

LJLA Airspace Transition

Design Principles Evaluation

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Issue 1.1	Addition of 'Do Nothing' evaluation	16 th May 2019			
Issue 2	Addition of rationale for assessing baseline procedures in 'groups' see baseline options tables in section 3.1	29 th May 2019			

Approval Level	Authority	Name
Author		
Reviewer		



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1 Introduction

1.1 Background

The LJLA Airspace Transition project is currently at the Stage 2 – Develop & Assess stage of the CAP 1616 Airspace Design process. Step 2A requires the change sponsor to develop a comprehensive list of options that address the Statement of Need and that align with the Design Principles developed in Stage 1. As the change sponsor, LJLA is then required to test these options with those stakeholders that contributed to the development of the Design Principles before producing a Design Principle evaluation that sets out how the options have responded to the Design Principles.

This document articulates the evaluation of each of the options developed against the Design Principles agreed in Stage 1 and forms part of the document set required to provide the necessary evidence to satisfy the Stage 2 Develop & Assess Gateway and should be read alongside the LJLA Airspace Transition Initial Options Appraisal document.

The change sponsor must also bear in mind that the options that are eventually chosen must also be compliant with the relevant technical criteria as detailed in Appendix F to CAP 1616. Also included in this document is an initial evaluation of how each option developed responds to the technical criteria, identifying where plans will need to be established to resolve any issues that may arise.

1.2 Prioritised List of Design Principles

The work undertaken during Stage 1 helped to establish a prioritised shortlist of Design Principles to act as a framework against which Design Options have been drawn up. The prioritised list of Design Principles is shown in Table 1 below.

Prioritised DP	Design Principle
1	Procedures must be designed to meet acceptable levels of flight safety.
2	Procedures must be designed to minimise aircraft emissions to reduce air pollution.
3	Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.
=4 (4a)	Procedures must be designed to minimise the impact of noise below 7,000ft.
=4 (4b)	Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.
6	Procedures should be designed to enable more continuous climbs.
=7 (7a)	Procedures should be designed to fit within existing airspace constraints and boundaries.

Prioritised DP	Design Principle
=7 (7b)	Procedures should be designed to enable more continuous descents.
9	Procedures should be designed that minimise the number of track miles flown.
10	If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.
11	Procedures should be developed to allow for alternative routes to offer respite.
=12 (12a)	Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.
=12 (12b)	Procedures should be designed to concentrate routes to minimise the numbers overflown.
14	Procedures should be designed to ensure predictability of tracks for consistency of operations.
15	Procedures should be designed to include alternative routes to avoid other aviation operators.

Table 1 – Prioritised Design Principles

1.3 Step 2B – Options Appraisal

The second part of Stage 2 (Step 2B) involves an assessment of the options to develop the short list to be taken forward to Stage 3. Options Appraisal is used as a tool throughout the CAP1616 process to help refine the options from an initial longlist, down to a short list and a final set of preferred options. The process is iterative with the Initial Options Appraisal being used to whittle down the longlist in Stage 2B, Full Options Appraisal of the shortlist taking place in Stage 3 for consultation, and the Final Options Appraisal supporting the submission of the ACP application to CAA.

At the end of Step 2B, LJLA will submit details of the options and the Initial Options Appraisal to the CAA to pass through the Stage 2 Develop & Assess Gateway, currently programmed for 31st May 2019.

2 Longlist of Options

2.1 Procedure Options

New arrival and departure procedures, including transitions, are being considered by the Airport to comply with the new regulatory directives, and to improve operational efficiency. Table 2 contains a summary of the extant conventional procedures and the longlist of options under consideration.

Procedure	Number of options	Basic Description							
Conventional SID from each runway	4	Conventional departures from each runway to POLE HILL, REXAM, WAL and BARTN							
SID from runway 27 to AGGER	3	Options include: an immediate right turn to AGGER; a later right hand turn to AGGER; and a left hand turn to AGGER							
SID from runway 27 to WAL	2	Options include: a right hand turn overhead the Mersey to WAL; and a later right hand turn overland to WAL.							
SID from runway 27 to TEMP2	1	Only one option available to balance aircraft performance versus noise sensitive areas.							
SID from runway 09 to AGGER	2	Both options follow similar series of right hand turns to achieve 11,000ft by AGGER. Left hand turns not feasible to achieve height by AGGER.							
SID from runway 09 to CAVEN	4	Two options turning left, and two turning right to CAVEN.							
SID from runway 09 to CORKA	3	Two options turning right to CORKA and one turning left.							
Transitions	0	No current Transition procedures. Aircraft are vectored by ATC to join the approach procedure.							
Transition to runway 27 from DIOUF	1	Only one option available to achieve continuous descent profile from starting altitude.							
Transition to 27 from NOMSU	1	Only one option due to conflict with Manchester arrivals.							
Transition to 27 from VEGUN	2	One option routes aircraft to join the approach procedure from the north and the other offers a shorter transition from southeast.							

Procedure	Number of options	Basic Description
Transition to runway 09 from DIOUF	1	Only one option for continuous descent and optimal length.
Transition to runway 09 from NOMSU	1	Only one option considered: optimal route remains over the sea.
Transition to runway 09 from VEGUN	1	Only one option for continuous descent and optimal length.
Conventional and RNAV approaches to each runway	9	Conventional approaches (ILS/DME/NDB, LOC/DME/NDB, NDB/DME and SRA) and RNAV approaches to each runway
Approach to runway 27	3	Three traditional T-bar approaches of varying lengths with defined Missed Approach Procedures.
Approach to runway 09	3	Three traditional T-bar approaches of varying lengths with defined Missed Approach Procedures.

Table 2 – Summary of number of options under consideration

3 Design Principle Evaluation

3.1 Evaluation of the Options against the Design Principles

Each option has been assessed against the prioritised list of Design Principles shown in Table 1 in Section 1 above. Table 3 below gives an overview of how well each option aligns to each Design Principle; it shows a summary of the analysis conducted for each option with a high-level assessment of whether the Design Principle is either not met, partially met or fully met, as follows:

- A green box indicates that the Design Principle has been **met** by the specified option.
- An orange box means that the Design Principle has been **partially met** by the specified option.
- A red box indicates that the Design Principle has **not been met** by the specified option.

