pact this may have on co	
General Aviation	Access	Qualitative
- · ·		nined within existing CAS. Qualitatively there would be a
General Aviation/	Economic impact f	ed with the baseline do-nothing option. from increased Qualitative
	effective capacity	
		ntial to contribute to increased effective capacity, which
		mpared with the baseline do-nothing option. We do not
predict a change in		
General Aviation/	Fuel Burn	Qualitative
commercial airlines		
Qualitatively this desi	ign option's shorter fligh	tplannable track distance would result in a reduced fuel
burn impact on com	mercial traffic when co	mpared with the baseline do-nothing option. We do not
predict a change in	GA impacts.	
Commercial airlines	Training costs	Qualitative
		dwide with each AIRAC cycle and airlines would update
		vired. This option is not anticipated to impose additional
training cost impacts		
Commercial airlines	Other costs	Qualitative
No other airline costs		
Our Future Skies A	Airspace Modernisation	ACP-2018-89 Step 2B Options Appraisal (Phase 1 Initial)

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Airport/ ANSP	Infrastructure costs	Qualitative		
This design option is not expected to change Airport or ANSP infrastructure impacts, beyond the initial				
deployment phase	which will require some systems en	ngineering amendments.		
Airport/ ANSP	Operational costs	Qualitative		
This design option is	not expected to change Airport (	or ANSP operational cost impacts.		
Airport/ ANSP	Deployment costs	Qualitative		
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	Performance against the vis parameters/strategic object the AMS			
On balance, this design option has the potential to contribute to the AMS (enables capacity improvement, increased overall noise impact, reduced fuel/CO <sub>2</sub> ).				

#### **Qualitative Safety Assessment**

This proposed arrival route is common to runway 09 and 27 via a significantly shorter arrival route from the southwest and south. The safety appraisal indicates that deconfliction would be required with Gatwick air traffic flows, and there could be the potential for interaction with Biggin Hill and Heathrow which would need to be assessed. This option requires integration with LCY arrivals to 09 and 27 from the point merge system which would require a safety hazard assessment.

### 3.2 Outer Routes (from 7,000ft-4,000ft) specifically for Runway 09

3.2.1 ARR-09-Outer-S-Wide-Alt



Runway 09 arrival, outer south wide alternative

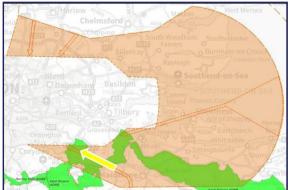
Group	Impact	Level of Analysis
Communities	Noise impact on heal	th and quality Qualitative
	of life (includes impac	ct on
	tranquillity due to AOI	NB overflight)
his design option w	ould overfly northern Kent	. It would also not reduce the overflight of populated
areas elsewhere at	these altitudes. Therefore,	, qualitatively the anticipated noise impact would be
greater overall whe	n compared with the base	eline do-nothing option.
Some areas of the k	Cent Downs AONB may also	o be overflown at higher altitudes which would have a
negative impact or		
Communities	Air quality	Qualitative
		ng higher than 1,000ft are unlikely to have a significant
mpact on local air	quality.	
Arriving aircraft wou	uld still descend through 1,0	000ft on final approach, about 1.7 nautical miles (3.2km
rom touchdown at	either end of the runway.	This is close to landing, in the very final stages of the
approach, so the a	ir quality impact would not	t change when compared with the baseline do-nothing
option.		
Nider society	Greenhouse gas impo	
<b>U</b>	· · · · · · · · · · · · · · · · · · ·	val route from the northeast, east and southeast. It
		out leave in an alternate direction towards Sheerness
and Grain, rather th	an following the Estuary. T	This shorter flightplannable track distance would result ir
a reduction of gree	nhouse gas impacts for ea	ach flight using this route when compared to the
paseline do-nothing	g option.	
Nider society	Capacity/ resilience	Qualitative
This design option w	ould introduce a new system	emised route from the existing point-merge structure
which would have t	he potential to improve co	apacity/ resilience and associated impacts.
However, it would re	equire a delay absorption s	structure in the upper network. The integration of arriva
lows from more the	in one direction may introc	duce operational complexities, at this stage it is not
clear how much im	pact this may have on cap	pacity/resilience.
General Aviation	Access	Qualitative
his design option is	anticipated to be contain	ned within existing CAS. Qualitatively there would be a
similar access impa	<u>ct on GA traffic comparec</u>	d with the baseline do-nothing option.
General Aviation/	Economic impact fror	m increased Qualitative
commercial airlines	effective capacity	
Qualitatively this de	sign option has the potent	tial to contribute to increased effective capacity, which
vould have a positi	ve economic impact com	pared with the baseline do-nothing option.
General Aviation/	Fuel Burn	Qualitative
commercial airlines	;	
Qualitatively this de	sign option's shorter flightp	blannable track distance would result in a reduced fuel
our increased and acre	nmercial traffic when com	pared with the baseline do-nothing option. We do not
sum impact on cor		
oredict a change ir	n GA impacts.	Qualitative
oredict a change ir Commercial airline:	n GA impacts. <b>s</b> Training costs	
Dredict a change ir Commercial airlines Qualitatively, flight p	n GA impacts. <b>s</b> Training costs procedures change worldw	Qualitative
predict a change ir Commercial airlines Qualitatively, flight p heir procedures ac	n GA impacts. <b>s</b> Training costs procedures change worldw cordingly, training if require	Qualitative wide with each AIRAC cycle and airlines would update
Dredict a change ir Commercial airlines Qualitatively, flight p heir procedures ac raining cost impac	n GA impacts. s Training costs procedures change worldw cordingly, training if require ts for airlines.	Qualitative wide with each AIRAC cycle and airlines would update
oredict a change ir Commercial airlines Qualitatively, flight p	n GA impacts. s Training costs procedures change worldw cordingly, training if require ts for airlines. s Other costs	Qualitative wide with each AIRAC cycle and airlines would update ed. This option is not anticipated to impose additional

Airport/ ANSP	Infrastructure costs	Qualitative			
This design option is no	This design option is not expected to change Airport or ANSP infrastructure impacts, beyond the initial				
deployment phase which will require some systems engineering amendments.					
Airport/ ANSP	Operational costs	Qualitative			
This design option is no	ot expected to change Airport or ANSP	operational cost impacts.			
Airport/ ANSP	Deployment costs	Qualitative			
At this stage it is disproportionate to quantify deployment costs per design option as they would be					
used in arrival, departure and runway permutations not yet detailed. However, a system change for					
LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic					
simulators (including sim prep, management and staffing), with additional engineering costs TBC.					
All	Performance against the vision and	Qualitative			
	parameters/strategic objectives of				
	the AMS				
On balance, this desig	On balance, this design option has the potential to contribute to the AMS (no increase in				
capacity but is already optimised, increased overall noise impact, reduced fuel/CO <sub>2</sub> ).					

#### **Qualitative Safety Assessment**

This proposed arrival route provides shorter track mileage to runway 09 from the northeast, east and southeast using the existing Point-Merge system. The qualitative safety assessment for this option indicates similar levels of safety assurance to today's operation, however, the integration of an arrival flow from more than one direction may need a safety hazard assessment. There could be some safety benefit in that this option might enable some departures to climb more quickly.

#### 3.2.2 ARR-09-Outer-S-Shortcut-SE



Runway 09 arrival, outer shortcut southeast

	Impact	Level of Analysis
Communities	Noise impact on healt	h and quality Qualitative
	of life (includes impac	ton
	tranquillity due to AON	JB overflight)
This design option wo		It would also not reduce the overflight of populated
		would however provide enable a reduction in
		nerefore, qualitatively the anticipated noise impact
		n the baseline do-nothing option.
-		b be overflown at higher altitudes which may have a
negative impact on t		<u> </u>
Communities	Air quality	Qualitative
		g higher than 1,000ft are unlikely to have a significant
mpact on local air q		g higher high 1,000h are shinkery to have a significant
		) 00ft on final approach, about 1.7 nautical miles (3.2km
		This is close to landing, in the very final stages of the
		change when compared with the baseline do-nothing
option.		change when compared with the paseline do-norming
Nider society	Greenhouse gas impa	uct Qualitative
		y shorter arrival route from the southwest although it
		e in the upper network. This shorter flightplannable
	-	n of greenhouse gas impacts for each flight using this
	ed to the baseline do-noth	
Wider society	Capacity/ resilience	Qualitative
- · · ·		emised route which would have the potential to
	silience and associated in	
		structure in the upper network. The integration of arriva
		luce operational complexities, at this stage it is not clea
-	is may have on capacity,	
General Aviation	Access	Qualitative
This design option is a	nticipated to be contained	ed within existing CAS. Qualitatively there would be a
- · · ·	<sup>•</sup> on GA traffic compared	with the baseline do-nothing option.
imilar access impact		with the baseline do-nothing option.
similar access impact General Aviation/	Economic impact from	with the baseline do-nothing option.
similar access impact General Aviation/ commercial airlines	Economic impact fron effective capacity	with the baseline do-nothing option. n increased Qualitative
similar access impact General Aviation/ commercial airlines Qualitatively this desig	Economic impact from effective capacity gn option has the potenti	with the baseline do-nothing option. n increased Qualitative al to contribute to increased effective capacity, which
similar access impact General Aviation/ commercial airlines Qualitatively this design would have a positive	Economic impact from effective capacity gn option has the potenti e economic impact comp	with the baseline do-nothing option. n increased Qualitative al to contribute to increased effective capacity, which pared with the baseline do-nothing option.
similar access impact General Aviation/ commercial airlines Qualitatively this design would have a positive General Aviation/	Economic impact from effective capacity gn option has the potenti	with the baseline do-nothing option. n increased Qualitative al to contribute to increased effective capacity, which
similar access impact General Aviation/ commercial airlines Qualitatively this design would have a positive General Aviation/ commercial airlines	Economic impact from effective capacity gn option has the potenti e economic impact comp Fuel Burn	with the baseline do-nothing option. n increased Qualitative al to contribute to increased effective capacity, which pared with the baseline do-nothing option. Qualitative
similar access impact General Aviation/ commercial airlines Qualitatively this design would have a positive General Aviation/ commercial airlines Qualitatively this design	Economic impact from effective capacity gn option has the potenti e economic impact comp Fuel Burn gn option's significantly sh	with the baseline do-nothing option. n increased Qualitative al to contribute to increased effective capacity, which pared with the baseline do-nothing option. Qualitative
similar access impact General Aviation/ commercial airlines Qualitatively this design would have a positive General Aviation/ commercial airlines Qualitatively this design reduced fuel burn impacts	Economic impact from effective capacity gn option has the potenti e economic impact comp Fuel Burn gn option's significantly sh pact on commercial traff	with the baseline do-nothing option. n increased Qualitative al to contribute to increased effective capacity, which pared with the baseline do-nothing option. Qualitative norter flightplannable track distance would result in a fic when compared with the baseline do-nothing
similar access impact General Aviation/ commercial airlines Qualitatively this design would have a positive General Aviation/ commercial airlines Qualitatively this design reduced fuel burn importion. We do not pr	Economic impact from effective capacity gn option has the potenti e economic impact comp Fuel Burn gn option's significantly sh pact on commercial traff redict a change in GA im	with the baseline do-nothing option. n increased Qualitative al to contribute to increased effective capacity, which pared with the baseline do-nothing option. Qualitative horter flightplannable track distance would result in a ic when compared with the baseline do-nothing pacts.
similar access impact General Aviation/ commercial airlines Qualitatively this desig would have a positive General Aviation/ commercial airlines Qualitatively this desig reduced fuel burn im option. We do not pr Commercial airlines	Economic impact from effective capacity gn option has the potenti e economic impact comp Fuel Burn gn option's significantly sh pact on commercial traff redict a change in GA im Training costs	with the baseline do-nothing option. n increased Qualitative al to contribute to increased effective capacity, which pared with the baseline do-nothing option. Qualitative norter flightplannable track distance would result in a fic when compared with the baseline do-nothing pacts. Qualitative
similar access impact General Aviation/ commercial airlines Qualitatively this design would have a positive General Aviation/ commercial airlines Qualitatively this design reduced fuel burn im option. We do not pr Commercial airlines Qualitatively, flight pr	Economic impact from effective capacity gn option has the potenti e economic impact comp Fuel Burn gn option's significantly sh pact on commercial traff redict a change in GA im Training costs ocedures change worldw	with the baseline do-nothing option. In increased Qualitative al to contribute to increased effective capacity, which pared with the baseline do-nothing option. Qualitative morter flightplannable track distance would result in a fic when compared with the baseline do-nothing pacts. Qualitative vide with each AIRAC cycle and airlines would update
similar access impact General Aviation/ commercial airlines Qualitatively this design would have a positive General Aviation/ commercial airlines Qualitatively this design reduced fuel burn im option. We do not pr Commercial airlines Qualitatively, flight pr their procedures acc	Economic impact from effective capacity gn option has the potenti e economic impact comp Fuel Burn gn option's significantly sh pact on commercial traff redict a change in GA im Training costs ocedures change worldw ordingly, training if require	with the baseline do-nothing option. In increased Qualitative al to contribute to increased effective capacity, which pared with the baseline do-nothing option. Qualitative norter flightplannable track distance would result in a fic when compared with the baseline do-nothing pacts. Qualitative
imilar access impact General Aviation/ commercial airlines Qualitatively this design vould have a positive General Aviation/ commercial airlines Qualitatively this design educed fuel burn im option. We do not pr Commercial airlines Qualitatively, flight pr heir procedures acc raining cost impacts	Economic impact from effective capacity gn option has the potenti e economic impact comp Fuel Burn gn option's significantly sh pact on commercial traff redict a change in GA im Training costs ocedures change worldw ordingly, training if require for airlines.	with the baseline do-nothing option. In increased Qualitative al to contribute to increased effective capacity, which pared with the baseline do-nothing option. Qualitative norter flightplannable track distance would result in a fic when compared with the baseline do-nothing pacts. Qualitative vide with each AIRAC cycle and airlines would update ed. This option is not anticipated to impose additional
similar access impact General Aviation/ commercial airlines Qualitatively this design would have a positive General Aviation/ commercial airlines Qualitatively this design reduced fuel burn im poption. We do not pr Commercial airlines Qualitatively, flight pr	Economic impact from effective capacity gn option has the potenti e economic impact comp Fuel Burn gn option's significantly sh pact on commercial traff redict a change in GA im Training costs ocedures change worldw ordingly, training if require for airlines. Other costs	with the baseline do-nothing option. In increased Qualitative al to contribute to increased effective capacity, which pared with the baseline do-nothing option. Qualitative morter flightplannable track distance would result in a fic when compared with the baseline do-nothing pacts. Qualitative vide with each AIRAC cycle and airlines would update

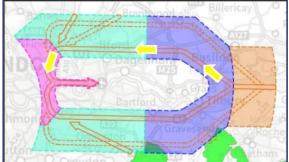
Airport/ ANSP	Infrastructure costs	Qualitative		
This design option is not expected to change Airport or ANSP infrastructure impacts, beyond the initial				
deployment phase which will require some systems engineering amendments.				
Airport/ ANSP	Operational costs	Qualitative		
This design option is not expected to change Airport or ANSP operational cost impacts.				
Airport/ ANSP	Deployment costs	Qualitative		
At this stage it is disproportionate to quantify deployment costs per design option as they would be				
used in arrival, departure and runway permutations not yet detailed. However, a system change for				
LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic				
simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	Performance against the vision and	Qualitative		
	parameters/strategic objectives of			
	the AMS			
On balance, this desig	On balance, this design option has the potential to contribute to the AMS (enables capacity			
improvement, increased overall noise impact, reduced fuel/CO <sub>2</sub> ).				

#### **Qualitative Safety Assessment**

This proposed arrival route provides a significantly shorter arrival route to runway 09 from the southwest. The safety assessment for this option indicates that deconfliction would be required against Gatwick, Biggin Hill and Heathrow air traffic flows. This option would also require integration with arrivals from the point merge system which would require a safety hazard assessment.

# 3.3 Inner Routes (from 4,000ft to final approach) specifically for Runway 09

3.3.1 ARR-09-Inner-N-Tight



Runway 09 arrival, inner north tight

Group	Impact	Level of Analysis
Communities	Noise impact on health a	
	of life (includes impact o	n tranquillity
	due to AONB overflight)	
his design option wo	ould overfly less densely popu	lated areas to the east, towards the start of the
		overfly more densely populated areas to the west,
		des. Qualitatively, the anticipated noise impact are
	the second se	ne baseline do-nothing option. This design option
would not overfly an	AONB from 7,000ft-4,000ft he	nce no change in tranquillity impacts.
Communities	Air quality	Qualitative
-		igher than 1,000ft are unlikely to have a significant
impact on local air c		
		t on final approach, about 1.7 nautical miles (3.2km)
		is close to landing, in the very final stages of the
approach, so the air	quality impact would not che	ange when compared with the baseline do-nothing
option.		
Wider society	Greenhouse gas impact	Qualitative
		R-09-Inner-S-Tight. The same route length would be
		es would be attained along the track for this design
option (possibly sligh	tly higher than today). Theref	ore, there would be no change in greenhouse gas
		ne baseline do-nothing option, which itself is
optimised for this ele	ment.	
Wider society	Capacity/ resilience	Qualitative
<b>.</b> .		element would be flown which, while already
optimised, would not	t enable additional capacity,	resilience and associated impacts.
General Aviation	Access	Qualitative
This design option wo	ould have a minor negative in	npact on low-altitude GA airspace users. There is
known activity in the	northwest/ north corner of Lo	ondon City's CAS which would be negatively
impacted when con	npared with the baseline do-r	nothing option.
General Aviation/	Economic impact from ir	ncreased Qualitative
commercial airlines	effective capacity	
Qualitatively this desi	ign option has the potential to	o contribute to increased effective capacity, which
would have a positiv	e economic impact compare	ed with the baseline do-nothing option.
General Aviation/	Fuel Burn	Qualitative
commercial airlines		
Qualitatively this desi	ign option means the same ro	oute length would be flown which, while already
optimised, would me	an that commercial airline fu	el impacts are broadly similar when compared with
		may be slightly higher for longer than today). We
do not predict a cho		
Commercial airlines	Training costs	Qualitative
	rocedures change worldwide	with each AIRAC cycle and airlines would update
		This option is not anticipated to impose additional
training cost impacts	s tor airlines.	
training cost impacts Commercial airlines	other costs	Qualitative
	Other costs	Qualitative

Airport/ ANSP	Infrastructure costs		Qualitative	
This design option is not expected to change Airport or ANSP infrastructure impacts, beyond the initial				
deployment phase which will require some systems engineering amendments.				
Airport/ ANSP	Operational costs		Qualitative	
This design option is not	t expected to change Airpor	t or ANSP op	perational cost impacts.	
Airport/ ANSP	Deployment costs		Qualitative	
At this stage it is disproportionate to quantify deployment costs per design option as they would be				
used in arrival, departure and runway permutations not yet detailed. However, a system change for				
LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic				
simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	Performance against the v		Qualitative	
	parameters/strategic obje	ctives of		
	the AMS			
On balance, this design option's contribution to the AMS would be broadly similar to the baseline				
(may reduce capacity, similar overall noise impact, similar fuel/CO2).				