					Star	ndar	d In	strui	ment	t Dep	partu	ıres					Transitions						Approaches								
	Baseline (Do Nothing)	SID 27 AGGER Option 1	SID 27 AGGER Option 2	SID 27 AGGER Option 3	SID 27 WAL Option 1	SID 27 WAL Option 2	SID 27 TEMP2	SID 09 AGGER Option 1	SID 09 AGGER Option 2	SID 09 CAVEN Option 1	SID 09 CAVEN Option 2	SID 09 CAVEN Option 3	SID 09 CAVEN Option 4	SID 09 CORKA Option 1	SID 09 CORKA Option 2	SID 09 CORKA Option 3	Baseline (Do Nothing)	Trans 27 DIOUF	Trans 27 NOMSU	Trans 27 VEGUN	Trans 27 VEGUN (CC05)	Trans 09 DIOUF	Trans 09 NOMSU	Trans 09 VEGUN	Baseline (Do Nothing)	Approach 27 Option 1	Approach 27 Option 2	Approach 27 Option 3	Approach 09 Option 1	Approach 09 Option 2	Approach 09 Option 3
DP 1																															
DP 2																															
DP 3																															
DP 4a																															
DP 4b																															
DP6																															
DP 7a																															
DP 7b																															
DP 9																															
DP 10																															
DP 11																															
DP 12a																															
DP 12b																															
DP 14																															
DP 15																															

Table 3 – Design Principle Evaluation Overview

Design Principle Evaluation		OPTION NO	: Baseline							
Option Name: SID Baseline (Do Nothing)		REJECT								
<i>Description of Option:</i> Retain the current conventional SIDs. The DPE for all SIDs are summarised in this table – the results were the same for each.										
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET							
Summary of Qualitative Assessment: No change. Current	t convention	al procedure	s are safe.							
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET							
<i>Summary of Qualitative Assessment:</i> Maximum altitude until cleared by ATC.	for aircraft i	following SID	s is 4,000 ft							
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET							
<i>Summary of Qualitative Assessment:</i> Conventional routi procedures do not take into account sensitive areas.	ng less pred	lictive that PI	3N. Current							
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET							
<i>Summary of Qualitative Assessment:</i> Maximum altitude until cleared by ATC.	for aircraft	following SID	s is 4,000 ft							
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET							
Summary of Qualitative Assessment: No Change. Current technically flyable and maintain existing operational per		-	es are							
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET							
<i>Summary of Qualitative Assessment:</i> Maximum altitude until cleared by ATC.	for aircraft	following SID	s is 4,000 ft							
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET							

<i>Summary of Qualitative Assessment:</i> Potential for aircra clearance to climb not received by ATC.	ift to leave co	ontrolled air:	space if
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for S	SIDs.		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: More direct routin	g achievable.		
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: No change.			
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Single SIDs availab	le depending	g on routing.	
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change. ATC ir clearances to join the en-route structure and deconflicti traffic.			
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Conventional proc ground-based beacon information and don't represent a	-	-	nterpreting
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Single SIDs availab destination.	le depending	g on routing	to

Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: No change to existi	ng arrangen	ients.	

Design Principle Evaluation		OPTION NO	: SID 1
Option Name: Runway 27 SID AGGER Option 1		REJEC	CT
<i>Description of Option:</i> On achieving 500 ft, aircraft make an immediate right-hand turn to fly direct towards AGGER, achieving an altitude of FL 110 (approximately 11,000 ft) by AGGER. During the initial turn, aircraft will fly-by waypoints GPW01, GPW03, GPN01 and GPN03.	CIRR O SFC CIRR O SFC CIRR O SFC TO A 572 + TH950 (50 MANN VERENCE STORE O SFC MACHAN STORE O SFC MACHAN STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE STORE	CALL OF A CONTRACT OF A CONTRA	TIMA A 35001 CUB CONCENTRATION OF THE WAY AND CONCENTRATION OF T
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has levels of flight safety.	been design	ed to meet a	cceptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Although the proce climb, the procedure is designed to be flown at 190 Kts a be in an optimum configuration so will need an increase The aircraft will not be able to follow this route if the tur speed/configuration to minimise emissions.	and therefore d power sett	e the aircraft ting to fly the	will not profile.
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The procedure over park) and a secondary school during the initial turn after gradient to avoid the areas vertically would not be possi	r departure.	A steeper cl	imb
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The initial turn is d therefore the aircraft will not be in an optimum configur power setting to fly the profile. A steeper climb gradient configuration and the aircraft will not be able to follow t achieve optimum speed/configuration.	ation so will t is not possi	l need an inc ble in this	reased
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.			
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure incomprofile.	orporates a c	ontinuous cl	imb
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is co boundaries.	ontained wit	hin existing	airspace
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for S	IDs.		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This procedure rep AGGER.	resents the i	most direct r	oute to
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required Controlled Airspace.	l to existing	arrangemen	ts for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Option to route to the south of the airport to route to AGGER – to be assessed as an alternative SID option.			
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET

<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.				

This procedure is not compliant with the criteria laid down in PANS-OPS 8168 Vol II Construction of Visual and Instrument Flight Procedures and has therefore been rejected.

Design Principle Evaluation		OPTION NO	: SID 2
Option Name: Runway 27 SID AGGER Option 2		ACCEI	PT
<i>Description of Option:</i> Climb straight ahead then turn right to flyby waypoints 270501, 270502, 270503 and GPN03 then direct to overfly AGGER, achieving an altitude of FL 110 (approximately 11,000 ft) by AGGER.	SUPERIOR DIST SUPERIOR DI SUPERIOR DIST SUPERIOR DIST SUPERIOR DIST SUPERIOR	OLSDELENS 2500 466 CTA D 25 FLO OL BUT UNCLUE FORMULA SLAD UNCLUE FORMULA FORMERS 100551 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55) 20(55	TIMA 35001 CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON CUMPTON
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b levels of flight safety.	een designee	d to meet acc	eptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b optimum aircraft performance but is not the most direct r design allows, an earlier turn to allow more direct routing but may adversely affect DP 3 and DP 4a.	outing to AC	GER. If proc	edure
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The procedure overf departure, 3.2 nm on the extended centreline. Current de follow this routing and are above 2, 000 ft over the Park. is located adjacent to Eastham Country Park. A school and are close to the planned flightpath; aircraft will be above 2 these points. If procedure design allows, an earlier turn m but may adversely affect DP 2 and DP 4a.	parting airc A fixed Noise d a hospital, 2,000 ft and	raft from Rur e Monitoring within built- 4,000 ft resp	nway 27 Terminal up areas, ectively at
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is des climb profile to minimise the impact of noise. Routing tak areas of Bebington and Liverpool. Routing to avoid popul effect on DP 2 and DP 9.	es the aircra	aft over popu	lated

Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> The procedure is tech existing operational performance, and capacity.	<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.				
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> The procedure incor	porates a coi	ntinuous clir	nb profile.		
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> The procedure is comboundaries.	tained withi	n existing ai	rspace		
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET		
Summary of Qualitative Assessment: Not evaluated for SIL)s.				
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> Although this is not t is the shortest route that allows the aircraft to fly at optim PANS-OPS compliant in design.					
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rangements	for		
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> Option to route to the south of the airport to route to AGGER – to be assessed as an alternative SID option.					
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET		

<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload.			
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: No impact on other aviation operators.			

Design Principle Evaluation		OPTION NO	: SID 3	
Option Name: Runway 27 SID AGGER Option 3		ACCEPT		
<i>Description of Option:</i> Climb straight ahead then turn left to flyby waypoints 270501, 270601, 270602 and 270603 then direct to overfly AGGER, achieving an altitude of FL 110 (approximately 11,000 ft)by AGGER. (Alternatively, flyby 270602 then GPN03 before direct to overfly AGGER). Both options are assessed together; the aircraft will be above approximately 7, 000 ft by the time the routes split so there will be minimal difference between the 2 options.	CIERCE D SE CIERCE D SE CIERC	00 STRILL BNS C-2500 165 3600 Store 37 Store 38 Store 38 Store 39 Store 30 Store 30 Store 30 Store 30 Store 31 Store 32 Store 33 Store 34 Store 35 Store 36 Store 35	TIMA A 3500 TOTAL A 3500 CARE AND A 100 CARE AND A	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure has be levels of flight safety.	een designed	l to meet acc	eptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be optimum aircraft performance but has increased distance after take-off. A right turn after take-off would meet this I options 1 and 2 and may adversely affect DP 4a	to AGGER by	y turning lef	t initially	
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overflies Eastham Country Park after departure, 3.2 nm on the extended centreline. Current departing aircraft from Runway 27 follow this routing and are above 2, 000 ft over the Park. A fixed Noise Monitoring Terminal is located adjacent to Eastham Country Park. The procedure also overflies Capenhurst Nuclear Processing plant, a Restricted area up to 2,200 ft, at an altitude of approximately 4,000 ft. The route flies over school grounds in Ellesmere Port, at an altitude of approximately 4,500 ft. Routing to avoid all these sites would have further effect on DP 2 and DP 9.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> The procedure is designed to incorporate a continuous climb profile to minimise the impact of noise. Routing takes the aircraft over populated areas of Bebington and Ellesmere Port but avoids the more densely populated south Liverpool. Any routing to decrease the impact of noise would have an adverse effect on DP 2 and DP 9.				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is tech existing operational performance, and capacity.	hnically flya	ble and main	itains	
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure incor	porates a co	ntinuous clir	nb profile.	
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is conboundaries.	itained withi	n existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for SII)s.			
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> By turning left about after take-off, this procedure is not the most direct routing to AGGER and therefore increases the number of track miles flown. The most direct routing would involve a right turn after take-off, which has been assessed as options 1 and 2.				
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to existing arrangements for Controlled Airspace.				
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> This option would provide respite should the chosen option route to the north of the airport.			
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload. In addition, there may be potential conflict with this procedure and traffic inbound to Hawarden Runway 22.			
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN accurate route keeping meaning tracks over the ground fl	1		
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: .This procedure has the potential to impact on Hawarden operations. ATC intervention may be required to ensure deconfliction between LJLA traffic and aircraft inbound to Hawarden Runway 22.			

Design Principle Evaluation		OPTION NO): SID 4
Option Name: Runway 27 SID WAL Option 1		ACCEPT	
Description of Option: Climb straight ahead then turn right to flyby waypoint GPW01 then direct to overfly WAL.	WAL 114.1 DME	495 497 497 497 497 497 497 497 497 497 497	WERPOOL SUHE D SFC-2500 Afjels50 (5050) Afjels50 (5050) MAN CTALD Unit Control D FLROOM D FLROOM D FLROOM D STANDARD JAGUART RUNCORN BERDORI STANDARD JAGUART RUNCORN JAGUART RU
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b levels of flight safety.	een designee	d to meet acc	ceptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b routing to WAL and incorporates a continuous climb prof		d to be the m	lost direct
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure overfinumber of schools in residential areas of Bebington and B procedure is very similar to the current Wallasey SID curres sensitive areas would have an adverse effect on DP 2, DP 4	irkenhead, a ently in use.	although this . Routing to	
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is desclimb profile to minimise the impact of noise. Direct track over populated areas of Bebington and Birkenhead. Minimake an adverse effect on DP 2 and DP 9.	to WAL foll	ows extende	ed routing
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.				
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure incor	porates a co	ntinuous clir	nb profile.	
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is conboundaries.	itained withi	n existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for SIL)s.			
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This procedure repre- WAL.	esents the m	ost direct ro	uting to	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing a	rrangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This option could probut will increase the numbers overflown, having an advert	-		-	
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to integrate with the en-route structure reducing the required input from ATC.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviationNOT METPARTIALMET				
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.				

Design Principle Evaluation		OPTION NO	: SID 5	
Option Name: Runway 27 SID WAL Option 2		ACCE	PT	
Description of Option: Climb straight ahead then turn right to flyby waypoint NEW6 then direct to overfly WAL.	South The Provide	(433) (433) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310) (1310)	VERPOOL SUPEL D SFC-2500 THEISSO (SOG) C MAIN CTAP PODL C REPOOL PODL C	
esign Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has b levels of flight safety.	een designe	d to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure incor and has been designed to be flown at optimum aircraft pe direct routing to WAL. A reduction in track miles to reduc as option 1, which would have an adverse effect on DP 4a.	rformance b ce air polluti	ut is not the	most	
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overflies Eastham Country Park after departure, 3.2 nm on the extended centreline and also flies in the vicinity of schools in Bebington. The routing is close to two major hospitals (Clatterbridge and Arrowe Park) in the Wirral. Routing to avoid all these sites would have further effect on DP 2, DP 4a and DP 9.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is desclimb profile to minimise the impact of noise. The routing route over populated areas of Bebington and avoids most Wirral.	g follows the	shortest pos	sible	

Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is tech existing operational performance, and capacity.	hnically flya	ble and mair	ntains
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure incor	porates a co	ntinuous clii	nb profile.
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is comboundaries.	itained withi	n existing ai	rspace
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for SIL	Ds.		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This procedure does to WAL but represents only approximately 1 nm greater t reduction in track miles has been assessed as option 1, whon DP 4a.	han the mos	t direct rout	e. A
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing a	rangements	for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This option would provide respite should an alternative option be chosen.			
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET

<i>Summary of Qualitative Assessment:</i> The procedure has been designed to integrate with the en-route structure reducing the required input from ATC.			
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: No impact on other aviation operators.			

Design Principle Evaluation		OPTION NO	: SID 6	
Option Name: Runway 27 SID TEMP2		ACCEI	PT	
Description of Option: Climb straight ahead then turn left to flyby waypoints NEW6 and NEW5 then direct to overfly TEMP2.	HEAD - 407(328) HEAD - 2000-350 CTA D 2500-350 CARASTON - 00000 CTA D 2500-350 CTA D 2500-3500 CTA D 2500-35	TIME CAR PACTORY CAR PACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY CONTRACTORY C	CONTRACTOR OF CO	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be levels of flight safety.	een designee	d to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be optimum aircraft performance but is not the most direct r routing could have an adverse effect on DP 3 and DP 4a.				
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overflies Eastham Country Park after departure, 3.2 nm on the extended centreline. Current departing aircraft from Runway 27 follow this routing and are above 2, 000 ft over the Park. A fixed Noise Monitoring Terminal is located adjacent to Eastham Country Park. The procedure also flies in the vicinity of schools in Bebington. Routing to avoid all these sites would have further effect on DP 2, DP 4a and DP 9.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is designed to incorporate a continuous climb profile to minimise the impact of noise. The routing flies over populated areas of Bebington and Raby Mere but follows the most direct route across the populated area. The route also avoids most of the populated areas in the southern part of the Wirral, including the densely populated Ellesmere Port.				

Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is tech existing operational performance, and capacity.	hnically flyal	ble and mair	ntains
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The procedure incor	porates a co	ntinuous clir	nb profile.
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is conboundaries.	tained withi	n existing ai	rspace
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for SII)s.		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This procedure does to TEMP2. A change to the routing could have an adverse			
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	o existing ar	rangements	for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No alternative options have been developed for this SID, as there are no practical alternatives. Any alternate options may have an adverse effect on DP 3, DP 4a and DP 9.			
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to integrate with the en-route structure reducing the required input from ATC.			

Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.			

Design Principle Evaluation		OPTION NO): SID 7	
Option Name: Runway 09 SID AGGER Option 1		ACCEPT		
Description of Option: Climb straight ahead then turn right to flyby waypoints 091601, 091602, 091603, GPN01 and GPN03 then direct to overfly AGGER.	CTR D SFC-2500 CTR D SFC-2500	A Construction of the second s	AT A 35001 100 100 100 100 100 100 100	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be levels of flight safety.	een designee	l to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be optimum aircraft performance but has increased distance after take-off. A more direct routing to AGGER would have DP 6, DP 7a and DP 12.	to AGGER b	y turning rig	ht initially	
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overfl departure, 1.5 nm on the extended centreline. The proced Runcorn and Frodsham. Option 8 amends the routing to a and Frodsham.	ure also ove	erflies school	s in	
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is designed to incorporate a continuous climb profile to minimise the impact of noise. Routing takes the aircraft over the village of Hale and populated areas of Runcorn, Frodsham and Helsby. Option 8 amends the routing to avoid sensitive areas in Runcorn and Frodsham.				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.				
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure incor	porates a co	ntinuous clir	nb profile.	
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is comboundaries.	tained withi	n existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for SIL)s.			
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This procedure has be clockwise direction around LJLA to enable aircraft to obta AGGER. Therefore, this is not the most direct routing to A track miles flown. A more direct routing to AGGER would DP 4a, DP 6, DP 7a and DP 12.	in the correc GGER and in	ct height prio	or to number of	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This option would not provide respite for alternative options.				
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload. In addition, there may be potential conflict with this procedure and traffic inbound to Hawarden Runway 22.					
Design Principle 12b:Procedures should be designed to concentrate routes to minimise the numbers overflown.NOT METPARTIALMET					
Summary of Qualitative Assessment: Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.					
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.NOT METPARTIALMET					
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.					
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET		
Summary of Qualitative Assessment: This procedure has the potential to impact on Hawarden operations. ATC intervention may be required to ensure deconfliction between LJLA traffic and aircraft inbound to Hawarden Runway 22.					

Design Principle Evaluation		OPTION NO	: SID 8
Option Name: Runway 09 SID AGGER Option 2		ACCEI	PT
<i>Description of Option:</i> Climb straight ahead then turn right to flyby waypoints 091501, 091502, 091201, 091603, GPN01 and GPN03 then direct to overfly AGGER.	CTRN D SFC-2500 40 - HP4450 (500) 41 - HP4450 (500) 42 - HP4450 (500) 43 - HP4450 (500) 44 - HP4450 (50		13001 77 1100 100 km 1100
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The procedure has b levels of flight safety.	een designe	d to meet acc	eptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b optimum aircraft performance but has increased distance after take-off. A more direct routing to AGGER would hav DP 6, DP 7a and DP 12.	to AGGER b	y turning rig	ht initially
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure overf departure, 1.5 nm on the extended centreline.	lies Hale Pri	mary School	after
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is designed to incorporate a continuous climb profile to minimise the impact of noise. Routing takes the aircraft over the village of Hale immediately after take-off. The proposed turn after take-off is as tight as PANS-OPS design criteria will allow to minimise the population centres overflown.			
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.				
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure incorp	porates a co	ntinuous clir	nb profile.	
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is comboundaries.	itained withi	n existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for SIL)s.			
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This procedure has be clockwise direction around LJLA to enable aircraft to obta AGGER. Therefore, this is not the most direct routing to A track miles flown. A more direct routing to AGGER would DP 4a, DP 6, DP 7a and DP 12.	in the correc GGER and in	ct height prio	or to number of	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No alternative options have been developed for this SID that would provide respite.				
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload. In addition, there may be potential conflict with this procedure and traffic inbound to Hawarden Runway 22.			
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: This procedure has the potential to impact on Hawarden operations. ATC intervention may be required to ensure deconfliction between LJLA traffic and aircraft inbound to Hawarden Runway 22.			

Design Principle Evaluation		OPTION NO	: SID 9
Option Name: Runway 09 SID CAVEN Option 1		ACCEF	Τ
Description of Option: Climb straight ahead then turn left to flyby waypoints 091601, 091001 and 091002 then direct to overfly CAVEN.	4413 497 497 (200 495) 497 (200 495) 497 (200 495) 452 (305) 452 (305) 452 (305) 457 (D SFC-2500 A191850 (5000) MAIN CTA D 22 RPOD E ILPOOLA D LABOR D CAR D L	500'-3500' BURTO 500'-3500' BURTO 500'-3500' BURTO 5000'-500' BURTO 5000'-500' BURTO 5000'-500' BURTO 5000'-500' BURTO 5000'-500' BURTO 5000'-500' BURTO 5000'-500' BURTO 500'-500' BUR
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b levels of flight safety.	een designe	d to meet acc	eptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b optimum aircraft performance but is restricted to 5,000 fr remain at this altitude for a number of track miles. This re(North) requirements.	t maximum a	altitude. Airc	raft will
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure overf departure, 1.5 nm on the extended centreline. The proced Widnes. Alternate routing would have an adverse effect o	dure also ove	erflies schools	
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is desclimb profile to minimise the impact of noise but has been of 5,000 ft. Routing takes the aircraft over populated area Liverpool. The height restriction is to comply with FASI (routing would have an adverse effect on DP 2 and DP 9.	n restricted t as of Widnes	o a maximum , Huyton and	altitude
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.				
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure incorbut is limited to a maximum altitude of 5,000 ft, which air This restriction is to comply with FASI (North) requireme	craft will ach			
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is conboundaries.	tained withi	n existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for SII)s.			
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This procedure repre- CAVEN.	esents the m	ost direct ta	ck to	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This option would provide respite should the chosen option route to the south of the airport.				
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload.				

Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.				

Design Principle Evaluation		OPTION NO	: SID 10	
Option Name: Runway 09 SID CAVEN Option 2		ACCEPT		
Description of Option: Climb straight ahead then turn right to flyby waypoints 091601, 091602 and 091603 then direct to overfly CAVEN.	452 (310) 477 455 (355) 457 (329) 0 1 2004-35002 0 200	MAN CTA D 25 MAN CTA D 25 DD F REPORTANT WRP D RABOCK URP URP URP URP URP URP URP URP	19:3500 BURTON 19:3500 FUARRI 19:3500 FUARRI	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure has be levels of flight safety.	een designe	ed to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to be flown at optimum aircraft performance but is restricted to 5,000 ft maximum altitude. Aircraft will remain at this altitude for a number of track miles. The distance to CAVEN is increased by turning right initially after take-off. The height restriction is to comply with FASI (North) requirements. Turning left after take-off to reduce track miles is assessed as options 9 and 12.				
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overflies Hale Primary School after departure, 1.5 nm on the extended centreline. The procedure also overflies schools in Runcorn, Frodsham and Ellesmere Port. Option 12 amends the routing to avoid sensitive areas in Runcorn and Frodsham. Alternative routing to also avoid Ellesmere Port would have an adverse effect on DP 9.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	

Design Principle 4b: Procedures should be designed to	NOT MET	PARTIAL	MET
be technically flyable and maintain existing operational			
performance, and capacity.			