#### **Qualitative Safety Assessment**

This proposed arrival route provides a northern mirror option of ARR-09-Inner-S-Tight (see section 3.3.2 below) which is the same track as today's baseline route. The safety assessment for this option indicates that there could be the potential for interaction with London City departures. Furthermore, if the proposed routing route is higher than the equivalent southern baseline that is flown today then deconfliction may be required against Heathrow arrivals and departures, all of which would require safety hazard assessments.

#### 3.3.2 ARR-09-Inner-S-Tight

Brentwood Billericay	Runv
and the second	
A CONTRACTOR AND	
Dartford	
himon the second s	
itton	
O O Croydon	

Runway 09 arrival, inner south tight

Group	Impact	Level of Analysis
Communities	Noise impact on health an	d quality Qualitative
	of life (includes impact on	tranquillity
	due to AONB overflight)	
his design option is p	ositioned to match the current	t track however, it would be slightly higher.
		t would be less when compared with the baseline
<b>e</b> 1		erfly an AONB from 7,000ft-4,000ft hence no
change in tranquillity		
Communities	Air quality	Qualitative
0		her than 1,000ft are unlikely to have a significant
mpact on local air qu		
		on final approach, about 1.7 nautical miles (3.2km
		close to landing, in the very final stages of the
	quality impact would not chan	nge when compared with the baseline do-nothing
option.		
Nider society	Greenhouse gas impact	Qualitative
-		d similar typical altitudes would be attained along
-		uld be no change in greenhouse gas
		baseline do-nothing option, which itself is
optimised for this eler		
Nider society	Capacity/ resilience	Qualitative
-		element would be flown which, while already
•		esilience and associated impacts.
General Aviation		
		nt which would be contained within existing CAS.
	buid be a similar access impac	t on GA traffic compared with the baseline do-
nothing option. General Aviation/	Economic impact from inc	reased Qualitative
	-	reased Qualitative
commercial airlines	effective capacity	
		contribute to increased effective capacity, which
General Aviation/		d with the baseline do-nothing option.
commercial airlines	Fuel Burn	Qualitative
	an option means the same (ou	rrent) route element would be flown which, while
		irline fuel burn impacts compared with the
	option. We do not predict a ch	
Commercial airlines	Training costs	Qualitative
	0	vith each AIRAC cycle and airlines would update
		his option is not anticipated to impose additional
raining cost impacts		
	Other costs	Qualitative
Commercial airlines		Qualitative
		Qualitative
No other airline costs	Intrastructure costs	
Commercial airlines No other airline costs Airport/ ANSP	Infrastructure costs	t or ANSP infrastructure impacts beyond the initic
No other airline costs Airport/ ANSP This design option is n	ot expected to change Airpor	
No other airline costs Airport/ ANSP This design option is n		t or ANSP infrastructure impacts, beyond the initic engineering amendments. Qualitative

Airport/ ANSP	Deployment costs	Qualitative
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.		
All	Performance against the vis parameters/strategic object the AMS	ion and Qualitative
On balance, this design option's contribution to the AMS would be broadly similar to the baseline (similar capacity, reduced overall noise impact, similar fuel/CO <sub>2</sub> ).		

#### **Qualitative Safety Assessment**

This proposed arrival route is the same track as today's baseline route. The safety assessment for this option indicates that if the proposed routing route is higher than the route flown today then deconfliction may be required against Heathrow arrivals and departures which would require a safety hazard assessment.

#### 3.3.3 ARR-09-Inner-S-Wide



Runway 09 arrival, inner south wide

O Q Croydor	atham	
Group	Impact	Level of Analysis
Communities	Noise impact on health a	
	of life (includes impact o	n tranquillity
	due to AONB overflight)	
		urrent route, it would overfly less densely populated
		ated noise impact would be less when compared
		nern section of the Kent Downs AONB may also be
		ould have a negative impact on tranquillity.
Communities	Air quality	Qualitative
<b>–</b>	· · · ·	igher than 1,000ft are unlikely to have a significant
impact on local air o		
		t on final approach, about 1.7 nautical miles (3.2km)
		is close to landing, in the very final stages of the
	quality impact would not che	ange when compared with the baseline do-nothing
option.		
Wider society	Greenhouse gas impact	
		I route from the west below 4,000ft. This longer
_		ncrease of greenhouse gas impacts for each flight
	compared to the baseline d	
Wider society	Capacity/ resilience	Qualitative
<b>—</b>		ut initially links from the existing Estuary westbound
		be unlikely to enable additional capacity/resilience
and associated imp		
General Aviation	Access	Qualitative
		npact on low-altitude GA airspace users. There is
-		ondon City's CAS which would be negatively
	npared with the baseline do-r	
General Aviation/	Economic impact from in	ncreased Qualitative
commercial airlines	effective capacity	
		o contribute to increased effective capacity, which
		ed with the baseline do-nothing option.
General Aviation/	Fuel Burn	Qualitative
commercial airlines	fore and the state of a second of the later to a	
		hable track distance (below 4,000ft) would result in
	the second s	ffic when compared with the baseline do-nothing
	predict a change in GA impac	
Commercial airlines		
		with each AIRAC cycle and airlines would update
		This option is not anticipated to impose additional
training cost impact		Quer Plante en
Commercial airlines		Qualitative
No other airline cost		Qualitative
Airport/ ANSP	Infrastructure costs	
		ort or ANSP infrastructure impacts, beyond the initial
	which will require some system	
Airport/ ANSP	Operational costs	Qualitative
Inis design option is	not expected to change Airp	ort or ANSP operational cost impacts.

Airport/ ANSP	Deployment costs	Qualitative
used in arrival, depo LCY would involve tr	rture and runway permutations not aining c.180-200 controllers and 30 c	t costs per design option as they would be yet detailed. However, a system change for assistants via the use of various air traffic g), with additional engineering costs TBC.
All	Performance against the vision parameters/strategic objective the AMS	
On balance, this design option's contribution to the AMS would be broadly similar to the baseline (may enable increased capacity, similar overall noise impact, potential increase in fuel/CO <sub>2</sub> ).		

#### **Qualitative Safety Assessment**

This proposed arrival route runs parallel and south of ARR-09-Inner-S-Tight (see section 3.3.2) which is similar to today's baseline route. The safety assessment for this option indicates that if the proposed routing route is higher than the parallel route that is flown today then deconfliction may be required against Heathrow arrivals and departures and there could be the potential for interaction with Biggin Hill air traffic flows, all of which would require safety hazard assessments.

#### 3.3.4 ARR-09-Inner-S-Shortcut-SE



Runway 09 arrival, inner south shortcut southeast

Communities         Noise impact on health and quality due to AONB overflight)         Qualitative of life (includes impact on tranquility due to AONB overflight)           This design option would be significantly shorter below 4,000ft than the current route. This would in a reduction in the overflight of populated areas at these altitudes. Therefore, qualitatively the anticipated noise impact would be less when compared with the baseline do-nothing option. A northern section of the Kent Downs AONB may also be overflown at higher altitudes by this route which would have a negative impact on tranquility.         Qualitative           Communities         Air quality         Qualitative         Qualitative           Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a signific impact on local air quality         Qualitative           Arriving aircraft would still descend through 1,000ft on final approach, about 1.7 nautical miles (3 from touchdown at either end of the runway. This is close to landing, in the very final stages of the approach, so the air quality impact would not change when compared with the baseline do-not option.           Wider society         Greenhouse gas impact         Qualitative           This design option would provide a significantly shorter arrival route from the southwest/ south an inks from design option would provide a significantly shorter arrival route form the southwest/ south and istance would result in a reduction of greenhouse gas impacts for each flight using this route w compared to the baseline do-nothing option.           Wider society         Capacity/resilience         Qualitative         Therefore This design option would ha	Group	Impact	Level of Analysis
due to AONB overflight)         his design option would be significantly shorter below 4,000ft than the current route. This would in a reduction in the overflight of populated arces at these altitudes. Therefore, qualitatively the anticipated noise impact would be less when compared with the baseline do-nothing option. A torthem section of the Kent Downs AONB may also be overflown at higher altitudes by this route which would have a negative impact on tranquillity.         Communities       Air quality       Qualitative         Sovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a signific mpact on local air quality.       Auditative         Arriving aircraft would still descend through 1,000ft on final approach, about 1.7 nutrical miles (3 rom touchdown at either end of the runway. This is close to landing, in the very final stages of the paproach, so the air quality impact would not change when compared with the baseline do-not ppion.         Wider soclety       Greenhouse gas impact       Qualitative         his design option would provide a significantly shorter arrival route from the southwest/ south an inks from design option would provide a significantly shorter arrival route from the southwest/ south an inks from design option would provide a new systemised route which would have the potential to mprove capacity. Resilience would be broadly similar to today (baseline do-nothing option).         Wider soclety       Capacity/ resilience       Qualitative         his design option would have a minor negative impact on low-altitude GA airspace users. Therefore, and would introduce a bit more room on the southern side which would have the inflexib hortur arrivals from the nor	Communities	Noise impact on health and q	uality Qualitative
his design option would be significantly shorter below 4,000ft than the current route. This would in a reduction in the overflight of populated areas at these altitudes. Therefore, qualitatively the indicipated noise impact would be less when compared with the baseline do-nothing option. A corthern section of the Kent Downs AONB may also be overflown at higher attitudes by this route which would have a negative impact on tranquility. Qualitative Sovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a signific mpact on local air quality. This is close to landing, in the very final stages of the protoch, so the air quality impact would not change when compared with the baseline do-not not populate a significantly shorter arrival route from the southwest/ south an his form design option NAR-OP-OuterS-Shortcut-SE. This considerably shorter flightplannable tradistance would result in a reduction of greenhouse gas impacts for each flight using this route we compared to the baseline do-nothing option. Wider society Capacity/ resilience Qualitative his design option would introduce a new systemised route which would have the potential to mprove capacity. Resilience would be broadly similar to today (baseline do-nothing option) although it would introduce a timp regative impact on the southmest for the southing option. Seneral Aviation Access Qualitative his design option would have a minor negative impact on the vold have the potential to mprove capacity. Resilience would be broadly similar to today (baseline do-nothing option) although it would have a minor negative impact on contribute to increase defective capacity, would have a positive economic impact from increased Qualitative flectly proceedures the southwest / south corner of London City's CAS which would be negatively mpacted when compared with the baseline do-nothing option. Seneral Aviation Keese and the potential to contribute to increase defective capacity, would have a positive economic impact from increased Qualitative		of life (includes impact on trar	nquillity
n a reduction in the overflight of populated areas at these altitudes. Therefore, qualitatively the initial patel noise impact would be less when compared with the baseline do-nothing option. A conteme section of the Kent Downs AONB may also be overflown at higher altitudes by this route which would have a negative impact on tranquillity. Qualitative Soverment guidance strates that aircraft flying higher than 1.000ft are unlikely to have a signific mpact on local air quality. Qualitative Soverment guidance strates that aircraft flying higher than 1.000ft are unlikely to have a signific mpact on local air quality impact would not change when compared, about 1.7 nautical miles (3 room touchdown at either end of the runway. This is close to landing, in the very final stages of the approach, so the air quality impact would not change when compared with the baseline do-not piption. Vider society Greenhouse gas impact Qualitative his design option would provide a significantly shorter arrival route from the southwest/ south an nks from design option ARR-09-Outer-S-Shortout-SE. This considerably shorter flightplannable tradistance would route into a reduction of greenhouse gas impacts for each flight using this route with approach so the baseline do-nothing option. Wider society Capacity/ resilience would be broadly similar to today (baseline do-nothing option) atthough it would have to a bit more room on the southern side which may reduce the inflexib his design option would pave a minor negative impact on low-altitude GA airspace users. There move a capacity in the southwest / south corner of London City's CAS which would be negatively mpacted when compared with the baseline do-nothing option. Seeneral Aviation Access Qualitative to another southwest / south corner of London City's CAS which would be negatively mpacted when compared with the baseline do-nothing option. Seeneral Aviation Fuel Burn Commercial airlines Training costs Qualitative to an actouction of senthose additive to increased effective capacity voul		due to AONB overflight)	
anticipated noise impact would be less when compared with the baseline do-nothing option. A loother section of the Kent Downs AONB may also be overflown at higher altitudes by this route which would have a negative impact on tranquility.         Communities       Air quality       Qualitative         Sovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a signific mpact on local air quality.       Naver and the second through 1,000ft on final approach, about 1.7 nautical miles (3 room touchdown at either end of the runway. This is close to landing, in the very final stages of the approach, so the air quality impact would not change when compared with the baseline do-not proposed.         Vider society       Greenhouse gas impact       Qualitative         his design option would provide a significantly shorter arrival route from the southwest/ south an next from design option ARR-OP-Outer-S-Shortcut-SE. This considerably shorter flightplannable tradistance would result in a reduction of greenhouse gas impacts for each flight using this route who to the baseline do-nothing option.         Vider society       Capacity/ resilience       Qualitative         his design option would introduce a new systemised route which would have the potential to mprove capacity. Resilience would be broadly similar to today (baseline do-nothing option).         Proteored Aviation       Access       Qualitative         his design option would have a minor negative impact on low-altitude GA airspace users. There nown activity in the southwest/ south corner of London City's CAS which would be negatively mpacted when compared with the baseline do-nothing option.	his design option wo	ould be significantly shorter below 4	4,000ft than the current route. This would resul
orthern section of the Kent Downs AONB may also be overflown at higher altitudes by this route which would have a negative impact on tranquility.         Communities       Air quality       Qualitative         Sovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a signific mpact on local air quality.       Sovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a signific mpact on local air quality.         Sovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a signific mpact on local air quality impact would not change when compared with the baseline do-not ption.         Vider society       Greenhouse gas impact       Qualitative         his design option would provide a significantly shorter arrival route from the southwest/ south an nks from design option ARR-09-Outer-S-Shortcut-SE. This considerably shorter flightplannable tradistance would result in a reduction of greenhouse gas impacts for each flight using this route which would have the potential to mprove capacity. Resilience would be broadly similar to today (baseline do-nothing option)         Vider society       Capacity/resilience       Qualitative         his design option would introduce a new systemised route which way reduce the inflexib hard using the north.       Sovernment developed and the baseline do-nothing option)         uthough it would introduce a bit more room on the southern side which may reduce the inflexib hard align option would have a minor negative impact on low-altitude GA airspace users. There nown activity in the southwest/ south corner of London City's CAS which would be negatively mpacted when compared with the b	n a reduction in the	overflight of populated areas at th	ese altitudes. Therefore, qualitatively the
which would have a negative impact on tranquillity.         Qualitative           Communities         Air quality         Qualitative           Sovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a signific mpact on local air quality.         Investigation of the unit of the runway. This is close to landing, in the very final stages of the pproach, so the air quality impact would not change when compared with the baseline do-not onto uchdown at either end of the runway. This is close to landing, in the very final stages of the pproach, so the air quality impact would not change when compared with the baseline do-not option.           Vider society         Greenhouse gas impact         Qualitative           his design option would provide a significantly shorter arrival route from the southwest/ south an nks from design option ARR-09-Outer-S-Shortcut-SE. This considerably shorter flightplannable tra listance would result in a reduction of greenhouse gas impacts for each flight using this route whis compared to the baseline do-nothing option.           Vider society         Capacity/ resilience         Qualitative           his design option would introduce a new systemised route which would have the potential to more capacity. Resilience would be broadly similar to today (baseline do-nothing option) although it would introduce a bit more room on the southern side which may reduce the inflexib hortcut arrivals from the north.           General Aviation         Access         Qualitative           his design option would have a minor negative impact on low-altitude GA airspace users. There nown activity in the southwest/ south corner of London City's CAS which wo	anticipated noise im	pact would be less when compare	ed with the baseline do-nothing option. A smo
Communities         Air quality         Qualitative           Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a signific mpact on local air quality.         Intervent of the numway. This is close to landing, in the very final stages of the approach, so the air quality impact would not change when compared with the baseline do-not approach, so the air quality impact would not change when compared with the baseline do-not approach, so the air quality impact would not change when compared with the baseline do-not approach, so the air quality impact would not change when compared with the baseline do-not approach, so the air quality impact would not change when compared with the baseline do-not piton.           Vider society         Greenhouse gas impact         Qualitative           his design option would provide a significantly shorter arrival route from the southwest/ south an nks from design option would routed on of greenhouse gas impacts for each flight using this route wf compared to the baseline do-nothing option.           Vider society         Capacity/ resilience         Qualitative           his design option would introduce a new systemised route which would have the potential to mprove capacity. Resilience would be broadly similar to today (baseline do-nothing option) uithough it would introduce a bit more room on the southern side which may reduce the inflexib hortur arrivals from the north.           General Aviation         Access         Qualitative           General Aviation         Access         Qualitative           General Aviation/         Economic impact from increased         Qualitative	orthern section of th	ne Kent Downs AONB may also be	overflown at higher altitudes by this route
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Qualitatively this design option's significantly shorter flightplannable track distance would result in educed fuel burn impact on commercial traffic when compared with the baseline do-nothing option. We do not predict a change in GA impacts.         Commercial airlines       Training costs         Qualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would upon heir procedures accordingly, training if required. This option is not anticipated to impose additionation raining costs         Qualitative         Commercial airlines         Other costs         Qualitative		Fuel Burn	Qualitative
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Option. We do not predict a change in GA impacts.         Commercial airlines       Training costs       Qualitative         Qualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would upon heir procedures accordingly, training if required. This option is not anticipated to impose addition raining cost impacts for airlines.       Qualitative         Commercial airlines       Other costs       Qualitative         No other airline costs are foreseen.       Other costs       Qualitative			
Commercial airlinesTraining costsQualitativeQualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would upon heir procedures accordingly, training if required. This option is not anticipated to impose addition raining cost impacts for airlines.QualitativeCommercial airlinesOther costsQualitativeNo other airline costs are foreseen.Qualitative			compared with the baseline do-nothing
Qualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would up heir procedures accordingly, training if required. This option is not anticipated to impose additic raining cost impacts for airlines. Commercial airlines Other costs Qualitative No other airline costs are foreseen.			
heir procedures accordingly, training if required. This option is not anticipated to impose additionation and the cost impacts for airlines.  Commercial airlines Other costs Qualitative No other airline costs are foreseen.			
raining cost impacts for airlines.         Commercial airlines       Other costs         Qualitative         Io other airline costs are foreseen.			
Commercial airlinesOther costsQualitativeNo other airline costs are foreseen.Other airline costs are foreseen.		<b>o</b> ,	ption is not anticipated to impose additional
No other airline costs are foreseen.			
			Qualitative
Airport/ ANSP Intrastructure costs Qualitative			
his design option is not expected to change Airport or ANSP infrastructure impacts, beyond the	Airport/ ANSP	Intrastructure costs	Qualitative

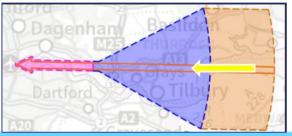
Airport/ ANSP	Operational costs	Qualitative		
This design option is not	expected to change Airport or ANSP op	perational cost impacts.		
Airport/ ANSP	Deployment costs	Qualitative		
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	parameters/strategic objectives of the AMS			
On balance, this design option has the potential to contribute to the AMS (enables capacity improvement, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).				