Summary of Qualitative Assessment: The procedure is technically flyable and maintains existing operational performance, and capacity.

Design Principle 6: Procedures should be designed to	NOT MET	PARTIAL	MET
enable more continuous climbs.			

Summary of Qualitative Assessment: The procedure incorporates a continuous climb profile but is limited to a maximum altitude of 5,000 ft, which aircraft will achieve prior to CAVEN. This restriction is to comply with FASI (North) requirements.

Design Principle 7a: Procedures should be designed to	NOT MET	PARTIAL	MET
fit within existing airspace constraints and boundaries.			

Summary of Qualitative Assessment: The procedure is contained within existing airspace boundaries.

Design Principle 7b: Procedures should be designed to	NOT MET	PARTIAL	MET
enable more continuous descents.			

Summary of Qualitative Assessment: Not evaluated for SIDs.

Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
that minimise the number of track miles nown.			

Summary of Qualitative Assessment: By turning right after take-off, this procedure is not the most direct routing to CAVEN and therefore increases the number of track miles flown. Turning left after take-off to reduce track miles is assessed as options 9 and 12.

Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required to existing arrangements for Controlled Airspace.			
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET

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<i>Summary of Qualitative Assessment:</i> This option could provide respite should the chosen option route to the north of the airport.				
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload. In addition, there may be potential conflict with this procedure and traffic inbound to Hawarden Runway 22.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN accurate route keeping meaning tracks over the ground fl				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: This procedure has the potential to impact on Hawarden operations. ATC intervention may be required to ensure deconfliction between LJLA traffic and aircraft inbound to Hawarden Runway 22.				

Design Principle Evaluation		OPTION NO :	SID 11	
Option Name: Runway 09 SID CAVEN Option 3		ACCEI	РТ	
Description of Option: Climb straight ahead then turn right to flyby waypoints 091501, 091502, 091201 and 091603 then direct to overfly CAVEN.	413 413 413 413 413 413 413 413	199830 (5000) 33 MAN GTALD 225 201 POLL Liceotral VRP LABOCK VRP VRP JACUAR VRP LABOCK VRP JACUAR V	6 001-3500 BURROWN 1998500 WARRI 656 1998500 WARRI 656 199012878 FERRY FIDULERS FERRY FIDULERS FERRY WRF 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 19905HAM 1	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure has be levels of flight safety.	een designe	d to meet acc	eptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be optimum aircraft performance but is restricted to 5,000 ft remain at this altitude for a number of track miles. The di turning right initially after take-off. The height restriction requirements. Turning left after take-off to reduce track r 12.	maximum a stance to CA is to compl	lltitude. Airc VEN is incre y with FASI (raft will ased by North)	
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overflies Hale Primary School after departure, 1.5 nm on the extended centreline. The procedure also overflies schools in Ellesmere Port. Alternate routing would have an adverse effect on DP 2, DP 4a and DP 9.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is described by profile to minimise the impact of noise, but is restrict for en-route requirements. Routing takes the aircraft over areas of Ellesmere Port. The height restriction is to complex Alternate routing would have an adverse effect on DP 2, D	cted to 5,000 r the village ly with FASI) ft maximun of Hale and p (North) requ	n altitude oopulated	

Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is tech existing operational performance, and capacity.	hnically flya	ble and mair	ntains
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure incorpute in the procedure incorpute is limited to a maximum altitude of 5,000 ft, which air of this restriction is to comply with FASI (North) requirements.	craft will ach		-
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is comboundaries.	itained withi	in existing ai	rspace
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for SIL)s.		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> By turning right after most direct routing to CAVEN and therefore increases the Turning left after take-off to reduce track miles is assessed	number of t	rack miles fl	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required t Controlled Airspace.	to existing a	rrangements	for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This option could provide respite should the chosen option route to the north of the airport.			
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET

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<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload. In addition, there may be potential conflict with this procedure and traffic inbound to Hawarden Runway 22.					
Design Principle 12b:Procedures should be designed to concentrate routes to minimise the numbers overflown.NOT METPARTIALMET					
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.					
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.NOT METPARTIALMET					
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.					
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET		
Summary of Qualitative Assessment: This procedure has the potential to impact on Hawarden operations. ATC intervention may be required to ensure deconfliction between LJLA traffic and aircraft inbound to Hawarden Runway 22.					

Design Principle Evaluation		OPTION NO	: SID 12	
Option Name: Runway 09 SID CAVEN Option 4		ACCE	PT	
<i>Description of Option:</i> Climb straight ahead then turn left to flyby waypoints 091501, 09xx02, 091001 and 091002 then direct to overfly CAVEN. This option is an amendment to Option 1 to avoid the densely populated areas overflown by that option.	13 CTR D 101/2 497 41 457 457 (559) 105 1/2 (559) 105 1/2 (559) 101 1/2 (559) 101 1/2 (559) 101 1/2 (570) 101 1/2 (570) 11/2 1/2 (570)	SEC-2500 446 (355) (5060) MAIN CTAL D 2250 H TABOCK 370 HP	0'-3500' BURTONY A19:8500' WARR 654 FIDDLERS FERRY POWER STATION UPP UPP POWER STATION UPP UPP UPP UPP UPP UPP UPP UPP UPP UP	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure has be levels of flight safety.	een designe	ed to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to be flown at optimum aircraft performance but is restricted to 5,000 ft maximum altitude. Aircraft will remain at this altitude for a number of track miles. The distance to CAVEN is increased slightly by routing via the gap between Widnes and Warrington. The height restriction is to comply with FASI (North) requirements. Alternate routing would have an adverse effect on DP 2 and DP 4a.				
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overflies Hale Primary School after departure, 1.5 nm on the extended centreline.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is des climb profile to minimise the impact of noise but has been of 5,000 ft. Routing takes the aircraft over populated area height restriction is to comply with FASI (North) requirem have an adverse effect on DP 2 and DP 9.	restricted s of Huyton	to a maximur and Liverpo	n altitude ol. The	

Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is tec existing operational performance, and capacity.	hnically flya	ble and mair	ntains
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure incorbut is limited to a maximum altitude of 5,000 ft, which air This restriction is to comply with FASI (North) requireme	craft will ach		
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is corboundaries.	itained withi	in existing ai	rspace
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for SII)s.		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The number of track delaying the initial left-hand turn to avoid overflying populaternative routing would have an adverse effect on DP 4a	ulated areas		by
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rrangements	for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This option could prooption route to the south of the airport.	ovide respite	e should the	chosen
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET

<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: No impact on other aviation operators.				