#### **Qualitative Safety Assessment**

This proposed arrival route is similar to today's baseline route but provides a significantly shorter arrival route from the southwest and south. The safety assessment for this option indicates that if the proposed routing route is higher than the route flown today then deconfliction may be required against Heathrow arrivals and departures, and Gatwick and Biggin Hill air traffic flows, which would require safety hazard assessments.

#### 3.4 Inner Route (from 4,000ft to final approach) specifically for Runway 27

3.4.1 ARR-27-Inner



Runway 27 arrival, inner

(This is a structural component of the baseline do-nothing airspace system, which is already optimised, therefore has been retained)

A20		
Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life (includes impact on tranquillity due to AONB overflight)	Qualitative
of overflight at low a improvement. There compared with the k	Imunities would continue to be overflown b Ititudes. However, this route is already option fore, qualitatively the anticipated noise im paseline do-nothing option. This design op a no change in tranquillity impacts.	imised with no opportunity for pact would not change when
Communities	Air quality	Qualitative
impact on local air of Arriving aircraft woul from touchdown at e	ce states that aircraft flying higher than 1,0 quality. d still descend through 1,000ft on final app either end of the runway. This is close to lar quality impact would not change when c	roach, about 1.7 nautical miles (3.2km) nding, in the very final stages of the
Wider society	Greenhouse gas impact	Qualitative
be attained along the already as short, dire	eans the same (current) route length would be track. This design option is the same as t ect and efficient as possible. Therefore, the h flight when compared to the baseline do ment.	the baseline because the route is are would be no change in greenhouse
Wider society	Capacity/ resilience	Qualitative
is already as short, di (current) route eleme	pportunity to improve airspace capacity c irect and efficient as possible. Therefore, th ent would be flown which, while already op and associated impacts.	nis design option means the same
General Aviation	Access	Qualitative
	the same (current) route element which wo rould be a similar access impact on GA tra	
General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative
	ign option has the potential to contribute t e economic impact compared with the b	
General Aviation/	Fuel Burn	Qualitative
commercial airlines		
already optimised, w	ign option means the same (current) route yould not reduce commercial airline fuel by option. We do not predict a change in G	urn impacts compared with the
Commercial airlines	Training costs	Qualitative
Qualitatively, flight p	rocedures change worldwide with each A cordingly, training if required. This option is	IRAC cycle and airlines would update
Commercial airlines	Other costs	Qualitative
No other airline costs	s are foreseen.	

Airport/ ANSP	Infrastructure costs	Qualitative		
This design option is	not expected to change Airpor	t or ANSP infrastructure impacts, beyond the initial		
deployment phase	which will require some systems	engineering amendments.		
Airport/ ANSP	Operational costs	Qualitative		
This design option is	not expected to change Airpor	t or ANSP operational cost impacts.		
Airport/ ANSP	Deployment costs	Qualitative		
At this stage it is disp	At this stage it is disproportionate to quantify deployment costs per design option as they would be			
used in arrival, departure and runway permutations not yet detailed. However, a system change for				
LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic				
simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	Performance against the v	rision and Qualitative		
	parameters/strategic obje	ctives of		
	the AMS			
On balance, this design option has the potential to contribute to the AMS (no increase in capacity				
but already optimised, no improvement in overall noise impact but already optimised, no change in				
fuel/CO <sub>2</sub> but alread	ly optimised).			

#### **Qualitative Safety Assessment**

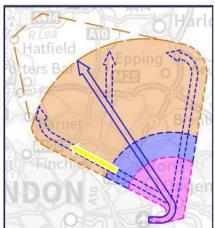
This proposed design option for runway 27 is the same as the baseline route flown today. As the same route lengths would be flown and typical altitudes would be attained then the safety assessment for this option indicates similar levels of safety assurance to today's operation.

## 4 Runway 09 Departure Options

### 4.1 Runway 09 SIDs to the northwest and west

#### With a left turn out after take-off (LTO)

4.1.1 DEP-09-NW-LTO-1



Runway 09 departure to the northwest, left turn out (option 1)

<b>NDON</b>	and the second s	
60,051		
Group	Impact	Level of Analysis
Communities	Noise impact on health and que of life (includes impact on trang due to AONB overflight)	
number of people; bu route. This design opti tranquillity impacts.	t would be expected to be higher r on would not overfly an AONB from	unities as today and a broadly similar more quickly when compared to today's 7,000ft-4,000ft hence no change in
Communities	Air quality	Qualitative
impact on local air qu	ality. JId still climb through 1,000ft on initia	an 1,000ft are unlikely to have a significant al departure, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impact	Qualitative
Heathrow Airport's airs to the baseline do-not	space before turning north. Howev	e to the northwest, turning left towards er, it would climb quicker when compared ave the potential to result in a reduction of
Wider society	Capacity/ resilience	Qualitative
because it turns in a si		ity to the baseline do-nothing option otential to improve resilience over the
General Aviation	Access	Qualitative
Qualitatively there wo nothing option.	uld be a similar access impact on C	GA traffic compared with the baseline do-
General Aviation/ commercial airlines	Economic impact from increase effective capacity	d Qualitative
· · · · · ·	n option has the potential to contri economic impact compared with	bute to increased effective capacity, which the baseline do-nothing option.
General Aviation/ commercial airlines	Fuel Burn	Qualitative
	al traffic when compared when the	Itential to result in a reduced fuel burn baseline do-nothing option. We do not
Commercial airlines	Training costs	Qualitative
	ordingly, training if required. This opt	ach AIRAC cycle and airlines would update ion is not anticipated to impose additional
Commercial airlines	Other costs	Qualitative
No other airline costs a		
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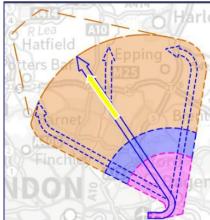
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Airport/ ANSP	Infrastructure costs	Qualitative			
	This design option is not expected to change Airport or ANSP infrastructure impacts, beyond the initial				
	nich will require some systems engine				
Airport/ ANSP	Operational costs	Qualitative			
This design option is no	ot expected to change Airport or AN	SP operational cost impacts.			
Airport/ ANSP	Deployment costs	Qualitative			
At this stage it is dispro	At this stage it is disproportionate to quantify deployment costs per design option as they would be				
used in arrival, departure and runway permutations not yet detailed. However, a system change for					
LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic					
simulators (including sim prep, management and staffing), with additional engineering costs TBC.					
All	Performance against the vision a				
	parameters/strategic objectives of	of			
	the AMS				
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to					
today, improved overall noise impact, reduced fuel/CO2).					

#### **Qualitative Safety Assessment**

This proposed departure option from runway 09 provides a longer departure route to the northwest, with a left turn towards Heathrow airspace before turning north with a higher and quicker climb in comparison to today's operation. The safety assessment for this option indicates that a safety hazard assessment would be required for deconfliction from Heathrow, Luton and Stansted's departures and arrivals, and RAF Northolt departures.

#### 4.1.2 DEP-09-NW-LTO-2



Runway 09 departure to the northwest, left turn out (option 2)

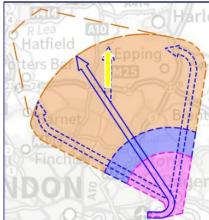
Group	Impact	Level of Analysis
Communities	Noise impact on health and quality	Qualitative
	of life (includes impact on tranquillity	
	due to AONB overflight)	
his design option wou	Id overfly the same initial communities a	is today after take-off. However, it is
expected to be higher	more quickly. Therefore, qualitatively the	ne anticipated noise impact would be
ess when compared v	vith the baseline do-nothing option. This	design option would not overfly an
AONB from 7,000ft-4,00	00ft hence no change in tranquillity impo	acts.
Communities	Air quality	Qualitative
Government guidance	e states that aircraft flying higher than 1,0	000ft are unlikely to have a significant
mpact on local air qu	ality.	
Departing aircraft wou	Id still climb through 1,000ft on initial dep	parture, about 1.7 nautical miles (3.2kr
rom either end of the		
Wider society	Greenhouse gas impact	Qualitative
- · ·	Id provide the same departure route to	
would climb quicker w	hen compared to the baseline do-nothi	ing option and would therefore have
the potential to result i	n a reduction of greenhouse gas impact	ts for each flight using this route.
Nider society	Capacity/ resilience	Qualitative
This design option wou	Id provide a broadly similar capacity to	the baseline do-nothing option
pecause it turns in a sir	milar direction, but it also has the potenti	ial to improve resilience over the
paseline do-nothing of	otion due to the quicker climb.	
General Aviation	Access	Qualitative
Qualitatively there wo	uld be a similar access impact on GA tro	affic compared with the baseline do-
nothing option.		
General Aviation/	Economic impact from increased	Qualitative
commercial airlines	· · · · · ·	
	n option has the potential to contribute <sup>-</sup>	
would have a positive	economic impact compared with the b	baseline do-nothing option.
General Aviation/	Fuel Burn	Qualitative
commercial airlines		
	n option's quicker climb has the potentic	
	Il traffic when compared when the base	eline do-nothing option. We do not
oredict a change in G		
Commercial airlines	Training costs	Qualitative
Qualitatively, flight pro	cedures change worldwide with each A	AIRAC cycle and airlines would update
their procedures acco	rdingly, training if required. This option is	not anticipated to impose additional
training cost impacts fo	or airlines.	
Commercial airlines	Other costs	Qualitative
No other airline costs c	ire foreseen.	
Airport/ ANSP	Infrastructure costs	Qualitative
	t expected to change Airport or ANSP ir	
deployment phase wh	ich will require some systems engineering	g amendments.
Airport/ ANSP	Operational costs	Qualitative
	t expected to change Airport or ANSP o	

Airport/ ANSP	Deployment costs	Qualitative
used in arrival, depo LCY would involve tr	rture and runway permutations aining c.180-200 controllers and	ment costs per design option as they would be not yet detailed. However, a system change for 30 assistants via the use of various air traffic (ffing), with additional engineering costs TBC.
All	Performance against the v parameters/strategic object the AMS	
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).		

#### **Qualitative Safety Assessment**

This proposed departure option from runway 09 is similar to today's baseline route but aims to provide a higher and more continuous climb. The safety assessment for this option indicates similar levels of safety assurance to today's operation, however a safety hazard assessment would still be required to ensure deconfliction from Heathrow, Luton and Stansted's departures and arrivals, and RAF Northolt departures.

#### 4.1.3 DEP-09-NW-LTO-3



Runway 09 departure to the northwest, left turn out (option 3)

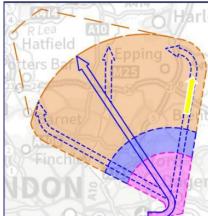
	2	
Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life (includes impact on tranquillity due to AONB overflight)	Qualitative y
expected to be hig continue to climb. compared with the	vould overfly some of the same communiti gher more quickly and is positioned to over Therefore, qualitatively the anticipated no baseline do-nothing option. This design o base no change in tranquillity impacts.	rfly less populated areas as aircraft pise impact would be less when option would not overfly an AONB from
Communities	Air quality	Qualitative
impact on local air Departing aircraft from either end of t	would still climb through 1,000ft on initial de the runway.	eparture, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impact	Qualitative
would climb quicke	vould provide a similar departure route to er when compared to the baseline do-noth ult in a reduction of greenhouse gas impac	hing option and would therefore have
Wider society	Capacity/ resilience	Qualitative
because it turns in a	vould provide a broadly similar capacity to a similar direction, but it also has the poten g option due to the quicker climb.	
<b>General Aviation</b>	Access	Qualitative
nothing option.	would be a similar access impact on GA tr	raffic compared with the baseline do-
General Aviation/ commercial airline	Economic impact from increased effective capacity	Qualitative
-	esign option has the potential to contribute ive economic impact compared with the	
General Aviation/ commercial airline	Fuel Burn <b>s</b>	Qualitative
	esign option's quicker climb has the potent rcial traffic when compared when the bas n GA impacts.	
Commercial airline		Qualitative
	procedures change worldwide with each ccordingly, training if required. This option i cts for airlines.	is not anticipated to impose additional
Commercial airline		Qualitative
No other airline cos		
Airport/ ANSP	Infrastructure costs	Qualitative
deployment phase	s not expected to change Airport or ANSP which will require some systems engineering	ng amendments.
Airport/ ANSP	Operational costs	Qualitative
This design option is	s not expected to change Airport or ANSP	operational cost impacts.

Airport/ ANSP	Deployment costs	Qualitative
used in arrival, depo LCY would involve tr	arture and runway permutations no raining c.180-200 controllers and 30	ent costs per design option as they would be t yet detailed. However, a system change for assistants via the use of various air traffic ng), with additional engineering costs TBC.
All	Performance against the vision parameters/strategic objecting the AMS	
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).		

#### **Qualitative Safety Assessment**

This proposed departure option from runway 09 provides the same initial track as today's baseline route but then turns north to overfly a less densely populated area and is expected to climb higher more quickly. The safety assessment for this option indicates similar levels of safety assurance to today's operation, however a safety hazard assessment would still be required to ensure deconfliction from Heathrow, Luton and Stansted's departures and arrivals, and RAF Northolt departures.

### 4.1.4 DEP-09-NW-LTO-4



Runway 09 departure to the northwest, left turn out (option 4)

NDON	S S	
Group	Impact	Level of Analysis
Communities	Noise impact on heal of life (includes impac due to AONB overfligh	Ith and quality Qualitative ct on tranquillity
expected to be hig continue to climb. compared with the	her more quickly and is pos Therefore, qualitatively the	ame communities as today after take-off. However, it is sitioned to overfly less populated areas as aircraft anticipated noise impact would be less when n. This design option would not overfly an AONB from impacts.
Communities	Air quality	Qualitative
impact on local air	quality. would still climb through 1,00	ng higher than 1,000ft are unlikely to have a significant 00ft on initial departure, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impo	act Qualitative
departure direction option and would t each flight using th	<ul> <li>However, it would climb c herefore have the potential is route.</li> </ul>	parture route to the northwest due to the alternate initial quicker when compared to the baseline do-nothing all to result in a reduction of greenhouse gas impacts for
Wider society	Capacity/ resilience	Qualitative
because it turns in a		nilar capacity to the baseline do-nothing option o has the potential to improve resilience over the climb.
<b>General Aviation</b>	Access	Qualitative
Qualitatively there nothing option.	would be a similar access in	mpact on GA traffic compared with the baseline do-
General Aviation/ commercial airline		
would have a posit	ive economic impact comp	al to contribute to increased effective capacity, which pared with the baseline do-nothing option.
General Aviation/ commercial airline		Qualitative
impact on comme predict a change i	rcial traffic when compared n GA impacts.	has the potential to result in a reduced fuel burn d when the baseline do-nothing option. We do not
Commercial airline	<u> </u>	Qualitative
their procedures ac training cost impac	ccordingly, training if require ts for airlines.	vide with each AIRAC cycle and airlines would update ed. This option is not anticipated to impose additional
Commercial airline		Qualitative
No other airline cos		
		Qualitative Airport or ANSP infrastructure impacts, beyond the initial tems engineering amendments.
Airport/ ANSP	Operational costs	Qualitative
		Airport or ANSP operational cost impacts.
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Airport/ ANSP	Deployment costs	Qualitative	
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic			
simulators (including	simulators (including sim prep, management and staffing), with additional engineering costs TBC.		
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative	
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).			

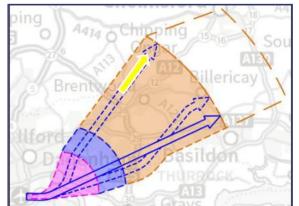
### **Qualitative Safety Assessment**

This proposed departure option from runway 09 provides a longer departure route to the northwest due to the alternate initial departure than today's baseline route but then turns north to overfly a less densely populated area and is expected to climb higher more quickly. The safety assessment for this option indicates similar levels of safety assurance to today's operation, however a safety hazard assessment would still be required to ensure deconfliction from Heathrow, Luton and Stansted's departures and arrivals, and RAF Northolt departures.

### 4.2 Runway 09 SIDs to the northeast and east

With a left turn out after take-off (LTO)

4.2.1 DEP-09-ENE-LTO-1



Runway 09 departure to the east-northeast, left turn out (option 1)

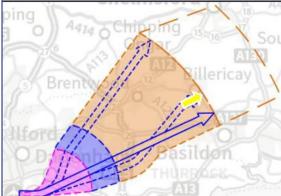
Group	Impact	Level of Analysis
Communities	Noise impact on healt	h and quality Qualitative
	of life (includes impac	t on tranquillity
	due to AONB overfligh	
his design option wo	ould overfly many of the sa	me communities as today after take-off. However, it i
		l overall overfly a broadly similar number of people as
		noise impact would be broadly similar when
		. This design option would not overfly an AONB from
	no change in tranquillity ir	
Communities	Air quality	Qualitative
0		g higher than 1,000ft are unlikely to have a significant
mpact on local air c		
	÷	0ft on initial departure, about 1.7 nautical miles (3.2km
rom either end of th	,	
Vider society	Greenhouse gas impa	
		irture route to the east/ northeast as today but
		e current tactical controlling. However, it would climb
		thing option and would therefore have the potential
		icts for each flight using this route.
Vider society	Capacity/ resilience	Qualitative
		lar capacity to the baseline do-nothing option
		has the potential to improve resilience over the
	option due to the quicker of	
General Aviation	Access	Qualitative
	ould be a similar access im	npact on GA traffic compared with the baseline do-
nothing option.		
General Aviation/	Economic impact fron	n increased Qualitative
commercial airlines		
-	÷	al to contribute to increased effective capacity, which
		ared with the baseline do-nothing option.
General Aviation/	Fuel Burn	Qualitative
commercial airlines		
-	÷	nas the potential to result in a reduced fuel burn
mpact on commerc	ial traffic when compared	when the baseline do-nothing option. We do not
predict a change in	GA impacts.	
Commercial airlines	Training costs	Qualitative
		ide with each AIRAC cycle and airlines would update
		d. This option is not anticipated to impose additional
	for airlines	
raining cost impacts Commercial airlines	Other costs	Qualitative

Airport/ ANSP	Infrastructure costs	Qualitative	
This design option is not expected to change Airport or ANSP infrastructure impacts, beyond the initial			
deployment phase which will require some systems engineering amendments.			
Airport/ ANSP	Operational costs	Qualitative	
This design option is n	ot expected to change Airport of	or ANSP operational cost impacts.	
Airport/ ANSP	Deployment costs	Qualitative	
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.			
All	Performance against the visit parameters/strategic object the AMS		
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).			

#### **Qualitative Safety Assessment**

This proposed departure option from runway 09 follows today's baseline SID but will continue further northeast, which is similar to today's tactical controlling, but is expected to climb higher more quickly. The safety assessment for this option indicates that a safety hazard assessment would be required to ensure deconfliction from Heathrow, Stansted and Southend air traffic flows.

### 4.2.2 DEP-09-ENE-LTO-2



Runway 09 departure to the east-northeast, left turn out (option 2)

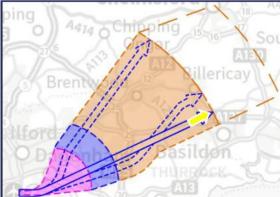
Group	Impact	Level of Analysis
Communities	Noise impact on health ar	nd quality Qualitative
	of life (includes impact on	tranquillity
	due to AONB overflight)	
his design option w	ould overfly some of the same,	but primarily different, communities from today
after take-off. Howe	ever, it is expected to be higher	more quickly and would overfly less densely
		refore, qualitatively the anticipated noise impact
		o-nothing option. This design option would not
	m 7,000ft-4,000ft hence no char	
Communities	Air quality	Qualitative
-		her than 1,000ft are unlikely to have a significant
mpact on local air (		
		n initial departure, about 1.7 nautical miles (3.2km
rom either end of th		
Nider society	Greenhouse gas impact	Qualitative
		e route to the east/ northeast as today but
		y's route. However, it would climb quicker when
	- · · ·	vould therefore have the potential to result in a
	ouse gas impacts for each fligh	
Nider society	Capacity/ resilience	Qualitative
- · ·		apacity to the baseline do-nothing option
		the potential to improve resilience over the
	option due to the quicker clim	
General Aviation	Access	Qualitative
	vould be a similar access impac	t on GA traffic compared with the baseline do-
nothing option.		
General Aviation/	Economic impact from inc	creased Qualitative
commercial airlines		
	· ·	contribute to increased effective capacity, which
		d with the baseline do-nothing option.
General Aviation/	Fuel Burn	Qualitative
commercial airlines		
		he potential to result in a reduced fuel burn
		en the baseline do-nothing option. We do not
oredict a change in		
Commercial airlines	0	Qualitative
		with each AIRAC cycle and airlines would update
		his option is not anticipated to impose additional
training cost impact		
Commercial airlines		Qualitative
No other airline cost		
Airport/ ANSP	Infrastructure costs	Qualitative
This design option is		t or ANSP infrastructure impacts, beyond the initic
	which will require some systems	engineering amendments
deployment phase	which will require some systems	

Airport/ ANSP	Deployment costs	Qualitative
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.		
All	Performance against the vision parameters/strategic objectives the AMS	
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).		

#### **Qualitative Safety Assessment**

This proposed departure option from runway 09 provides a similar departure route to the east/northeast as today, but removes the complex turn from today's baseline SID, and is expected to climb higher more quickly. The safety assessment for this option indicates that a safety hazard assessment would be required to ensure deconfliction from Heathrow, Stansted and Southend air traffic flows.

### 4.2.3 DEP-09-ENE-LTO-3



Runway 09 departure to the east-northeast, left turn out (option 3)

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality	Qualitative
	of life (includes impact on tranquillity	/
	due to AONB overflight)	
his design option wou	uld overfly many of the same communitie	es as today after take-off. However, it i
expected to be highe	r more quickly and would overall overfly	a broadly similar number of people as
oday. Therefore, qua	alitatively the anticipated noise impact v	would be broadly similar when
compared with the bo	aseline do-nothing option. This design of	ption would not overfly an AONB from
7,000ft-4,000ft hence r	no change in tranquillity impacts.	
Communities	Air quality	Qualitative
<u> </u>	e states that aircraft flying higher than 1,	,000ft are unlikely to have a significant
mpact on local air qu		
	uld still climb through 1,000ft on initial de	parture, about 1.7 nautical miles (3.2km
from either end of the		
Wider society	Greenhouse gas impact	Qualitative
	uld provide a similar departure route to t	
emoves some of the o	current complex turns in today's route a	nd is as direct as possible. It would also
climb quicker when co	ompared to the baseline do-nothing op	tion and would therefore have the
potential to result in a	reduction of greenhouse gas impacts for	or each flight using this route.
Vider society	Capacity/ resilience	Qualitative
his design option wou	uld provide a broadly similar capacity to	the baseline do-nothing option
oecause it turns in a si	milar direction, but it also has the potent	tial to improve resilience over the
oaseline do-nothing o	ption due to the quicker climb.	
General Aviation	Access	Qualitative
Qualitatively there wo	ould be a similar access impact on GA tro	affic compared with the baseline do-
nothing option.		
General Aviation/	Economic impact from increased	Qualitative
commercial airlines	effective capacity	
Qualitatively this desig	n option has the potential to contribute	to increased effective capacity, which
would have a positive	economic impact compared with the k	baseline do-nothing option.
General Aviation/	Fuel Burn	Qualitative
commercial airlines		
Qualitatively this desig	n option's quicker climb has the potenti	ial to result in a reduced fuel burn
mpact on commercio	al traffic when compared when the base	eline do-nothing option. We do not
predict a change in G	A impacts.	
	Training costs	Qualitative
Commercial airlines		
	ocedures change worldwide with each	AIRAC cycle and airlines would update
Qualitatively, flight pro	<u> </u>	
Qualitatively, flight pro	ocedures change worldwide with each / ordingly, training if required. This option is	
Qualitatively, flight pro heir procedures acco raining cost impacts f	ocedures change worldwide with each / ordingly, training if required. This option is	
Qualitatively, flight pro their procedures acco training cost impacts f <b>Commercial airlines</b>	ocedures change worldwide with each / ordingly, training if required. This option is for airlines. Other costs	s not anticipated to impose additional
Qualitatively, flight pro their procedures acco training cost impacts f <b>Commercial airlines</b> No other airline costs o	ocedures change worldwide with each / ordingly, training if required. This option is for airlines. Other costs	s not anticipated to impose additional
Qualitatively, flight pro their procedures acco training cost impacts f <b>Commercial airlines</b> No other airline costs o <b>Airport/ ANSP</b>	ocedures change worldwide with each / ordingly, training if required. This option is for airlines. Other costs are foreseen. Infrastructure costs	s not anticipated to impose additional Qualitative Qualitative
their procedures acco training cost impacts f <b>Commercial airlines</b> No other airline costs o <b>Airport/ ANSP</b> This design option is no	ocedures change worldwide with each / ordingly, training if required. This option is for airlines. Other costs are foreseen. Infrastructure costs ot expected to change Airport or ANSP i	s not anticipated to impose additional Qualitative Qualitative Infrastructure impacts, beyond the initia
Qualitatively, flight pro their procedures acco training cost impacts f <b>Commercial airlines</b> No other airline costs o <b>Airport/ ANSP</b> This design option is no	ocedures change worldwide with each / ordingly, training if required. This option is for airlines. Other costs are foreseen. Infrastructure costs	s not anticipated to impose additional Qualitative Qualitative Infrastructure impacts, beyond the initia

Airport/ ANSP	Deployment costs	Qualitative		
At this stage it is disproportionate to quantify deployment costs per design option as they would be				
used in arrival, depart	used in arrival, departure and runway permutations not yet detailed. However, a system change for			
LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic				
simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	Performance against the vision and	Qualitative		
	parameters/strategic objectives of			
	the AMS			
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to				
today improved over	rall noise impact reduced fuel/ $(CO_2)$			

#### **Qualitative Safety Assessment**

This proposed departure option from runway 09 is a similar departure route to the east/northeast as today, but provides a more direct route to the east, removes the complex turn from today's baseline SID, and is expected to climb higher more quickly. The safety assessment for this option indicates that a safety hazard assessment would be required to ensure deconfliction from Heathrow, Stansted and Southend air traffic flows.

### With a right turn out after take-off (RTO)

4.2.4 DEP-09-ENE-RTO-1

	TIME THESE AD	Runway 09 departure to the east-
100	I HURBONS	northeast, right turn out (option 1)
Contraction of the local division of the loc	A CAE	
	Jays Gays	
Dartfe	A THE THE A	rv/ Da
Dartio		Store -
	0	ambaua
Group	Impact	Level of Analysis
Communities	Noise impact on health ar	-
	of life (includes impact on	
	due to AONB overflight)	
This desian option wo		but primarily different, communities from today
		more quickly and would overfly less densely
		refore, qualitatively the anticipated noise impact
		p-nothing option. This design option would not
	7,000ft-4,000ft hence no char	
Communities	Air quality	Qualitative
Government guidanc	ce states that aircraft flying hig	her than 1,000ft are unlikely to have a significant
mpact on local air qu		
Departing aircraft wo	uld still climb through 1,000ft o	on initial departure, about 1.7 nautical miles (3.2km
from either end of the	runway.	
Wider society	Greenhouse gas impact	Qualitative
- ·		e route to the east/ northeast as it has been
		reas. However, it would climb quicker when
		would therefore have the potential to result in a
	ouse gas impacts for each fligh	
Wider society	Capacity/ resilience	Qualitative
		capacity to the baseline do-nothing option. It turns
		onto a similar direction. It also has the potential to
	er the baseline do-nothing op	
General Aviation	Access	Qualitative
	ould be a similar access impac	ct on GA traffic compared with the baseline do-
nothing option. General Aviation/	Economic impact from inc	creased Qualitative
commercial airlines	Economic impact from inc	Jeasea Qualitative
commercial almines	attactive concepts	
Our alitativaly this desir	effective capacity	a antributa ta inara mad affa aliva a maaitu uubiab
	gn option has the potential to	
would have a positive	gn option has the potential to e economic impact compared	d with the baseline do-nothing option.
would have a positive General Aviation/	gn option has the potential to	
would have a positive General Aviation/ commercial airlines	gn option has the potential to e economic impact compared Fuel Burn	d with the baseline do-nothing option. Qualitative
would have a positive General Aviation/ commercial airlines Qualitatively this desig	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t	d with the baseline do-nothing option. Qualitative the potential to result in a reduced fuel burn
would have a positive General Aviation/ commercial airlines Qualitatively this design impact on commercie	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t al traffic when compared whe	d with the baseline do-nothing option. Qualitative
would have a positive General Aviation/ commercial airlines Qualitatively this design mpact on commerci- predict a change in C	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t al traffic when compared whe GA impacts.	d with the baseline do-nothing option. Qualitative the potential to result in a reduced fuel burn en the baseline do-nothing option. We do not
would have a positive General Aviation/ commercial airlines Qualitatively this desig mpact on commerci- predict a change in C Commercial airlines	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t al traffic when compared whe GA impacts. Training costs	d with the baseline do-nothing option. Qualitative the potential to result in a reduced fuel burn en the baseline do-nothing option. We do not Qualitative
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would have a positive General Aviation/ commercial airlines Qualitatively this desig mpact on commercial predict a change in C Commercial airlines Qualitatively, flight pro- their procedures according	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t al traffic when compared whe GA impacts. Training costs ocedures change worldwide v ordingly, training if required. Th	d with the baseline do-nothing option. Qualitative the potential to result in a reduced fuel burn en the baseline do-nothing option. We do not Qualitative
would have a positive General Aviation/ commercial airlines Qualitatively this design predict a change in C Commercial airlines Qualitatively, flight pro- their procedures acco training cost impacts	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t al traffic when compared whe GA impacts. Training costs ocedures change worldwide v ordingly, training if required. The for airlines.	d with the baseline do-nothing option. Qualitative the potential to result in a reduced fuel burn en the baseline do-nothing option. We do not Qualitative with each AIRAC cycle and airlines would update his option is not anticipated to impose additional
would have a positive General Aviation/ commercial airlines Qualitatively this desig mpact on commercial predict a change in C Commercial airlines Qualitatively, flight pro- their procedures accor training cost impacts Commercial airlines	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t al traffic when compared whe GA impacts. Training costs ocedures change worldwide ordingly, training if required. Th for airlines. Other costs	d with the baseline do-nothing option. Qualitative the potential to result in a reduced fuel burn en the baseline do-nothing option. We do not Qualitative with each AIRAC cycle and airlines would update
would have a positive General Aviation/ commercial airlines Qualitatively this desig impact on commercial predict a change in C Commercial airlines Qualitatively, flight pro- their procedures acco training cost impacts Commercial airlines No other airline costs	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t al traffic when compared whe GA impacts. Training costs ocedures change worldwide v ordingly, training if required. The for airlines. Other costs are foreseen.	d with the baseline do-nothing option. Qualitative the potential to result in a reduced fuel burn en the baseline do-nothing option. We do not Qualitative with each AIRAC cycle and airlines would update his option is not anticipated to impose additional Qualitative
would have a positive General Aviation/ commercial airlines Qualitatively this desig impact on commercial predict a change in C Commercial airlines Qualitatively, flight pro- their procedures accor training cost impacts Commercial airlines No other airline costs Airport/ ANSP	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t al traffic when compared whe GA impacts. Training costs ocedures change worldwide v ordingly, training if required. The for airlines. Other costs are foreseen. Infrastructure costs	d with the baseline do-nothing option. Qualitative the potential to result in a reduced fuel burn en the baseline do-nothing option. We do not Qualitative with each AIRAC cycle and airlines would update his option is not anticipated to impose additional Qualitative Qualitative
would have a positive General Aviation/ commercial airlines Qualitatively this design impact on commercial predict a change in C Commercial airlines Qualitatively, flight pro- their procedures accor- training cost impacts Commercial airlines No other airline costs Airport/ ANSP This design option is no	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t al traffic when compared whe GA impacts. Training costs ocedures change worldwide v ordingly, training if required. The for airlines. Other costs are foreseen. Infrastructure costs ot expected to change Airpor	d with the baseline do-nothing option. Qualitative the potential to result in a reduced fuel burn en the baseline do-nothing option. We do not Qualitative with each AIRAC cycle and airlines would update his option is not anticipated to impose additional Qualitative Qualitative rt or ANSP infrastructure impacts, beyond the initial
would have a positive General Aviation/ commercial airlines Qualitatively this desig impact on commercial predict a change in C Commercial airlines Qualitatively, flight pro- their procedures accor- training cost impacts Commercial airlines No other airline costs Airport/ ANSP This design option is no	gn option has the potential to e economic impact compared Fuel Burn gn option's quicker climb has t al traffic when compared whe GA impacts. Training costs ocedures change worldwide v ordingly, training if required. The for airlines. Other costs are foreseen. Infrastructure costs	Qualitative the potential to result in a reduced fuel burn en the baseline do-nothing option. We do not Qualitative with each AIRAC cycle and airlines would update his option is not anticipated to impose additional Qualitative Qualitative rt or ANSP infrastructure impacts, beyond the initial

Airport/ ANSP	Deployment costs	Qualitative
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.		
All	Performance against the vision a parameters/strategic objectives the AMS	
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).		

### **Qualitative Safety Assessment**

This departure option from runway 09 is similar to the east/northeast departure as is today but provides a longer departure route to avoid overflying more densely populated areas and is expected to climb higher more quickly. The safety assessment for this option indicates similar levels of safety assurance to today's operation, but a safety hazard assessment would be required to ensure deconfliction against London City 09 arrivals from the south and Southend air traffic flows.

### 4.3 Runway 09 SIDs to the southeast and south

With a left turn out after take-off (LTO)

4.3.1 DEP-09-SE-LTO-1



Runway 09 departure to the southeast, left turn out (option 1)

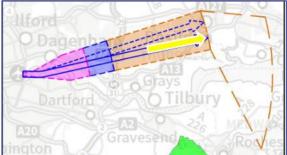
And 2	ravesend Rovies	
Group	Impact	Level of Analysis
Communities	Noise impact on health and quality	Qualitative
	of life (includes impact on tranquillity	
	due to AONB overflight)	
This design option wou	Id overfly some of the same, but primarily	v different, communities from today
	er, it is expected to be higher more quick	
populated areas as ai	rcraft continue to climb. Therefore, quali	tatively the anticipated noise impact
would be less when co	ompared with the baseline do-nothing op	ption. This design option would not
	7,000ft-4,000ft hence no change in tranq	uillity impacts.
Communities	Air quality	Qualitative
-	e states that aircraft flying higher than 1,0	00ft are unlikely to have a significant
impact on local air qu		
	uld still climb through 1,000ft on initial dep	arture, about 1.7 nautical miles (3.2km)
from either end of the		
Wider society	Greenhouse gas impact	Qualitative
<u> </u>	Ild provide a shorter departure route to th	<b>e</b>
-	tplannable track distance and increased	
	pacts for each flight using this route when	compared to the baseline do-nothing
option.		
Wider society	Capacity/ resilience	Qualitative
	Ild provide a broadly similar capacity to t	
	milar direction, but it also has the potentia	al to improve resilience over the
General Aviation	ption due to the quicker climb.	Qualitative
	Access uld be a similar access impact on GA trat	
nothing option.	old be a similar access impact on GA ira	nic compared with the baseline do-
General Aviation/	Economic impact from increased	Qualitative
commercial airlines	effective capacity	Quantanve
	n option has the potential to contribute t	o increased effective capacity, which
	economic impact compared with the bo	
General Aviation/	Fuel Burn	Qualitative
commercial airlines		
	n option's shorter flightplannable track di	stance and auicker climb would result
	impact on commercial traffic when com	
	edict a change in GA impacts.	Č
Commercial airlines	Training costs	Qualitative
Qualitatively, flight pro	ocedures change worldwide with each Al	IRAC cycle and airlines would update
	ordingly, training if required. This option is i	
training cost impacts f	or airlines.	
Commercial airlines	Other costs	Qualitative
No other airline costs o	are foreseen.	
Airport/ ANSP	Infrastructure costs	Qualitative
This design option is no	ot expected to change Airport or ANSP in	frastructure impacts, beyond the initial
deployment phase wh	nich will require some systems engineering	amendments.
Airport/ ANSP	Operational costs	Qualitative
This design option is no	ot expected to change Airport or ANSP or	perational cost impacts.
Our Euture Skies - Air	space Modernisation ACP-2018-	89 Step 2B Options Appraisal (Phase 1 Initial)

Airport/ ANSP	Deployment costs	Qualitative
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.		
All	Performance against the vision ar parameters/strategic objectives of the AMS	
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).		

#### **Qualitative Safety Assessment**

This departure option from runway 09 is similar to today's operation but provides a shorter flightplannable route and is expected to climb higher more quickly. The safety assessment for this option indicates similar levels of safety assurance to today's operation, but a safety hazard assessment would be required to ensure deconfliction against London City 09 arrivals and Southend air traffic flows.