Design Principle Evaluation		OPTION NO	: SID 13	
Option Name: Runway 09 SID CORKA Option 1		ACCE	PT	
Description of Option: Climb straight ahead then turn right to flyby waypoints 091601 and 091301 then direct to overfly CORKA.				
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be levels of flight safety.	een designe	d to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be optimum aircraft performance and includes a continuous			ı at	
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overflies Hale Primary School after departure, 1.5 nm on the extended centreline. The procedure also overflies schools in Runcorn and Frodsham. Option 15 amends the routing to avoid sensitive areas in Runcorn and Frodsham.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is designed to incorporate a continuous climb profile to minimise the impact of noise. Routing takes the aircraft over the village of Hale and populated areas of Runcorn and Frodsham. Option 15 amends the routing to avoid sensitive areas in Runcorn and Frodsham.				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.			
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The procedure incor	porates a co	ntinuous clir	nb profile.
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is cor boundaries.	ntained withi	in existing ai	rspace
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for SII	Ds.		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This procedure reproCORKA.	esents the m	ost direct ro	ute to
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required Controlled Airspace.	to existing ar	rangements	for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This option would proprion route to the north of the airport.	rovide respit	e should the	chosen
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload. In addition, there may be potential conflict with this procedure and traffic inbound to Hawarden Runway 22.			

Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: This procedure has the potential to impact on Hawarden operations. ATC intervention may be required to ensure deconfliction between LJLA traffic and aircraft inbound to Hawarden Runway 22.				

Design Principle Evaluation		OPTION NO	: SID 14	
Option Name: Runway 09 SID CORKA Option 2		ACCE	PT	
Description of Option: Climb straight ahead then turn left to flyby waypoints 091601, 091001, 091002 and CAVEN then direct to overfly TEMP2. (Planned procedure uses waypoint TEMP2 not CORKA)	410 497 97 452 97 452 97 452 97 452 98 452 98 452 99 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 10 90 100 90 100 90 100 90 100 90 100 90 100 90 100 90 100 90 100	MAIN CTAA D 22501 HEROOLARD 22501 HEROOLARD 25001 HEROOLARD 1500 HEROOLARD	ABOOL CURTONWOOD ABOOL CURTON ABOOL CURTONWOOD ABOOL CURTON ABOOL CURTONWOOD ABOOL CURTON ABOOL CU	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has b levels of flight safety.	een designe	d to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has b optimum aircraft performance but has increased distance after take-off. Turning right after take-off to reduce the di options 13 and 15.	to TEMP2 b	y turning lef	t initially	
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overf departure, 1.5 nm on the extended centreline. The proced Widnes. Alternate routing would have an adverse impact	lure also ove	erflies school		
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is designed to incorporate a continuous climb profile to minimise the impact of noise. Routing takes the aircraft over populated areas of Widnes, Huyton and Liverpool. Alternate routing would have an adverse impact on DP 2 and DP 9.				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.				
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure incor	porates a co	ntinuous clir	nb profile.	
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is cor boundaries.	ntained withi	n existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for SII	Ds.			
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> By turning left about after take-off, this procedure is not the most direct routing to CORKA and therefore increases the number of track miles flown. Turning right after take-off to reduce the the number of track miles flown has been assessed as options 13 and 15.				
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required Controlled Airspace.	to existing ar	rangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This option would provide respite should the chosen option route to the south of the airport.				
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to integrate with the en-route structure reducing the required input from ATC.				

Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.				

Design Principle Evaluation		OPTION NO:	SID 15	
Option Name: Runway 09 SID CORKA Option 3		ACCE	РТ	
Description of Option: Climb straight ahead then turn right to flyby waypoints 091501 and 091502 then direct to overfly TEMP2. This option is an amendment to Option 1 to avoid the densely populated areas overflown by that option.	AND	ISLAND 479 RUNCORI A 1931341 190(133)76 426 (1310) 111 111 125 101 111 111 111 111 111 111 11	5 VRP	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be levels of flight safety.	een designe	d to meet acc	eptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be optimum aircraft performance and represents the most di			at	
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overful departure, 1.5 nm on the extended centreline.	lies Hale Pri	mary School	after	
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is designed to incorporate a continuous climb profile to minimise the impact of noise. Routing takes the aircraft over the village of Hale.				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is tech existing operational performance, and capacity.	hnically flya	ble and main	tains	

Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure incorporates a continuous climb profile.				
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is cor boundaries.	ntained with	in existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for SII	Ds.			
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This procedure repre- CORKA.	esents the m	ost direct ro	ute to	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required Controlled Airspace.	to existing a	rrangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This option would proprion route to the north of the airport.	covide respit	e should the	chosen	
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload. In addition, there may be potential conflict with this procedure and traffic inbound to Hawarden Runway 22.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: This procedure has the potential to impact on Hawarden operations. ATC intervention may be required to ensure deconfliction between LJLA traffic and aircraft inbound to Hawarden Runway 22.				

Design Principle Evaluation		OPTION NO	Baseline	
Option Name: Transitions Baseline (Do Nothing)		REJECT		
<i>Description of Option:</i> Transitions are currently managed tactically by ATC. Aircraft are vectored to the IAF for the desired approach procedure. There are no defined routes for Transition; the DPE contained in this table applies to all tactical routes as the same results applied to each.				
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: No change. Tactica	l vectoring	by ATC is cur	rently safe.	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The current transit approach procedure is tactically managed by ATC. Track depend on the local traffic picture at the time and may n	k lengths an	d altitude pro		
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Tactical routing doulocations in the local area.	es not take	into account s	sensitive	
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Tactical routing do sensitive or residential areas.	es not take	into account i	noise-	
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No Change. Current conventional procedures are technically flyable and maintain existing operational performance, and capacity.				
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for Transitions.				

Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> Routing and altitude profile will be tactically managed by ATC and will depend on the local air picture at the time. There is no guarantee that the procedures will be contained within CAS.					
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET		
Summary of Qualitative Assessment: Descent clearances	s will be as d	irected by A'	TC.		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> Whilst ATC will end routing, actual routes will depend on the traffic situation			direct		
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET		
Summary of Qualitative Assessment: No change required Controlled Airspace.	d to existing	arrangemen	nts for		
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> There are no extan tactically managed by ATC.	t transition _]	procedures.	Routing is		
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> There are no extant transition procedures. Routing is tactically managed by ATC.					
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET		
Summary of Qualitative Assessment: Routing is tactically dictated by the local air picture at the time.	<i>Summary of Qualitative Assessment:</i> Routing is tactically managed by ATC and will be dictated by the local air picture at the time.				

Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Routing is tactically managed by ATC and will be dictated by the local air picture at the time.			
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: No change to existing arrangements.			