### 4.3.2 DEP-09-SE-LTO-2



Runway 09 departure to the southeast, left turn out (option 2)

Group	Impact	Level of Analysis
Communities	Noise impact on health and quali	ity Qualitative
	of life (includes impact on tranqui	illity
	due to AONB overflight)	
		narily different, communities from today
	ever, it is expected to be higher more c	
		qualitatively the anticipated noise impact
		ng option. This design option would not
	n 7,000ft-4,000ft hence no change in t	
Communities	Air quality	Qualitative
-		n 1,000ft are unlikely to have a significant
npact on local air c		
	-	departure, about 1.7 nautical miles (3.2kr
rom either end of th		
Vider society	Greenhouse gas impact	Qualitative
	ould provide a shorter departure route	
		ased climb rate would result in a reductio
	npacts for each flight using this route v	when compared to the baseline do-nothir
option.		
Vider society	Capacity/ resilience	Qualitative
	ould provide a broadly similar capacity	
	similar direction, but it also has the pot	rential to improve resilience over the
	option due to the quicker climb.	Qualitativa
General Aviation		
-	ould be a similar access impact on GA	A traffic compared with the baseline do-
nothing option. General Aviation/	Economic impact from increased	Qualitative
commercial airlines		Qualitative
		ute to increased effective capacity, whic
-	e economic impact compared with th	
General Aviation/	Fuel Burn	Qualitative
commercial airlines	I DEI DOITI	Qualitative
	ian option's shorter flightplannable tra	ck distance and quicker climb would resu
		compared with the baseline do-nothing
	predict a change in GA impacts.	compared with the baseline do horning
Commercial airlines		Qualitative
		ch AIRAC cycle and airlines would update
	÷	on is not anticipated to impose additional
raining cost impacts		
Commercial airlines		Qualitative
No other airline costs		
Airport/ ANSP	Infrastructure costs	Qualitative
		SP infrastructure impacts, beyond the initia
	which will require some systems engine	
deployment phase v		
deployment phase v Airport/ ANSP	Operational costs	Qualitative

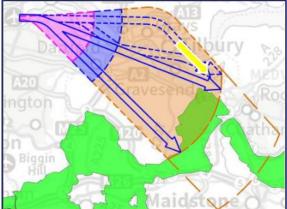
Airport/ ANSP	Deployment costs	Qualitative
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.		
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).		

#### **Qualitative Safety Assessment**

This departure option from runway 09 is similar to today's operation but provides a shorter flightplannable route to the southeast and is expected to climb higher more quickly. The safety assessment for this option indicates similar levels of safety assurance to today's operation, but a safety hazard assessment would be required to ensure deconfliction against London City 09 arrivals and Southend air traffic flows.

### With a right turn out after take-off (RTO)

4.3.3 DEP-09-SE-RTO-1



Runway 09 departure to the southeast, right turn out (option 1)

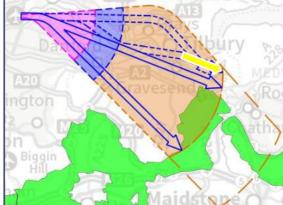
Group	Impact	Level of Analysis
Communities	Noise impact on health ar	-
	of life (includes impact on	tranquillity
	due to AONB overflight)	
This design option wou	Id overfly some of the same,	but primarily different, communities from today
	· · · · · · · · · · · · · · · · · · ·	more quickly and would overfly less densely
		refore, qualitatively the anticipated noise impact
		p-nothing option. This design option would not
	7,000ft-4,000ft hence no chai	
Communities	Air quality	Qualitative
0		her than 1,000ft are unlikely to have a significant
mpact on local air qu		n initial dan artura, about 1.7 neutical miles (2.0km)
from either end of the	-	n initial departure, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impact	Qualitative
		e route to the southeast alongside a quicker
		nd increased climb rate would result in a reduction
0	the second se	route when compared to the baseline do-nothing
option.		
Nider society	Capacity/ resilience	Qualitative
		vement over the baseline do-nothing option
		departure separation against preceding or
		improve resilience over the baseline do-nothing
option due to the quic	:ker climb.	
General Aviation	Access	Qualitative
	uld be a similar access impac	ct on GA traffic compared with the baseline do-
nothing option.		
General Aviation/	Economic impact from inc	creased Qualitative
commercial airlines	effective capacity	
Qualitatively this desia		
		contribute to increased effective capacity, which
would have a positive	economic impact compared	d with the baseline do-nothing option.
would have a positive General Aviation/		
would have a positive General Aviation/ commercial airlines	economic impact compared Fuel Burn	d with the baseline do-nothing option. Qualitative
would have a positive General Aviation/ commercial airlines Qualitatively this desig	economic impact compared Fuel Burn In option's shorter flightplanne	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result
would have a positive General Aviation/ commercial airlines Qualitatively this desig n a reduced fuel burn	economic impact compared Fuel Burn In option's shorter flightplanne impact on commercial traffi	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result c when compared with the baseline do-nothing
would have a positive General Aviation/ commercial airlines Qualitatively this desig n a reduced fuel burn option. We do not pre	economic impact compared Fuel Burn In option's shorter flightplanne impact on commercial traffi edict a change in GA impact	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result c when compared with the baseline do-nothing s.
would have a positive General Aviation/ commercial airlines Qualitatively this desig in a reduced fuel burn option. We do not pre Commercial airlines	economic impact compared Fuel Burn In option's shorter flightplanne impact on commercial traffi edict a change in GA impact Training costs	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result c when compared with the baseline do-nothing s. Qualitative
would have a positive General Aviation/ commercial airlines Qualitatively this desig in a reduced fuel burn option. We do not pre Commercial airlines Qualitatively, flight pro	economic impact compared Fuel Burn In option's shorter flightplanne impact on commercial traffi edict a change in GA impact Training costs ocedures change worldwide	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result c when compared with the baseline do-nothing s. Qualitative with each AIRAC cycle and airlines would update
would have a positive General Aviation/ commercial airlines Qualitatively this desig n a reduced fuel burn option. We do not pre Commercial airlines Qualitatively, flight pro their procedures acco	economic impact compared Fuel Burn In option's shorter flightplanne impact on commercial traffi edict a change in GA impact Training costs ocedures change worldwide ordingly, training if required. T	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result c when compared with the baseline do-nothing s. Qualitative
would have a positive General Aviation/ commercial airlines Qualitatively this desig in a reduced fuel burn option. We do not pre Commercial airlines Qualitatively, flight pro their procedures acco training cost impacts f	economic impact compared Fuel Burn In option's shorter flightplanne impact on commercial traffi edict a change in GA impact Training costs ocedures change worldwide ordingly, training if required. T	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result c when compared with the baseline do-nothing s. Qualitative with each AIRAC cycle and airlines would update
would have a positive General Aviation/ commercial airlines Qualitatively this desig in a reduced fuel burn option. We do not pre Commercial airlines Qualitatively, flight pro their procedures acco training cost impacts f Commercial airlines	economic impact compared Fuel Burn in option's shorter flightplanne impact on commercial traffi edict a change in GA impact Training costs ocedures change worldwide ordingly, training if required. T or airlines. Other costs	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result c when compared with the baseline do-nothing s. Qualitative with each AIRAC cycle and airlines would update his option is not anticipated to impose additional
would have a positive General Aviation/ commercial airlines Qualitatively this desig in a reduced fuel burn option. We do not pre Commercial airlines Qualitatively, flight pro	economic impact compared Fuel Burn in option's shorter flightplanne impact on commercial traffi edict a change in GA impact Training costs ocedures change worldwide ordingly, training if required. T or airlines. Other costs	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result c when compared with the baseline do-nothing s. Qualitative with each AIRAC cycle and airlines would update his option is not anticipated to impose additional
would have a positive General Aviation/ commercial airlines Qualitatively this desig in a reduced fuel burn option. We do not pre Commercial airlines Qualitatively, flight pro their procedures acco training cost impacts fo Commercial airlines No other airline costs of Airport/ ANSP	economic impact compared Fuel Burn in option's shorter flightplanne impact on commercial traffi edict a change in GA impact Training costs ocedures change worldwide ordingly, training if required. T or airlines. Other costs are foreseen. Infrastructure costs	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result c when compared with the baseline do-nothing s. Qualitative with each AIRAC cycle and airlines would update his option is not anticipated to impose additional Qualitative
would have a positive General Aviation/ commercial airlines Qualitatively this desig in a reduced fuel burn option. We do not pre Commercial airlines Qualitatively, flight pro their procedures acco training cost impacts f Commercial airlines No other airline costs of Airport/ ANSP This design option is no	economic impact compared Fuel Burn in option's shorter flightplanne impact on commercial traffi edict a change in GA impact Training costs ocedures change worldwide ordingly, training if required. T or airlines. Other costs are foreseen. Infrastructure costs	d with the baseline do-nothing option. Qualitative able track distance and quicker climb would result c when compared with the baseline do-nothing s. Qualitative with each AIRAC cycle and airlines would update his option is not anticipated to impose additional Qualitative dualitative

Airport/ ANSP	Operational costs	Qualitative	
This design option is not	This design option is not expected to change Airport or ANSP operational cost impacts.		
Airport/ ANSP	Deployment costs	Qualitative	
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.			
All Performance against the vision and parameters/strategic objectives of the AMS Qualitative			
On balance, this design option has the potential to contribute to the AMS (may enable an increase in capacity, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).			

### **Qualitative Safety Assessment**

This departure option from runway 09 climbs straight ahead then turns to provide a shorter departure route to the southeast along with a quicker climb. The safety assessment for this option indicates similar levels of safety assurance to today's operation, but a safety hazard assessment would be required to ensure deconfliction against London City 09 arrivals and Southend and Biggin Hill air traffic flows.

#### 4.3.4 DEP-09-SE-RTO-2



Runway 09 departure to the southeast, right turn out (option 2)

Communities         Noise impact on health and quality due to AONB overflight)         Qualitative (includes impact on tranquillity due to AONB overflight)           This design option would overfly some of the same, but primarily different after take-off. However, it is expected to be higher more quickly and wo populated areas as aircraft continue to climb. Therefore, qualitatively th would be less when compared with the baseline do-nothing option. This overfly an AONB from 7,000ft-4,000ft hence no change in tranquility impore Communities         Air quality         Qualitati           Communities         Air quality         Qualitati         Qualitati           Government guidance states that aircraft flying higher than 1,000ft are u impact on local air quality.         Qualitati           Departing aircraft would still climb through 1,000ft on initial departure, ab from either end of the runway.         Qualitati           Wider society         Greenhouse gas impact         Qualitati           This design option would provide a shorter departure route to the souther climb. This shorter flightplannable track distance and increased climb rai of greenhouse gas impacts for each flight using this route when compare option.         Qualitati           Wider society         Capacity/ resilience         Qualitati           This design option would provide a capacity improvement over the base because its initial direction may allow for reduced departure separation of succeeding departures. It also has the potential to improve resilience ov option due to the quicker climb.           General Aviation/         Economic impact from incr	Analysis
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in a reduced fuel burn impact on commercial traffic when compared wi option. We do not predict a change in GA impacts. Commercial airlines Training costs Qualitat Qualitatively, flight procedures change worldwide with each AIRAC cycl their procedures accordingly, training if required. This option is not anticip training cost impacts for airlines. Commercial airlines Other costs Qualitat No other airline costs are foreseen. Airport/ ANSP Infrastructure costs Qualitat This design option is not expected to change Airport or ANSP infrastructure deployment phase which will require some systems engineering amendm Airport/ ANSP Operational costs Qualitat This design option is not expected to change Airport or ANSP operational	
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Qualitatively, flight procedures change worldwide with each AIRAC cycl         their procedures accordingly, training if required. This option is not anticip         training cost impacts for airlines.         Commercial airlines       Other costs         Qualitat         No other airline costs are foreseen.         Airport/ ANSP       Infrastructure costs         Qualitat         This design option is not expected to change Airport or ANSP infrastructure         deployment phase which will require some systems engineering amendm         Airport/ ANSP       Operational costs         Qualitat         This design option is not expected to change Airport or ANSP infrastructure         deployment phase which will require some systems engineering amendm         Airport/ ANSP       Operational costs         Qualitat         This design option is not expected to change Airport or ANSP operational	
their procedures accordingly, training if required. This option is not anticip         training cost impacts for airlines.         Commercial airlines       Other costs         No other airline costs are foreseen.         Airport/ ANSP       Infrastructure costs         Qualitat         This design option is not expected to change Airport or ANSP infrastructure         Airport/ ANSP       Operational costs         Qualitat         Airport/ ANSP       Operational costs         Qualitat	
training cost impacts for airlines.          Commercial airlines       Other costs       Qualitat         No other airline costs are foreseen.       Airport/ANSP       Infrastructure costs       Qualitat         Airport/ANSP       Infrastructure costs       Qualitat         This design option is not expected to change Airport or ANSP infrastructure deployment phase which will require some systems engineering amendm         Airport/ANSP       Operational costs       Qualitat         This design option is not expected to change Airport or ANSP operational       Costs       Qualitat	
Commercial airlinesOther costsQualitatNo other airline costs are foreseen.Airport/ANSPInfrastructure costsQualitatAirport/ANSPInfrastructure costsQualitatThis design option is not expected to change Airport or ANSP infrastructure deployment phase which will require some systems engineering amendme Airport/ANSPQualitatAirport/ANSPOperational costsQualitatThis design option is not expected to change Airport or ANSP operationalCostsConstant	pated to impose additional
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deployment phase which will require some systems engineering amendmediationAirport/ ANSPOperational costsQualitateThis design option is not expected to change Airport or ANSP operational	
Airport/ ANSPOperational costsQualitatThis design option is not expected to change Airport or ANSP operational	e impacts, beyond the initic
This design option is not expected to change Airport or ANSP operational	ents.
	ve
	cost impacts.
	otions Appraisal (Phase 1 Initial) d Document, Issue 1.0 Page 53

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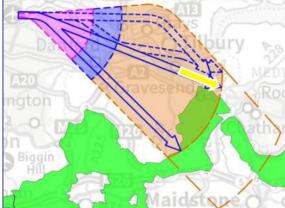
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Airport/ ANSP	Deployment costs	Qualitative
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.		
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
On balance, this design option has the potential to contribute to the AMS (may enable an increase in capacity, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).		

### **Qualitative Safety Assessment**

This departure option from runway 09 provides a shorter departure route to the southeast alongside a quicker climb. The safety assessment for this option indicates similar levels of safety assurance to today's operation, but a safety hazard assessment would be required to ensure deconfliction against London City 09 arrivals and Southend and Biggin Hill air traffic flows.

### 4.3.5 DEP-09-SE-RTO-3



Runway 09 departure to the southeast, right turn out (option 3)

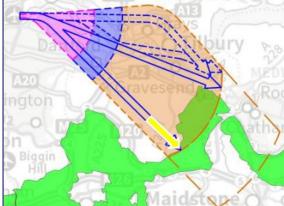
	Maidstope O	
Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life (includes impact on tranquillit due to AONB overflight)	ty
higher more quickly Therefore, qualitative the baseline do-noth overflown at higher of	and would overall overfly a broadly simile bly the anticipated noise impact would b ning option. A small northern section of the altitudes by this route which would have	be broadly similar when compared with he Kent Downs AONB may also be
Communities	Air quality	Qualitative
impact on local air c	ould still climb through 1,000ft on initial de	1,000tt are unlikely to have a significant eparture, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impact	Qualitative
exit point (as today) increased climb rate	ould provide the shortest possible depart alongside a quicker climb. This shorter fl would result in a reduction of greenhou ed to the baseline do-nothing option.	lightplannable track distance and use gas impacts for each flight using this
Wider society	Capacity/ resilience	Qualitative
because its initial dire	ould provide a capacity improvement ov ection may allow for reduced departure res. It also has the potential to improve u vicker climb.	separation against preceding or
General Aviation	Access	Qualitative
between the Isle of [	becifically the right turn out, may have a Dogs and the Queen Elizabeth II Bridge. Sted when compared with the baseline o	Therefore, GA access in this area could
General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative
would have a positiv	e economic impact compared with the	
General Aviation/ commercial airlines	Fuel Burn	Qualitative
in a reduced fuel bu	ign option's shorter flightplannable track rn impact on commercial traffic when co redict a change in GA impacts.	distance and quicker climb would result ompared with the baseline do-nothing
<b>Commercial airlines</b>	Training costs	Qualitative
	cordingly, training if required. This option	AIRAC cycle and airlines would update is not anticipated to impose additional
<b>Commercial airlines</b>	Other costs	Qualitative
No other airline costs		
Airport/ ANSP	Infrastructure costs	Qualitative
- ·	not expected to change Airport or ANSP vhich will require some systems engineeri	infrastructure impacts, beyond the initial ing amendments.

Airport/ ANSP	Operational costs	Qualitative	
This design option is no	This design option is not expected to change Airport or ANSP operational cost impacts.		
Airport/ ANSP	Deployment costs	Qualitative	
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.			
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative	
On balance, this design option has the potential to contribute to the AMS (may enable an increase in			
capacity, broadly similar overall noise impact to today, reduced fuel/CO <sub>2</sub> ).			

### **Qualitative Safety Assessment**

This departure option from runway 09 provides the shortest possible departure route to the applicable southeast exit point (as is today) alongside a quicker climb. The safety assessment for this option indicates similar levels of safety assurance to today's operation, but a safety hazard assessment would be required to ensure deconfliction against London City 09 arrivals and Gatwick, Southend and Biggin Hill air traffic flows.

### 4.3.6 DEP-09-SE-RTO-4



Runway 09 departure to the southeast, right turn out (option 4)

AB SO	A Maidstope O	
Group	Impact	Level of Analysis
Communities	Noise impact on health and of life (includes impact on t due to AONB overflight)	
higher more quickly Therefore, qualitativ the baseline do-not overflown at higher	and would overall overfly a broch rely the anticipated noise impact hing option. A small northern see altitudes by this route which wou	nunities from today. However, it is expected to be adly similar number of people as today. t would be broadly similar when compared with ction of the Kent Downs AONB may also be uld have a negative impact on tranquillity.
Communities	Air quality	Qualitative ner than 1,000ft are unlikely to have a significant
impact on local air	quality. vould still climb through 1,000ft or	n initial departure, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impact	Qualitative
exit point (as today increased climb rat	alongside a quicker climb. This	e departure route to the applicable southeast shorter flightplannable track distance and reenhouse gas impacts for each flight using this ption.
Wider society	Capacity/ resilience	Qualitative
because its initial di	rection may allow for reduced d ures. It also has the potential to i	ement over the baseline do-nothing option eparture separation against preceding or mprove resilience over the baseline do-nothing
General Aviation	Access	Qualitative
between the Isle of	· · · · ·	/ have a negative impact on GA airspace users Bridge. Therefore, GA access in this area could paseline do-nothing option.
General Aviation/ commercial airlines	Economic impact from incl effective capacity	reased Qualitative
would have a positi	<b>e</b>	contribute to increased effective capacity, which with the baseline do-nothing option.
General Aviation/ commercial airlines		Qualitative
in a reduced fuel b		ble track distance and quicker climb would result when compared with the baseline do-nothing
<b>Commercial airlines</b>	s Training costs	Qualitative
their procedures ac training cost impac	cordingly, training if required. Th ts for airlines.	vith each AIRAC cycle and airlines would update is option is not anticipated to impose additional
Commercial airlines		Qualitative
No other airline cos		
Airport/ ANSP	Infrastructure costs	
<b>—</b>	not expected to change Airport which will require some systems e	or ANSP infrastructure impacts, beyond the initial engineering amendments.

Airport/ ANSP	Operational costs	Qualitative	
This design option is no	This design option is not expected to change Airport or ANSP operational cost impacts.		
Airport/ ANSP	Deployment costs	Qualitative	
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.			
All Performance against the vision and parameters/strategic objectives of the AMS Qualitative			
On balance, this design option has the potential to contribute to the AMS (may enable an increase in			
capacity, broadly similar overall noise impact to today, reduced fuel/ $CO_2$ ).			

### **Qualitative Safety Assessment**

This departure option from runway 09 provides the shortest possible departure route to the applicable southeast exit point (as is today) alongside a quicker climb. The safety assessment for this option indicates similar levels of safety assurance to today's operation, but a safety hazard assessment would be required to ensure deconfliction against London City 09 arrivals and Heathrow, Gatwick, Southend and Biggin Hill air traffic flows.

# 5 Runway 27 Departure Options

### 5.1 Runway 27 SIDs to the northwest and west

### With a right turn out after take-off (RTO)

5.1.1 DEP-27-NW-RTO-1

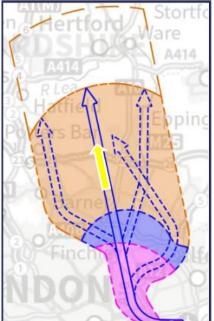
n 6 Hertford A414 B R Lea B H the B H	Runway 27 departure to the nor	
Group	Impact	Level of Analysis
Communities	Noise impact on health and quality	Qualitative
	of life (includes impact on tranquillity	
	due to AONB overflight)	
after take-off. Howeve number of people to to broadly similar when co	d overfly some of the same, but primarily or r, it is expected to be higher more quickly oday overall. Therefore, qualitatively the o pmpared with the baseline do-nothing op ,000ft-4,000ft hence no change in tranqui	and would overfly a broadly similar anticipated noise impact would be tion. This design option would not
Communities	Air quality	Qualitative
impact on local air qua	d still climb through 1,000ft on initial depa	
Wider society	Greenhouse gas impact	Qualitative
also climb quicker whe potential to result in a re	d provide a similar departure route length n compared to the baseline do-nothing a eduction of greenhouse gas impacts for e	ption and would therefore have the each flight using this route.
Wider society	Capacity/resilience	Qualitative
because it turns in a sim	d provide a broadly similar capacity to th nilar direction, but it also has the potential tion due to the quicker climb.	<b>.</b>
General Aviation	Access	Qualitative
	Id be a similar access impact on GA traffi	
General Aviation/	Economic impact from increased	Qualitative
commercial airlines	effective capacity	
	option has the potential to contribute to economic impact compared with the bas	

General Aviation/	Fuel Burn	Qualitative	
commercial airlines			
Qualitatively this design option's quicker climb has the potential to result in a reduced fuel burn			
impact on commercial	traffic when compared when the basel	ine do-nothing option. We do not	
predict a change in GA	impacts.		
Commercial airlines	Training costs	Qualitative	
Qualitatively, flight proc	edures change worldwide with each A	RAC cycle and airlines would update	
their procedures accord	dingly, training if required. This option is	not anticipated to impose additional	
training cost impacts for	airlines.		
Commercial airlines	Other costs	Qualitative	
No other airline costs are	e foreseen.		
Airport/ ANSP	Infrastructure costs	Qualitative	
This design option is not	expected to change Airport or ANSP in	frastructure impacts, beyond the initial	
deployment phase whic	ch will require some systems engineering	g amendments.	
Airport/ ANSP	Operational costs	Qualitative	
This design option is not	expected to change Airport or ANSP or	perational cost impacts.	
Airport/ ANSP	Deployment costs	Qualitative	
At this stage it is disprop	ortionate to quantify deployment costs	per design option as they would be	
used in arrival, departure and runway permutations not yet detailed. However, a system change for			
LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic			
simulators (including sim prep, management and staffing), with additional engineering costs TBC.			
All	Performance against the vision and	Qualitative	
	parameters/strategic objectives of		
	the AMS		
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to			
today, improved overall noise impact, reduced fuel/CO2).			

#### **Qualitative Safety Assessment**

This departure option from runway 27 departs to the northwest and is expected to climb higher more quickly. This design stays away from Heathrow airspace initially, then then turns left to provide an alternate route. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction against Heathrow, and Northolt arrivals and Luton and Stansted departures.

### 5.1.2 DEP-27-NW-RTO-2



Runway 27 departure to the northwest, right turn out (option 2)

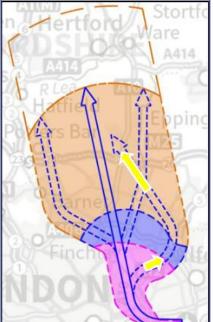
Finch		
Group	Impact	Level of Analysis
Communities	Noise impact on health of life (includes impact o due to AONB overflight)	and quality Qualitative on tranquillity
after take-off. Howe populated areas as would be less when overfly an AONB from	ever, it is expected to be high aircraft continue to climb. Th compared with the baseline m 7,000ft-4,000ft hence no ch	
Communities	Air quality	Qualitative
impact on local air o	quality. ould still climb through 1,000f	nigher than 1,000ft are unlikely to have a significant t on initial departure, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impac	t Qualitative
climb. This shorter flig	ghtplannable track distance	ture route to the northwest alongside a quicker and increased climb rate would result in a reduction his route when compared to the baseline do-nothing
Wider society	Capacity/ resilience	Qualitative
because it turns in a		r capacity to the baseline do-nothing option as the potential to improve resilience over the imb.
General Aviation	Access	Qualitative
nothing option.	ould be a similar access imp	act on GA traffic compared with the baseline do-
General Aviation/ commercial airlines	Economic impact from i effective capacity	
would have a positiv	ve economic impact compa	to contribute to increased effective capacity, which red with the baseline do-nothing option.
General Aviation/ commercial airlines	Fuel Burn	Qualitative
in a reduced fuel bu option. We do not p	rn impact on commercial tro predict a change in GA impa	
Commercial airlines		Qualitative
	cordingly, training if required.	e with each AIRAC cycle and airlines would update This option is not anticipated to impose additional
	Airspace Modernisation	ACP-2018-89 Step 28 Options Appraisal (Phase 1 Initial)

Commercial airlines	Other costs	Qualitative		
No other airline costs ar	No other airline costs are foreseen.			
Airport/ ANSP	Infrastructure costs	Qualitative		
		infrastructure impacts, beyond the initial		
deployment phase whi	ch will require some systems engineeri	ng amendments.		
Airport/ ANSP	Operational costs	Qualitative		
This design option is not	expected to change Airport or ANSP	operational cost impacts.		
Airport/ ANSP	Deployment costs	Qualitative		
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative		
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).				

#### **Qualitative Safety Assessment**

This departure option from runway 27 provides a shorter departure route to the northwest and is expected to climb higher more quickly. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction against Heathrow, and Northolt arrivals and Luton and Stansted departures.

#### 5.1.3 DEP-27-NW-RTO-3



Runway 27 departure to the northwest, right turn out (option 3)

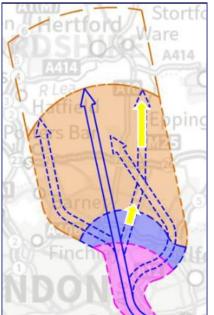
Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life (includes impact on tranquillity due to AONB overflight)	Qualitative
overflying less densely impact would be less	uld overfly the same communities as todo / populated areas at lower levels. Therefore when compared with the baseline do-no from 7,000ft-4,000ft hence no change in tr	bre, qualitatively the anticipated noise othing option. This design option would
Communities	Air quality	Qualitative
impact on local air qu	uld still climb through 1,000ft on initial dep	parture, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impact	Qualitative
also climb quicker wh potential to result in c	uld provide a similar departure route leng ien compared to the baseline do-nothing i reduction of greenhouse gas impacts for	option and would therefore have the each flight using this route.
Wider society	Capacity/ resilience	Qualitative
because it turns in a s	uld provide a broadly similar capacity to imilar direction, but it also has the potenti option due to the quicker climb.	÷ ·
General Aviation	Access	Qualitative
Qualitatively there we nothing option.	ould be a similar access impact on GA tra	
General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative
would have a positive	gn option has the potential to contribute t e economic impact compared with the b	aseline do-nothing option.
General Aviation/ commercial airlines	Fuel Burn	Qualitative
	gn option's quicker climb has the potentic al traffic when compared when the base GA impacts.	
Commercial airlines	Training costs	Qualitative
	ocedures change worldwide with each A ordingly, training if required. This option is for airlines.	
Commercial airlines	Other costs	Qualitative
No other airline costs		
		89 Step 2B Options Appraisal (Phase 1 Initial)

Airport/ ANSP	Infrastructure costs	Qualitative	
This design option is not expected to change Airport or ANSP infrastructure impacts, beyond the initial			
deployment phase w	hich will require some systems e	ngineering amendments.	
Airport/ ANSP	Operational costs	Qualitative	
This design option is n	ot expected to change Airport	or ANSP operational cost impacts.	
Airport/ ANSP	Deployment costs	Qualitative	
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.			
All	Performance against the vis parameters/strategic object the AMS		
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).			

#### Qualitative Safety Assessment

This departure option from runway 27 follows today's baseline SID but with a higher quicker climb. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction against Heathrow, and Northolt arrivals and Luton and Stansted departures.

### 5.1.4 DEP-27-NW-RTO-4



Runway 27 departure to the northwest, right turn out (option 4)

Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life (includes impact on tranquillity due to AONB overflight)	Qualitative
after take-off. Howe populated areas as would be less when	ould overfly some of the same, but primaril ever, it is expected to be higher more quick aircraft continue to climb. Therefore, qual compared with the baseline do-nothing of m 7,000ft-4,000ft hence no change in tranc	kly and would overfly less densely itatively the anticipated noise impact ption. This design option would not
Communities	Air quality	Qualitative
impact on local air c	ould still climb through 1,000ft on initial dep	
Wider society	Greenhouse gas impact	Qualitative
	alongside a quicker climb. This increased mpacts for each flight using this route wher Capacity/ resilience	
This design option we because it turns in a	ould provide a broadly similar capacity to similar direction, but it also has the potenti option due to the quicker climb.	the baseline do-nothing option
General Aviation	Access	Qualitative
Qualitatively there w nothing option.	vould be a similar access impact on GA tra	affic compared with the baseline do-
Qualitatively there w	Economic impact from increased	Qualitative
Qualitatively there w nothing option. General Aviation/ commercial airlines Qualitatively this des	Economic impact from increased	Qualitative to increased effective capacity, which
Qualitatively there w nothing option. General Aviation/ commercial airlines Qualitatively this des would have a positiv General Aviation/	Economic impact from increased effective capacity ign option has the potential to contribute t	Qualitative to increased effective capacity, which
Qualitatively there w nothing option. General Aviation/ commercial airlines Qualitatively this des would have a positiv General Aviation/ commercial airlines Qualitatively this des	Economic impact from increased effective capacity ign option has the potential to contribute to ve economic impact compared with the b Fuel Burn sign option's quicker climb has the potential cial traffic when compared when the base	Qualitative to increased effective capacity, which baseline do-nothing option. Qualitative al to result in a reduced fuel burn

Commercial airlines	Other costs	Qualitative		
No other airline costs ar	No other airline costs are foreseen.			
Airport/ ANSP	Infrastructure costs	Qualitative		
	expected to change Airport or ANSP in			
deployment phase which	ch will require some systems engineering	g amendments.		
Airport/ ANSP	Operational costs	Qualitative		
This design option is not	expected to change Airport or ANSP of	perational cost impacts.		
Airport/ ANSP	Deployment costs	Qualitative		
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative		
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).				

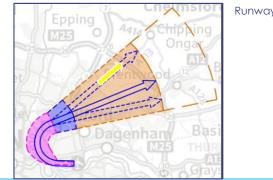
### **Qualitative Safety Assessment**

This departure option from runway 27 provides the shortest possible route to the applicable northwest exit point (as today) along with a quicker climb. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction against Heathrow, and Northolt arrivals and Luton and Stansted departures.

#### Runway 27 SIDs to the northeast and east 5.2

### With a right turn out after take-off (RTO)

5.2.1 DEP-27-ENE-RTO-1



Runway 27 departure to the east-northeast, right turn out (option 1)

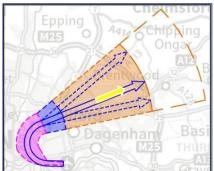
	enhan Basi M25 THUR 10 Grays	
Group	Impact	Level of Analysis
Communities	Noise impact on heal of life (includes impac due to AONB overfligh	ct on tranquillity
overflying less densel impact would be less not overfly an AONB	y populated areas at lowe when compared with the from 7,000ft-4,000ft hence	munities as today but with a faster climb, thus er levels. Therefore, qualitatively the anticipated noise e baseline do-nothing option. This design option would a no change in tranquillity impacts.
Communities	Air quality	Qualitative
impact on local air q	uality. Jould still climb through 1,00	g higher than 1,000ft are unlikely to have a significant 00ft on initial departure, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impo	act Qualitative
would also climb quid	cker when compared to th	arture route length to the east/ northeast as today. It he baseline do-nothing option and would therefore reenhouse gas impacts for each flight using this route. Qualitative
This design option was because it turns in a s baseline do-nothing o	uld provide a broadly sim similar direction, but it also option due to the quicker	ilar capacity to the baseline do-nothing option has the potential to improve resilience over the climb.
General Aviation	Access	Qualitative
nothing option.		npact on GA traffic compared with the baseline do-
General Aviation/ commercial airlines	Economic impact from effective capacity	
would have a positive	e economic impact comp	al to contribute to increased effective capacity, which bared with the baseline do-nothing option.
General Aviation/ commercial airlines	Fuel Burn	Qualitative
impact on commerce predict a change in (	al traffic when compared GA impacts.	has the potential to result in a reduced fuel burn I when the baseline do-nothing option. We do not
Commercial airlines	Training costs	Qualitative
, .	ordingly, training if require	vide with each AIRAC cycle and airlines would update ed. This option is not anticipated to impose additional
Commercial airlines	Other costs	Qualitative
No other airline costs		Qualitative
Airport/ ANSP	Infrastructure costs	Qualitative
This design option is n	ot expected to change A	Airport or ANSP infrastructure impacts, beyond the initial
		tems engineering amendments.
Airport/ ANSP	Operational costs	
inis design option is n	oi expectea to change A	Airport or ANSP operational cost impacts.

Airport/ ANSP	Deployment costs	Qualitative
used in arrival, depart LCY would involve tra	roportionate to quantify deployment costs rture and runway permutations not yet de aining c.180-200 controllers and 30 assistan sim prep, management and staffing), with	tailed. However, a system change for the use of various air traffic
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).		

#### **Qualitative Safety Assessment**

This departure option from runway 27 provides a similar departure route to today's baseline SID to the northeast but with a faster climb. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction against Heathrow, Stansted, Luton and Southend air traffic flows.

### 5.2.2 DEP-27-ENE-RTO-2



Runway 27 departure to the east-northeast, right turn out (option 2)

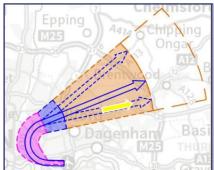
	agenhan Basi M25 THUR	
	Grays	
Group	Impact	Level of Analysis
Communities	Noise impact on hec of life (includes impo due to AONB overflig	act on tranquillity
take-off. However, areas as aircraft co less when compare	, it is expected to be higher ontinue to climb. Therefore	same, and some different, communities from today after r more quickly and would overfly less densely populated e, qualitatively the anticipated noise impact would be thing option. This design option would not overfly an in tranquillity impacts.
Communities	Air quality	Qualitative
		ng higher than 1,000ft are unlikely to have a significant
from either end of	would still climb through 1,0 the runway.	000ft on initial departure, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas imp	
northeast exit poin	t (as today) alongside a qu house gas impacts for eac	possible departure route to the applicable east/ uicker climb. This increased climb rate would result in a ch flight using this route when compared to the baseline
Wider society	Capacity/ resilience	Qualitative
because it turns in		
<b>General Aviation</b>	Access	Qualitative
Qualitatively there nothing option.	would be a similar access i	impact on GA traffic compared with the baseline do-
General Aviation/ commercial airline	Economic impact fro s effective capacity	om increased Qualitative
/	<b>o</b>	tial to contribute to increased effective capacity, which npared with the baseline do-nothing option.
General Aviation/ commercial airline	Fuel Burn <b>s</b>	Qualitative
	rcial traffic when compare	b has the potential to result in a reduced fuel burn ad when the baseline do-nothing option. We do not
<b>Commercial airline</b>	s Training costs	Qualitative
	ccordingly, training if requir	wide with each AIRAC cycle and airlines would update red. This option is not anticipated to impose additional
Commercial airline	s Other costs	Qualitative
No other airline cos	sts are foreseen.	
Airport/ ANSP	Infrastructure costs	Qualitative
This design option i	s not expected to change	Airport or ANSP infrastructure impacts, beyond the initial stems engineering amendments.
Airport/ ANSP	Operational costs	Qualitative
		Airport or ANSP operational cost impacts.

Airport/ ANSP	Deployment costs	Qualitative
used in arrival, depo LCY would involve tr	arture and runway permutations no raining c.180-200 controllers and 30	ent costs per design option as they would be t yet detailed. However, a system change for assistants via the use of various air traffic ng), with additional engineering costs TBC.
All	Performance against the vision parameters/strategic objecting the AMS	
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).		

#### **Qualitative Safety Assessment**

This departure option from runway 27 is a similar departure route to today's baseline SID then provides the shortest possible departure route to the applicable east/northeast exit point (as today) and is expected to climb higher more quickly. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction against Heathrow, Stansted, Luton and Southend air traffic flows.

### 5.2.3 DEP-27-ENE-RTO-3



Runway 27 departure to the east-northeast, right turn out (option 3)

C	agenhan Basi		
and and	Grays		
Group	Impact		Level of Analysis
Communities	Noise impact on hea of life (includes impo due to AONB overflig	act on tranquillity ght)	Qualitative
take-off. However areas as aircraft co less when compare	, it is expected to be higher ontinue to climb. Therefore	r more quickly and , qualitatively the c thing option. This c	ifferent, communities from today after I would overfly less densely populated anticipated noise impact would be design option would not overfly an cts.
Communities	Air quality		Qualitative
Government quido		na hiaher than 1,00	00ft are unlikely to have a significant
impact on local air Departing aircraft from either end of	quality. would still climb through 1,0 the runway.	000ft on initial depa	arture, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas imp		Qualitative
exit point (as today	/) alongside a quicker clim	b. This increased c	route to the applicable northwest limb rate would result in a reduction compared to the baseline do-nothing
Wider society	Capacity/ resilience		Qualitative
because it turns in		o has the potentia	ne baseline do-nothing option Il to improve resilience over the
<b>General Aviation</b>	Access		Qualitative
		impact on GA traff	fic compared with the baseline do-
General Aviation/ commercial airline	Economic impact from effective capacity	om increased	Qualitative
Qualitatively this de	1 1		o increased effective capacity, which useline do-nothing option.
General Aviation/ commercial airline	Fuel Burn	-	Qualitative
	rcial traffic when compare		to result in a reduced fuel burn ne do-nothing option. We do not
Commercial airline	s Training costs		Qualitative
Qualitatively, flight	procedures change world ccordingly, training if requir		RAC cycle and airlines would update not anticipated to impose additional
<b>Commercial airline</b>	other costs		Qualitative
No other airline co	sts are foreseen.		
Airport/ ANSP	Infrastructure costs		Qualitative
This design option i			rastructure impacts, beyond the initial
Airport/ ANSP	Operational costs	0	Qualitative
	s not expected to change	Airport or ANSP op	

Airport/ ANSP	Deployment costs	Qualitative
used in arrival, depar LCY would involve tro	ture and runway permutations aining c.180-200 controllers and	rment costs per design option as they would be not yet detailed. However, a system change for I 30 assistants via the use of various air traffic affing), with additional engineering costs TBC.
All	Performance against the parameters/strategic obje the AMS	ision and Qualitative
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).		

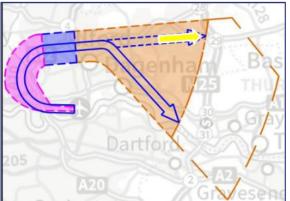
#### **Qualitative Safety Assessment**

This departure option from runway 27 is a similar departure route to today's baseline SID as far south as practicable for departures heading east/northeast and is expected to climb higher more quickly. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction against Heathrow, Stansted, Luton and Southend air traffic flows.

#### Runway 27 SIDs to the southeast and south 5.3

With a right turn out after take-off (RTO)

5.3.1 DEP-27-SE-RTO-1



Runway 27 departure to the southeast, right turn out (option 1)

Communities         Noise impact on health and quality of life (includes impact on tranquillity due to AONB overfight)           This design option would overfly many of the same, and some different, communities from today of take-off. However, it is expected to be higher more quickly and would overfly less densely popular areas as aircraft continue to climb. Therefore, qualitatively the anticipated noise impact would by less when compared with the baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-40.000ft hence no change in tranquility impacts.           Communities         Air quality         Qualitative           Government guidance states that aircraft flying higher than 1.000ft are unlikely to have a significa impact on local air quality.         Qualitative           Mider society         Greenhouse gas impact         Qualitative           Tom either end of the runway.         Wider society         Greenhouse gas impact         Qualitative           This design option would provide a shorter departure route to the southeast alongside a quicker climb. This shorter flightplannable track distance and increased climb rate would result in a reduc of greenhouse gas impacts for each light using this route when compared to the baseline do-not option.         Mider society         Capacity/ resilience           Mider society         Capacity/ resilience         Qualitative         This design option would provide a broadly similar capacity to the baseline do-nothing option because it turns in a similar direction, but it also has the potential to improve resilience over the baseline do-nothing option due to the quicker climb.	A. 9	Green	
of life (includes impact on tranquillity due to AONB overflight)           This design option would overfly many of the same, and some different, communities from today or take-off. However, it is expected to be higher more quickly and would overfly less densely popula areas as aircraft continue to climb. Therefore, qualitatively the anticipated noise impact would be takes when compared with the baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-4,000ft hence no change in tranquillity impacts.           Communities         Air quality         Qualitative           Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a significa impact on local air quality.         Qualitative           Departing aircraft would still climb through 1,000ft on initial departure, about 1.7 nautical miles (3.7 from either end of the runway.         Wider society         Greenhouse gas impact           Wider society         Greenhouse gas impact         Qualitative           This design option would provide a shorter departure route to the southeast alongside a quicker option.         Qualitative           Wider society         Capacity/ resilience         Qualitative           This design option would provide a broady similar capacity to the baseline do-nothing option because it turns in a similar direction, but it also has the potential to improve resilience over the baseline do-nothing option due to the quicker climb.           General Aviation         Access         Qualitative           Qualitatively there would be a similar access impact on GA traffic compared with the basel	Group	Impact	Level of Analysis
due to AONB overflight)         This design option would overfly many of the same, and some different, communities from today of take-off. However, it is expected to be higher more quickly and would overfly less densely populatareas as aircraft continue to climb. Therefore, qualitatively the anticipated noise impact would be as when compared with the baseline do-nothing option. This design option would not overfly an AONB from 7.000ft-4.000ft hence no change in tranquility impacts.         Communities       Air quality       Qualitative         Government guidance states that aircraft flying higher than 1.000ft are unlikely to have a significating aircraft would still climb through 1.000ft on initial departure, about 1.7 nautical miles (3.7 from either end of the runway.         Wider society       Greenhouse gas impact       Qualitative         This design option would provide a shorter departure route to the southeast alongside a quicker climb. This shorter flightplannable track distance and increased climb rate would result in a reduc of greenhouse gas impacts for each flight using this route when compared to the baseline do-not option.         Wider society       Capacity/resilience       Qualitative         Mis design option would provide a broadly similar capacity to the baseline do-nothing option because it truns in a similar direction, but it also has the potential to improve resilience over the baseline do-nothing option.         General Aviation       Access       Qualitative         Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option.       General Aviation/         General Av	Communities	•	
This design option would overfly many of the same, and some different, communities from today of alke-off. However, it is expected to be higher more quickly and would overfly less densely popula areas as aircraft continue to climb. Therefore, qualitatively the anticipated noise impact would be as when compared with the baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-4,000ft hence no change in tranquility impacts. Communities Air quality Qualitative Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a significal mpact on local air quality. Departing aircraft would still climb through 1,000ft on initial departure, about 1.7 nautical miles (3.2 rom either end of the runway. Wider society Greenhouse gas impact Qualitative This design option would provide a shorter departure route to the southeast alongide a quicker climb. This shorter flightplannable track distance and increased climb rate would result in a reduce of greenhouse gas impacts for each flight using this route when compared to the baseline do-not potion. Wider society Capacity/ resilience Qualitative Mider society Capacity/ resilience Qualitative Multer society there would provide a broadly similar capacity to the baseline do-nothing option occuse it turns in a similar direction, but it also has the potential to improve resilience over the paseline do-nothing option due to the quicker climb. General Aviation Access Qualitative Qualitative there would be a similar access impact on GA traffic compared with the baseline do- nothing option. General Aviation/ Economic impact from increased Qualitative commercial alitines Qualitatively this design option has the potential to contribute to increased effective capacity. Would have a positive economic impact compared with the baseline do-nothing option. General Aviation/ Fuel Bum Qualitative Qualitatively flight procedures change in GA impacts. Commercial alitines Training costs Qualitative Qualitatively fli			n tranquillity
take-off.       Howeveri, it is expected to be higher more quickly and would overfly less densely popula         areas as aircraft continue to climb.       Therefore, qualitatively the anticipated noise impact would by         Sowernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a significa       Magazia         Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a significa       Magazia         Sovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a significa       Magazia         Peparing aircraft would still climb through 1,000ft on initial departure, about 1.7 nautical miles (3.7 irom either end of the runway.       Mider society       Greenhouse gas impact       Qualitative         Mider society       Greenhouse gas impact       Qualitative       Mider society       Greenhouse gas impact       Qualitative         Nider society       Capacity/ resilience       Qualitative       Mider society       Capacity/ resilience       Qualitative         Mider society       Capacity/ resilience       Qualitative       Mider society       General Aviation       Access       Qualitative         Reserver dividion/       Economic impact from increased       Qualitative       Qualitative       General Aviation       Economic impact from increased       Qualitative         Qualitatively this design option has the potential to contribute to increased effective capacit			
areas as aircraft continue to climb. Therefore, qualitatively the anticipated noise impact would be ess when compared with the baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-4,000ft hence no change in tranquillity impacts. <b>Communities</b> Air quality Qualitative Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a significal mpact on local air quality. Departing aircraft would still climb through 1,000ft on initial departure, about 1.7 nautical miles (3.2 from either end of the rurway. <b>Wider society</b> Greenhouse gas impact Qualitative This design option would provide a shorter departure route to the southeast alongside a quicker climb. This shorter flightplannable track distance and increased climb rate would result in a reduce of greenhouse gas impacts for each flight using this route when compared to the baseline do-not potion. <b>Wider society</b> Capacity/ resilience Qualitative This design option would provide a broadly similar capacity to the baseline do-not because it turns in a similar direction, but it also has the potential to improve resilience over the paseline do-nothing option. <b>General Aviation</b> Access Qualitative Capacity/ Economic impact form increased Qualitative Commercial airlines Evaluation Economic impact form increased Qualitative Commercial airlines Evaluation Economic impact form increased Qualitative Commercial airlines Evaluation Economic impact form increased Coulditative Commercial airlines Evaluation Economic impact form increased Coulditative Commercial airlines Evaluation Economic impact form increased Coulditative Commercial airlines Evaluation Economic impact form increased Evaluation Economic impact form increased Evaluation Economic impact on commercial traffic when compared with the baseline do-nothing Economic im			
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Communities         Air quality         Qualitative           Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a significal impact on local air quality.         Departing aircraft would still climb through 1,000ft on initial departure, about 1.7 nautical miles (3.2 from either end of the runway.           Wider society         Greenhouse gas impact         Qualitative           Ihis design option would provide a shorter departure route to the southeast alongside a quicker climb. This shorter flightplannable track distance and increased climb rate would result in a reduce of greenhouse gas impacts for each flight using this route when compared to the baseline do-not option.           Wider society         Capacity/ resilience         Qualitative           This design option would provide a broadly similar capacity to the baseline do-nothing option because it turns in a similar direction, but it also has the potential to improve resilience over the baseline do-nothing option due to the quicker climb.           General Aviation         Access         Qualitative           Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option.         General Aviation           General Aviation         Economic impact from increased         Qualitative           Qualitatively this design option has the potential to contribute to increased effective capacity, whould have a positive economic impact compared with the baseline do-nothing option.         General Aviation/           General Aviation/         Fuel Burn         Quali			
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mpact on local air quality.         Departing aircraft would still climb through 1,000ft on initial departure, about 1.7 nautical miles (3,2 romeither end of the runway.         Wider society       Greenhouse gas impact       Qualitative         Initial design option would provide a shorter departure route to the southeast alongside a quicker climb. This shorter flightplannable track distance and increased climb rate would result in a reduce of greenhouse gas impacts for each flight using this route when compared to the baseline do-not option.         Wider society       Capacity/ resilience       Qualitative         Soseline do-nothing option due to the quicker climb.       General Aviation       Access         Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option.       General Aviation       Access         Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option.       General Aviation       General Aviation         General Aviation       Fuel Burn       Qualitative       Qualitative      <			
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from either end of the runway.         Wider society       Greenhouse gas impact       Qualitative         This design option would provide a shorter departure route to the southeast alongside a quicker climb. This shorter flightplannable track distance and increased climb rate would result in a reduct of greenhouse gas impacts for each flight using this route when compared to the baseline do-not option.         Wider society       Capacity/ resilience       Qualitative         This design option would provide a broadly similar capacity to the baseline do-nothing option because it turns in a similar direction, but it also has the potential to improve resilience over the baseline do-nothing option due to the quicker climb.         General Aviation       Access       Qualitative         Qualitatively there would be a similar access impact on GA traffic compared with the baseline do-nothing option.       General Aviation/         General Aviation/       Economic impact from increased       Qualitative         Qualitatively this design option has the potential to contribute to increased effective capacity, whould have a positive economic impact compared with the baseline do-nothing option.         General Aviation/       Fuel Burn       Qualitative         Qualitatively this design option's shorter flightplannable track distance and quicker climb would prove their procedures accordingly, training if required. This option is not anticipated to impose addition their procedures accordingly, training if required. This option is not anticipated to impose addition training costs are foreseen.         Qualitativel			on initial departure, about 1.7 nautical miles (3.2km
Wider society         Greenhouse gas impact         Qualitative           This design option would provide a shorter departure route to the southeast alongside a quicker         Climb. This shorter flightplannable track distance and increased climb rate would result in a reduce of greenhouse gas impacts for each flight using this route when compared to the baseline do-not option.           Wider society         Capacity/ resilience         Qualitative           Because it turns in a similar direction, but it also has the potential to improve resilience over the baseline do-nothing option         Decess           Qualitatively there would be a similar access impact on GA traffic compared with the baseline do nothing option.         General Aviation/         Economic impact from increased         Qualitative           Qualitatively this design option has the potential to contribute to increased effective capacity, whould have a positive economic impact compared with the baseline do-nothing option.         General Aviation/         Fuel Burn         Qualitative           Qualitatively this design option is shorter flightplannable track distance and quicker cl	-	-	
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deployment phase which will require some systems engineering amendments.			
Our Future Skies – Airspace Modernisation ACP-2018-89 Step 28 Options Approximal (Phase 1 Initial			
			ACP-2018-89 Step 2B Options Appraisal (Phase 1 Initial) Uncontrolled Document, Issue 1.0 Page 73

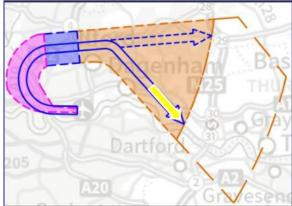
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Airport/ ANSP	Operational costs	Qualitative			
This design option is not expected to change Airport or ANSP operational cost impacts.					
Airport/ANSP Deployment costs Qualitative					
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.					
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative			
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to					
today, improved over	all noise impact, reduced fuel/CO <sub>2</sub> ).				

#### **Qualitative Safety Assessment**

This departure option from runway 27 is a similar departure route to today's baseline SID but is expected to climb higher more quickly and is not tactical as is today. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction from Southend air traffic flows.

### 5.3.2 DEP-27-SE-RTO-2



Runway 27 departure to the southeast, right turn out (option 2)

A2	Grvesen	6
Group	Impact	Level of Analysis
Communities	Noise impact on health of life (includes impact due to AONB overflight)	on tranquillity )
take-off. However, areas as aircraft co less when compare AONB from 7,000ft-4	it is expected to be higher manual to climb. Therefore, qu	ne, and some different, communities from today after ore quickly and would overfly less densely populated ualitatively the anticipated noise impact would be ng option. This design option would not overfly an ranguillity impacts.
Communities	Air quality	Qualitative
impact on local air	quality. vould still climb through 1,000f	higher than 1,000ft are unlikely to have a significant ft on initial departure, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impac	t Qualitative
exit point (as today) of greenhouse gas option.	) alongside a quicker climb. Impacts for each flight using t	ssible departure route to the applicable southeast This increased climb rate would result in a reduction this route when compared to the baseline do-nothing
Wider society	Capacity/ resilience	Qualitative
because it turns in c		ar capacity to the baseline do-nothing option has the potential to improve resilience over the limb.
General Aviation	Access	Qualitative
Qualitatively there v nothing option.	vould be a similar access imp	pact on GA traffic compared with the baseline do-
General Aviation/ commercial airlines	Economic impact from effective capacity	increased Qualitative
		to contribute to increased effective capacity, which ared with the baseline do-nothing option.
General Aviation/	Fuel Burn	Qualitative
commercial airlines	1	
	cial traffic when compared v	as the potential to result in a reduced fuel burn when the baseline do-nothing option. We do not
<b>Commercial airlines</b>	s Training costs	Qualitative
their procedures ac	cordingly, training if required	le with each AIRAC cycle and airlines would update . This option is not anticipated to impose additional
training cost impac		Out of the Providence
Commercial airlines		Qualitative
No other airline cos		Qualitatius
		Qualitative port or ANSP infrastructure impacts, beyond the initial
		ms engineering amendments.
Airport/ ANSP	Operational costs	Qualitative
inis design option is	not expected to change Air	port or ANSP operational cost impacts.

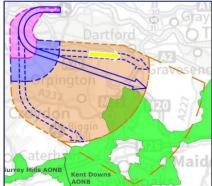
Airport/ ANSP	Deployment costs	Qualitative	
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.			
All	Performance against the visi parameters/strategic object the AMS		
On balance, this design option has the potential to contribute to the AMS (broadly similar capacity to today, improved overall noise impact, reduced fuel/CO <sub>2</sub> ).			

#### **Qualitative Safety Assessment**

This departure option from runway 27 is a similar departure route to today's baseline SID and then turns directly to the applicable southeast exit point (as today) alongside a quicker climb. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction from London City arrivals and Southend air traffic flows.

### With a left turn out after take-off (LTO)

5.3.3 DEP-27-SE-LTO-1



Runway 27 departure to the southeast, left turn out (option 1)

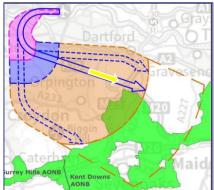
Group         Impact         Level of Analysis           Communities         Noise impact on health and quality of life (includes impact on tranquillity due to AONB overflight)         Qualitative           This design option would overfly very different communities from today. However, it is expected to be higher more quickly and would overall overfly a broadly similar number of people as today.         Interefore, qualitatively the anticipated noise impact would be broadly similar when compared with the baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-4,000ft hence no change in tranquility impacts.           Communities         Air quality         Qualitative           Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant         Impact
CommunitiesNoise impact on health and quality of life (includes impact on tranquillity due to AONB overflight)QualitativeThis design option would overfly very different communities from today. However, it is expected to be higher more quickly and would overall overfly a broadly similar number of people as today. Therefore, qualitatively the anticipated noise impact would be broadly similar when compared with the baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-4,000ft hence no change in tranquility impacts.QualitativeCommunitiesAir qualityQualitativeGovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant
of life (includes impact on tranquillity due to AONB overflight)This design option would overfly very different communities from today. However, it is expected to be higher more quickly and would overall overfly a broadly similar number of people as today. Therefore, qualitatively the anticipated noise impact would be broadly similar when compared with the baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-4,000ft hence no change in tranquillity impacts.CommunitiesAir qualityCommunitiesQualitativeGovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant
due to AONB overflight)This design option would overfly very different communities from today. However, it is expected to behigher more quickly and would overall overfly a broadly similar number of people as today.Therefore, qualitatively the anticipated noise impact would be broadly similar when compared withthe baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-4,000fthence no change in tranquility impacts.CommunitiesCommunitiesGovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant
This design option would overfly very different communities from today. However, it is expected to be higher more quickly and would overall overfly a broadly similar number of people as today.         Therefore, qualitatively the anticipated noise impact would be broadly similar when compared with the baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-4,000ft hence no change in tranquility impacts.         Communities       Air quality         Qualitative         Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant
Therefore, qualitatively the anticipated noise impact would be broadly similar when compared with the baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-4,000ft hence no change in tranquility impacts.CommunitiesAir qualityQualitativeCommunitiesAir qualityQualitativeGovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant
the baseline do-nothing option. This design option would not overfly an AONB from 7,000ft-4,000fthence no change in tranquility impacts.QualitativeCommunitiesAir qualityQualitativeGovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant
CommunitiesAir qualityQualitativeGovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant
CommunitiesAir qualityQualitativeGovernment guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant
Government guidance states that aircraft flying higher than 1,000ft are unlikely to have a significant
man and any longer later available
mpact on local air quality.
Departing aircraft would still climb through 1,000ft on initial departure, about 1.7 nautical miles (3.2km)
from either end of the runway.
Wider society         Greenhouse gas impact         Qualitative
This design option would provide a shorter departure route to the southeast alongside a quicker
climb. This shorter flightplannable track distance and increased climb rate would result in a reduction
of greenhouse gas impacts for each flight using this route when compared to the baseline do-nothing
option.
Wider society   Capacity/resilience   Qualitative
This design option would provide a capacity improvement over the baseline do-nothing option
because its initial direction may allow for reduced departure separation against preceding or
succeeding departures. It also has the potential to improve resilience over the baseline do-nothing
option due to the quicker climb.
General Aviation         Access         Qualitative
This design option, specifically the left turn out, may have a negative impact on GA airspace users to
the southwest and south of London City Airport. Therefore, GA access in this area could be negatively impacted when compared with the baseline do-nothing option.
General Aviation/ Economic impact from increased Qualitative
commercial airlines effective capacity
Qualitatively this design option has the potential to contribute to increased effective capacity, which
would have a positive economic impact compared with the baseline do-nothing option.
General Aviation/ Fuel Burn Qualitative
commercial airlines
Qualitatively this design option's shorter flightplannable track distance and quicker climb would result
in a reduced fuel burn impact on commercial traffic when compared with the baseline do-nothing
option. We do not predict a change in GA impacts.
Commercial airlines Training costs Qualitative
Qualitatively, flight procedures change worldwide with each AIRAC cycle and airlines would update
their procedures accordingly, training if required. This option is not anticipated to impose additional
training cost impacts for airlines.
Commercial airlines Other costs Qualitative
No other airline costs are foreseen.
Airport/ANSP Infrastructure costs Qualitative
This design option is not expected to change Airport or ANSP infrastructure impacts, beyond the initial
deployment phase which will require some systems engineering amendments.

Airport/ ANSP	Operational costs	Qualitative		
This design option is not expected to change Airport or ANSP operational cost impacts.				
Airport/ANSP Deployment costs Qualitative				
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative		
On balance, this design option has the potential to contribute to the AMS (enables capacity improvement, similar noise impact to today, reduced fuel/CO <sub>2</sub> ).				

#### **Qualitative Safety Assessment**

This departure option from runway 27 provides a shorter left turn out departure route to the southeast alongside a quicker climb. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction from Heathrow departures and Gatwick and Biggin Hill air traffic flows.

### 5.3.4 DEP-27-SE-LTO-2



Runway 27 departure to the southeast, left turn out (option 2)

urrey Hills, AONB Kent Downs	Maid	
Group	Impact	Level of Analysis
Communities	Noise impact on health and quality of life (includes impact on tranquilli due to AONB overflight)	v Qualitative ty
higher more quickly an Therefore, qualitatively the baseline do-nothin	nd would overall overfly a broadly simil	be broadly similar when compared with the Kent Downs AONB may also be
Government guidance	e states that aircraft flying higher than	1,000ft are unlikely to have a significant
impact on local air qu Departing aircraft wou from either end of the	uld still climb through 1,000ft on initial d	leparture, about 1.7 nautical miles (3.2km)
Wider society	Greenhouse gas impact	Qualitative
exit point (as today) a	longside a quicker climb. This increase	ture route to the applicable southeast ed climb rate would result in a reduction nen compared to the baseline do-nothing
Wider society	Capacity/ resilience	Qualitative
because its initial direc		- · · ·
General Aviation	Access	Qualitative
the southwest and sound sound sound sound the southwest and source the source of the s	uth of London City Airport. Therefore, C when compared with the baseline do-	nothing option.
General Aviation/ commercial airlines	Economic impact from increased effective capacity	Qualitative
Qualitatively this desig		te to increased effective capacity, which e baseline do-nothing option.
General Aviation/ commercial airlines	Fuel Burn	Qualitative
Qualitatively this desig	n option's quicker climb has the poter al traffic when compared when the ba 6A impacts.	
Commercial airlines	Training costs	Qualitative
	ordingly, training if required. This option	n AIRAC cycle and airlines would update n is not anticipated to impose additional
Commercial airlines	Other costs	Qualitative
No other airline costs a		
Airport/ ANSP	Infrastructure costs	Qualitative
This design option is no		P infrastructure impacts, beyond the initial
Airport/ ANSP	Operational costs	Qualitative
AUDUL/ AUJ		
	ot expected to change Airport or ANSF	

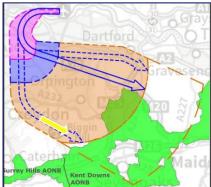
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Airport/ ANSP	Deployment costs	Qualitative		
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative		
On balance, this design option has the potential to contribute to the AMS (enables capacity improvement, similar noise impact to today, reduced fuel/CO <sub>2</sub> ).				

#### **Qualitative Safety Assessment**

This departure option from runway 27 is a left turn out departure route providing the shortest track possible to the applicable southeast exit point (as today) alongside a quicker climb. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction from Heathrow departures and Gatwick and Biggin Hill air traffic flows.

### 5.3.5 DEP-27-SE-LTO-3



Runway 27 departure to the southeast, left turn out (option 3)

Group	Impact	Lovel of Applysic
	Impact	Level of Analysis
Communities	Noise impact on health c	
	of life (includes impact of	n tranquility
	due to AONB overflight)	
<b>.</b> .	· · · · · · · · · · · · · · · · · · ·	munities from today. However, it is expected to be
		oadly similar number of people as today.
		ict would be broadly similar when compared with
	<b>.</b>	ection of the Kent Downs AONB may also be
		ould have a negative impact on tranquillity.
Communities	Air quality	Qualitative
•		gher than 1,000ft are unlikely to have a significant
mpact on local air o		
	÷	on initial departure, about 1.7 nautical miles (3.2km
from either end of th		
Nider society	Greenhouse gas impact	Qualitative
<b>.</b> .		ure route to the southeast alongside a quicker
		and increased climb rate would result in a reduction
0	mpacts for each flight using th	is route when compared to the baseline do-nothin
option.		
Wider society	Capacity/ resilience	Qualitative
		ovement over the baseline do-nothing option
		departure separation against preceding or
- · ·		o improve resilience over the baseline do-nothing
option due to the qu	Jicker climb.	
General Aviation	Access	Qualitative
<b>-</b>		y have a negative impact on GA airspace users to
		nerefore, GA access in this area could be
negatively impacted	d when compared with the bo	aseline do-nothing option.
negatively impacted General Aviation/	d when compared with the bo Economic impact from in	aseline do-nothing option.
negatively impacted General Aviation/ commercial airlines	d when compared with the bo Economic impact from in effective capacity	useline do-nothing option. Increased Qualitative
negatively impacted General Aviation/ commercial airlines Qualitatively this des	d when compared with the bo Economic impact from in effective capacity sign option has the potential to	aseline do-nothing option. Acreased Qualitative
negatively impacted General Aviation/ commercial airlines Qualitatively this des would have a positiv	d when compared with the bo Economic impact from in effective capacity sign option has the potential to ve economic impact compare	aseline do-nothing option. Acreased Qualitative Acreased effective capacity, which ad with the baseline do-nothing option.
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negatively impacted General Aviation/ commercial airlines Qualitatively this des would have a positiv General Aviation/ commercial airlines Qualitatively this des n a reduced fuel bu option. We do not p Commercial airlines	d when compared with the bo Economic impact from in effective capacity sign option has the potential to ve economic impact compare Fuel Burn sign option's shorter flightplann urn impact on commercial traf predict a change in GA impact Training costs	aseline do-nothing option. Acreased Qualitative a contribute to increased effective capacity, which ad with the baseline do-nothing option. Qualitative mable track distance and quicker climb would resul fic when compared with the baseline do-nothing ts. Qualitative
negatively impacted General Aviation/ commercial airlines Qualitatively this des would have a positiv General Aviation/ commercial airlines Qualitatively this des n a reduced fuel bu option. We do not p Commercial airlines	d when compared with the bo Economic impact from in effective capacity sign option has the potential to ve economic impact compare Fuel Burn sign option's shorter flightplann urn impact on commercial traf predict a change in GA impact Training costs	aseline do-nothing option. Acreased Qualitative a contribute to increased effective capacity, which ad with the baseline do-nothing option. Qualitative mable track distance and quicker climb would resul fic when compared with the baseline do-nothing ts. Qualitative
Antipacted products of the second straight of	d when compared with the bo Economic impact from in effective capacity sign option has the potential to ve economic impact compare Fuel Burn sign option's shorter flightplann urn impact on commercial traf predict a change in GA impact Training costs procedures change worldwide	aseline do-nothing option. Acreased Qualitative a contribute to increased effective capacity, which ad with the baseline do-nothing option. Qualitative mable track distance and quicker climb would resul fic when compared with the baseline do-nothing ts. Qualitative
Antipacted sectors of the sectors of	d when compared with the bo Economic impact from in effective capacity sign option has the potential to ve economic impact compare Fuel Burn sign option's shorter flightplann urn impact on commercial traf predict a change in GA impace Training costs procedures change worldwide cordingly, training if required.	Aseline do-nothing option. Acreased Qualitative Decontribute to increased effective capacity, which add with the baseline do-nothing option. Qualitative Mable track distance and quicker climb would resulfic fic when compared with the baseline do-nothing ts. Qualitative with each AIRAC cycle and airlines would update
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negatively impacted General Aviation/ commercial airlines Qualitatively this des would have a positiv General Aviation/ commercial airlines Qualitatively this des in a reduced fuel bu option. We do not p Commercial airlines Qualitatively, flight p	d when compared with the bo Economic impact from in effective capacity sign option has the potential to ve economic impact compare Fuel Burn sign option's shorter flightplann urn impact on commercial traf predict a change in GA impact Training costs procedures change worldwide cordingly, training if required. s for airlines. Other costs	Aseline do-nothing option. Acreased Qualitative Decontribute to increased effective capacity, which add with the baseline do-nothing option. Qualitative mable track distance and quicker climb would resul- fic when compared with the baseline do-nothing ts. Qualitative With each AIRAC cycle and airlines would update This option is not anticipated to impose additional
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negatively impacted General Aviation/ Commercial airlines Qualitatively this des would have a positiv General Aviation/ Commercial airlines Qualitatively this des in a reduced fuel but option. We do not p Commercial airlines Qualitatively, flight p their procedures acc training cost impact Commercial airlines No other airline cost Airport/ ANSP This design option is	d when compared with the bo Economic impact from in effective capacity sign option has the potential to ve economic impact compare Fuel Burn sign option's shorter flightplann urn impact on commercial traf predict a change in GA impact oredict a change in GA impact oredict a change worldwide cordingly, training if required. is for airlines. Other costs s are foreseen. Infrastructure costs not expected to change Airpo	Aseline do-nothing option. Acreased Qualitative Decontribute to increased effective capacity, which add with the baseline do-nothing option. Qualitative Applied track distance and quicker climb would resulf fic when compared with the baseline do-nothing ts. Qualitative With each AIRAC cycle and airlines would update This option is not anticipated to impose additional Qualitative Qualitative Qualitative Qualitative Qualitative
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An egatively impacted General Aviation/ Commercial airlines Qualitatively this des would have a positive General Aviation/ Commercial airlines Qualitatively this des in a reduced fuel but option. We do not performercial airlines Qualitatively, flight performercial airlines Qualitatively, flight performercial airlines Commercial airlines Qualitatively, flight performercial airlines Commercial airlines Automoter airline cost Airport/ ANSP This design option is deployment phase of Airport/ ANSP	d when compared with the bo Economic impact from in effective capacity sign option has the potential to ve economic impact compare Fuel Burn sign option's shorter flightplann urn impact on commercial traf predict a change in GA impact to cordingly, training if required. s for airlines. Other costs s are foreseen. Infrastructure costs not expected to change Airpot which will require some system Operational costs	Aseline do-nothing option. Acreased Qualitative Decontribute to increased effective capacity, which add with the baseline do-nothing option. Qualitative Applied track distance and quicker climb would resulf fic when compared with the baseline do-nothing ts. Qualitative With each AIRAC cycle and airlines would update This option is not anticipated to impose additional Qualitative Qualitative Qualitative Qualitative Qualitative

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Airport/ ANSP	Deployment costs	Qualitative		
At this stage it is disproportionate to quantify deployment costs per design option as they would be used in arrival, departure and runway permutations not yet detailed. However, a system change for LCY would involve training c.180-200 controllers and 30 assistants via the use of various air traffic simulators (including sim prep, management and staffing), with additional engineering costs TBC.				
All	Performance against the vision and parameters/strategic objectives of the AMS	Qualitative		
On balance, this design option has the potential to contribute to the AMS (enables capacity improvement, similar noise impact to today, reduced fuel/CO <sub>2</sub> ).				

### **Qualitative Safety Assessment**

This departure option from runway 27 is a left turn out immediately south then routes to the southeast alongside a quicker climb. The safety assessment for this option indicates a safety hazard assessment would be required to ensure deconfliction from Gatwick easterly departures and Heathrow and Biggin Hill air traffic flows.

## **6** Conclusions and Next Steps

- 6.1.1 The airspace change process started in 2019 at Stage 1 with a Statement of Need, continued with the development of Design Principles (DPs) via stakeholder engagement, and progressed through the CAA's regulatory Stage 1 Gateway Assessment.
- 6.1.2 In Stage 2 airspace design options were created, described, engaged upon (Step 2Ai) and formally evaluated against the DPs (Step 2Aii). The design options progressing through Step 2Aii were subjected to a qualitative Initial Options Appraisal (Step 2B) including an assessment of safety considerations.
- 6.1.3 The Initial Options Appraisal (Step 2B) does not discount any of the design options progressed at Step 2Aii Design Principle Evaluation. . However, it also does not consider combinations of design options that may provide respite from overflight when organised into systems; these will be developed during Stage 3 (see paragraph 1.1.10).
- 6.1.4 Step 2B is the final document of Stage 2 of the airspace change process, published on the airspace change portal in late May 2022 for CAA regulatory process compliance assessment in June.

The UK Airspace Modernisation Strategy (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.

- 6.1.5 There is not yet enough detailed quantified data for LCY to make a statement on preferred option(s). Appropriate quantitative assessments will be carried out as part of Stage 3, and these will be monetised where possible. These will include:
  - Noise modelling analysis to Category B standards<sup>(5)</sup>; we do not anticipate this category to change throughout the ACP process
  - Fuel/CO<sub>2</sub> modelling analysis using the most recent appropriate version of Eurocontrol's Base of Aircraft Data (BADA) as the data source, which will be processed via a fast-time simulation application

The results will be subsequently assessed using the Government's transport analysis tools to provide a monetised output; these are known as WebTAG.

- 6.1.6 A cost-benefit analysis will be performed, and a preferred option (or combination of options) will be stated. Compromises and trade-offs may be necessary between airports taking part in the FASI-S regional airspace change. These will be guided by the advice and tools provided by the Airspace Change Organising Group ACOG, the independent team tasked with coordinating the redesign of the UK's airspace.
- 6.1.7 This Step 2B document defines the shortlist of airspace design options. There are 12 arrival design options and 26 departure design options, summarised in Section 6 of Step 2A(ii) Design Principle Evaluation document.
- 6.1.8 Subject to passing the Stage 2 Gateway Assessment, this proposal will move on to Stage 3 Consult. Stage 3 will involve significant preparation, development, collaboration and coordination with the sponsors of adjacent ACPs, as well as further stakeholder engagement.

<sup>&</sup>lt;sup>5</sup> Defined in CAP2091 CAA Policy on Minimum Standards for Noise Modelling (link to CAA policy) Our Future Skies – Airspace Modernisation ACP-2018-89 Step 2B Options Appraisal (Phase 1 Initial) © London City Airport 2022 all rights reserved Uncontrolled Document, Issue 1.0 Page 83

- 6.1.9 As a regional multi-airport airspace change, there are a wide range of stakeholders with conflicting requirements over a large area. There may be intermediate airspace change process phases over a long period, and it is possible that there may be more than one change in the same area as individual airport systems (or partial systems) progress to become a fully integrated regional network of air routes.
- 6.1.10 A date for the Stage 3 Gateway Assessment has not yet been set. For the latest information on this proposal, please subscribe to email updates on the CAA's airspace change portal (link to the page for this proposal).

## 7 Annexe: Design Principles

### Design Principles (DPs): Recap

Ref Num	Tier 1 Design Principles	Priority
DP0	Must maintain (and ideally enhance) current safety standards	А
DP1	Must be in compliance with all laws and regulations	А
DP2	Must enhance navigation standards by utilising modern navigation technology	А
DP3	Must be consistent with the CAA's Airspace Modernisation Strategy (CAP1711) and any current or future plans associated with it, including the provision of sufficient airspace capacity Strategy (CAP1711) and any current or future plans associated with it, including the provision of sufficient airspace capacity	A

Ref Num	Tier 2 Design Principles Priority		
	Should limit and where possible reduce aircraft noise		А
	Group (i) noise mitigations	Use noise efficient operational practices	
		Provide predictable respite routes	
DP4		Avoid overflying communities with multiple routes, including from other airports	
DF4	Group (ii) noise mitigations	Minimise the number of people newly overflown	
		Provide managed dispersal	
		Minimise the total population overflown	
		Avoid overflying noise sensitive areas e.g. schools, hospitals, homes	care
DP5	Should minimise the amount of fuel used and the CO <sub>2</sub> subsequently emitted B		В
DP6	Should minimise air pollution in the local area from aircraft         B		В
DP7	Should improve resilience during abnormal operating conditions B		В
DP8	Should promote optimal network performance in collaboration with other airspace users		С

Table 1 Design Principles from Stage 1, encompassing the safety, environmental and operational criteria and the strategic policy objectives we seek to achieve in developing the airspace change proposal.

# 8 Annexe: Additional Resources

The CAA Airspace Change Portal (<u>link</u>) for Stage 2 of this proposal contains the following material:

- 8.1.1 Step 2A(i) Design Options document
- 8.1.2 Step 2A(ii) Design Principle Evaluation document
- 8.1.3 **Step 2B** Options Appraisal (Phase 1 Initial) Including Safety Considerations
- 8.1.4 An **example presentation**, as given to stakeholders either by virtual online meeting, or via email for self-briefing
- 8.1.5 A document containing **stakeholder feedback** (redacted to de-personalise)
- 8.1.6 A **technical reference map**, with layers. This map allows for the switching on and off of 'data layers', allowing the user to see illustrations of the current airspace system, the systems LCY designed to engage with stakeholders, and the airspace designs modified following receipt of stakeholder feedback. These can be compared, to illustrate potential areas of change in overflight.

The map is technical in nature but on initial opening it provides an explanation of what the layers mean and how to understand them.

- This layered map is designed to be downloaded to a computer/laptop.
- It will not function correctly if viewed using most tablet/smartphone devices.
- It must be opened using the freely available and commonly-used Adobe Reader software, or other genuine Adobe product.
- It will not function correctly if viewed within a browser such as Chrome or Edge or Internet Explorer, or any non-Adobe PDF viewing application.
- It is relevant to the airspace design development thus far (May 2022). Future development and design evolution will occur.

End of document