Design Principle Evaluation	(OPTION NO:	TRANS 1	
Option Name: Trans 27 DIOUF		ACCE	PT	
Description of Option: DIOUF @ FL120. Flyby CABRY, LATON (LATON @ FL100), NEW1 and NEW2. Flyby NEW3 at 4,000 ft then flyby IAF at LIV05 to join IAP.	A Construction of the cons	SIGNATION OF CONTRACT OF CONTR		
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has levels of flight safety.	been desigr	ned to meet a	cceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to be flown at optimum aircraft performance and includes a continuous descent profile. The extended 'S' profile increases track miles flown but this is required to allow the improved descent profile given the aircraft's altitude at the beginning of the Transition. Height restrictions at NEW3 to deconflict from Manchester arrival traffic means the descent profile flown is not optimum. This restriction is to comply with FASI (North) requirements.				
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overflies residential areas of Crosby and Liverpool in the vicinity of a number of schools and close to hospitals, but at altitudes greater than 4,000 ft. The procedure also passes over two small country parks, above 2,000 ft. Alternate routing would have an adverse effect on DP 2, DP 4a, DL 7b and DP 9.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure pass Liverpool and Crosby, aircraft will be above 5,000 ft and power settings. Routing is planned over industrial areas higher ambient noise.	in the desc	ent, so will ha	ave lower	

Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.				
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for T	ransitions.			
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is coboundaries.	ontained wit	hin existing	airspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to enable a more continuous descent but height restrictions at NEW3 to deconflict from Manchester arrival traffic means the descent profile flown is not optimum. This restriction is to comply with FASI (North) requirements.				
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The track miles flow continuous descent profile to be flown, given the aircraft Transition.				
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to existing arrangements for Controlled Airspace.				
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No alternative routes developed for this Transition. The procedure has been designed to comply with FASI (North) requirements.				

Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN accurate route keeping meaning tracks over the ground				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.				

Design Principle Evaluation	C	PTION NO:	TRANS 2	
Option Name: Trans 27 NOMSU		ACCE	PT	
Description of Option: Flyby NOMSU and NEW2. Flyby NEW3 at 4,000 ft then flyby IAF at LIV05 to join procedure.				
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure has be levels of flight safety.	een designe	d to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This procedure represented to be not performance and includes an improved descent profile, all NEW3 due to Manchester arrival traffic restricts the use of This restriction is to comply with FASI (North) requirement	e flown at o though heig f a continuo	ptimum airci ht restrictior	aft 1s at	
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overflies residential areas of Liverpool in the vicinity of a number of schools and close to hospitals, but at altitudes greater than 4,000 ft. The procedure also passes over two small country parks, above 2,000 ft. Alternate routing would have an adverse effect on DP 2, DP 4a, DL 7b and DP 9.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedures routes over residential areas of Wallasey, Liverpool and Huyton during the descent, so will have lower power settings. Routing is planned over industrial areas and close to the motorways, with higher ambient noise.				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.			
existing operational performance, and capacity.			
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for Tra	ansitions.		
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is corboundaries.	itained withi	in existing ai	rspace
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The procedure has b continuous descent. Height restrictions at NEW3 to decort traffic means the descent profile flown is not optimum. The FASI (North) requirements.	nflict from M	anchester ai	rival
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This procedure is alr NOMSU to the IAP, although routing in a direct line would flown by approximately 500m.			
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required Controlled Airspace.	to existing ar	rangements	for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No alternative routes developed for this Transition. The procedure has been designed to comply with FASI (North) requirements.			
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET

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<i>Summary of Qualitative Assessment:</i> All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: No impact on other aviation operators.				

Design Principle Evaluation		OPTION NO:	TRANS 3
Option Name: Trans 27 VEGUN		ACCEPT	
Description of Option: Flyby VEGUN then flyby NEW7 at 3,000 ft. Flyby IAF at NEW8 to join procedure.	HEAD OF A CALL CALL CALL CALL CALL CALL CALL C	SAME STORES (SAME STORES) STORES (SAME STOR	We show the second seco
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The procedure has b levels of flight safety.	een design	ed to meet acc	ceptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure represents the most direct routing from VEGUN, minimising the track miles flown. The height restriction of 3,000 ft at NEW7 is required to separate from Manchester departures and hence the descent profile is not continuous, requiring an increased engine power setting. This restriction is to comply with FASI (North) requirements.			
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure routes close to schools in Broughton and Chester, but at heights in excess of 3,000 ft. The procedure overflies Delamere Forest Park. Alternate routing would have an adverse effect on DP 2 and DP 9.			
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure routes over mainly rural locations, with the exception of residential areas in Broughton and Chester, where aircraft will be at, or above, 3,000 ft. The procedure does not incorporate a continuous descent profile due to a height restriction of 3,000 ft at NEW7 to deconflict from Manchester departures, requiring an increased engine power setting. This restriction is to comply with FASI (North) requirements.			

NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.			
NOT MET	PARTIAL	MET	
ansitions.			
NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is contained within existing airspace boundaries.			
NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> A height restriction of 3,000 ft at NEW7 is required to separate from Manchester departures and hence the procedure does not fully follow a continuous descent profile. This restriction is to comply with FASI (North) requirements.			
NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This procedure represents the most direct flyable route from VEGUN to the IAP.			
NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to existing arrangements for Controlled Airspace.			
NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This option would provide respite should an alternative option be chosen.			
NOT MET	PARTIAL	MET	
	hnically flyal NOT MET ansitions. NOT MET ntained within NOT MET of 3,000 ft at redure does r with FASI (Not NOT MET esents the m NOT MET to existing an NOT MET rovide respit	NOT MET PARTIAL NOT MET PARTIAL ansitions. PARTIAL NOT MET PARTIAL ntained within existing ai NOT MET PARTIAL of 3,000 ft at NEW7 is recently followith FASI (North) required NOT MET PARTIAL of 3,000 ft at NEW7 is recently followith FASI (North) required NOT MET PARTIAL NOT MET PARTIAL	

<i>Summary of Qualitative Assessment:</i> All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload.			
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This procedure has the potential to impact on Hawarden operations. ATC intervention may be required to ensure deconfliction between LJLA traffic and aircraft inbound to Hawarden Runway 22.			

Design Principle Evaluation		OPTION NO:	TRANS 4
Option Name: Trans 27 VEGUN (CC05)		ACCEPT	
Description of Option: VEGUN @ FL90. Flyby NEW2 then flyby NEW3 at 4,000 ft and flyby IAF at LIV05 to join procedure.		B Construction of the second s	And
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The procedure has be levels of flight safety.	een designe	ed to meet acc	ceptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This procedure routes to the north of the airport, increasing the track miles flown. A height restriction of 4,000 ft at NEW3 due to Manchester arrival traffic restricts the use of a continuous descent profile. This routing is required when Manchester Airport is operating on Runway 05 to deconflict with Manchester arrivals. The height restriction is to comply with FASI (North) requirements. Alternate routing would have an adverse effect on DP 4a and DP 9.			
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure overflies two schools and the periphery of Clatterbridge Hospital in the Wirral, although aircraft will be above 5,000 ft at this point. The procedure also overflies residential areas of Liverpool in the vicinity of a number of schools and close to hospitals, but at altitudes greater than 4,000 ft. The procedure passes over two small country parks, above 2,000 ft. Alternate routing would have an adverse effect on DP 2, DP 4a and DP 9.			
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET

<i>Summary of Qualitative Assessment:</i> The procedure routes over residential areas of Birkenhead, Liverpool and Huyton. A height restriction of 4,000 ft at NEW3 due to Manchester arrival traffic restricts the use of a continuous descent profile, requiring an increased engine power setting. Increased track miles by routing to the north increases the time below 7,000 ft. This routing is required when Manchester Airport is operating on Runway 05 to deconflict with Manchester arrivals. The height restriction is to comply with
Runway 05 to deconflict with Manchester arrivals. The height restriction is to comply with FASI (North) requirements. Alternate routing would have an adverse effect on DP 2 and DP 9.

Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.			
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for Tra	ansitions.		
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is contained within existing airspace boundaries.			
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to enable a more continuous descent. However, extended track miles and a height restriction of 4,000 ft at NEW3 to deconflict from Manchester arrival traffic means the descent profile flown is not optimum. This restriction is to comply with FASI (North) requirements.			
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: This procedure routes to the north of the airport, increasing the track miles flown. This routing is required when Manchester Airport is operating on Runway 05 to deconflict with Manchester arrivals.			
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required to existing arrangements for Controlled Airspace.			

Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This option would provide respite should an alternative option be chosen.			
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload.			
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.			
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.			

Design Principle Evaluation		OPTION NO:	TRANS 5
<i>Option Name:</i> Trans 09 DIOUF		ACCE	РТ
Description of Option: DIOUF @ FL120. Flyby CABRY, LATON (LATON @ FL100and LIV20. Flyby IAF at LIV11 to join procedure.	ARD WORK OF A CALL AND	And Andrewski an	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	F PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has l levels of flight safety.	oeen design	ed to meet ac	ceptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	Γ PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> This procedure incorpofile and is the optimum distance for that profile.	orporates a	continuous de	scent
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	Γ PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The routing of this p several schools, in particular in the Crosby area. Howeve above, 7,000 ft.			
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	Γ PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Aircraft will descend Crosby, just prior to coasting out. Aircraft will be a contin minimum engine power setting. The aircraft will remain the Transition to the IAP.	nuous desce	ent so will hav	re a
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	F PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is tere existing operational performance, and capacity.	chnically fly	able and mair	ntains

Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for Tra	ansitions.			
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is conboundaries.	itained withi	in existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This procedure has b continuous descent.	een designe	d to enable a	3	
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> A more direct track of miles flown by approximately 4 nm but would require more busy period of the flight, so could have an adverse effect of	re turns by t			
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No alternative routes Transition. The procedure has been designed to comply v				
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. This procedure has been designed to integrate with the en-route structure and arrival procedures, reducing the required input from ATC.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.NOT METPARTIALMET				
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.				

Design Principle Evaluation		OPTION NO:	TRANS 6
Option Name: Trans 09 NOMSU		ACCE	PT
Description of Option: Flyby NOMSU then flyby IAF at LIV11 to join procedure.	SFC-FL45 673 T TM2/E SFC 22000/24 TCA 0 3500 CTA 0 35000 CTA 0 35000 CTA 0 35000 CTA 0 35000 C	COSOL Annual Cost Cost Cost Cost Cost Cost Cost Cost	ABY CHARACTER CONSTRUCTION OF THE CONSTRUCT OF THE CONSTR
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b levels of flight safety.	een designe	ed to meet acc	ceptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure incor profile at optimum aircraft performance and minimises th			scent
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The procedure rema	ins over the	e sea at all tim	ies.
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The procedure rema	ins over the	e sea at all tim	ies.
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is tec existing operational performance, and capacity.	hnically flya	able and main	itains
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for Tra			

Design Principle 7a: Procedures should be designed to NOT MET	DADT			
fit within existing airspace constraints and boundaries.	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> The procedure is contained within existing airspace boundaries.				
Design Principle 7b: Procedures should be designed to enable more continuous descents.	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> The procedure incorporates a comprofile.	ntinuous de	scent		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> This procedure represents the m NOMSU to the IF for the IAP.	ost direct ro	oute from		
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> No change required to existing an Controlled Airspace.	rrangements	s for		
Design Principle 11: Procedures should be developed NOT MET to allow for alternative routes to offer respite.	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> The procedure remains over the requirement for respite.	sea at all tin	nes. No		
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. This procedure has been designed to integrate with the en-route structure and arrival procedures, reducing the required input from ATC.				
Design Principle 12b:Procedures should be designed to concentrate routes to minimise the numbers overflown.NOT MET	PARTIAL	MET		
Summary of Qualitative Assessment: Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.NOT MET	PARTIAL	MET		

<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.NOT METPARTIALMET				
Summary of Qualitative Assessment: No impact on other aviation operators.				

Design Principle Evaluation	C	PTION NO:	TRANS 7
Option Name: Trans 09 VEGUN		ACCE	PT
Description of Option: Flyby VEGUN and LIV12 and flyby IAF at LIV11 to join procedure.	A Constraint of the second sec	ADD CARANGON (22) ADD Canonical ADD 25000 3500 (CAR CARANGE CARANGE ADD 25000 3500 (CARANGE) CARANGE CARANGE ADD 25000 (CARANGE) ADD 25000 (CARANGE)	Branch Frig VPP VPP </td
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b levels of flight safety.	een designe	d to meet acc	ceptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure incorprofile at optimum aircraft performance and minimises the			scent
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure does routes in the vicinity of a number of schools in rural villag an adverse effect on DP2, DP 4a and DP 9.			
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure incorprofile to reduce engine power settings. The route represervute to reduce track miles flown although the route pass locations at approximate altitudes of 3,000 ft and above. A adverse effect on DP2 and DP 9.	sents the mir es over seve	nimum practi ral small vill	icable age
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET

Summary of Qualitative Assessment:The procedure is technically flyable and maintains existing operational performance, and capacity.NOT METPARTIALMETDesign Principle 6:Procedures should be designed to fit within existing airspace constraints and boundaries.NOT METPARTIALMETSummary of Qualitative Assessment:Not evaluated for Transitions.METPARTIALMETSummary of Qualitative Assessment:The procedure is contained within existing airspace boundaries.NOT METPARTIALMETDesign Principle 7b:Procedures should be designed to enable more continuous descents.NOT METPARTIALMETSummary of Qualitative Assessment:The procedure incorporates a continuous descentPartialMETSummary of Qualitative Assessment:The procedure represents the minimum practicable routing to the IAF for the IAP.NOT METPARTIALMETDesign Principle 9:Procedures should be designed that minimise the number of track miles flown.NOT METPARTIALMETSummary of Qualitative Assessment:This procedure represents the minimum practicable routing to the IAF for the IAP.NOT METPARTIALMETDesign Principle 10:If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.NOT METPARTIALMETSummary of Qualitative Assessment:No change required to existing arrangements for Controlled Airspace.NOT METPARTIALMETSummary of Qualitative Assessment:No					
enable more continuous climbs.Not with the control of th					
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.NOT METPARTIALMETSummary of Qualitative Assessment: boundaries.The procedure is contained within existing airspace boundaries.NOT METPARTIALMETDesign Principle 7b: procedures should be designed to enable more continuous descents.NOT METPARTIALMETSummary of Qualitative Assessment: rofile.The procedure incorporates a continuous descent profile.NOT METPARTIALMETDesign Principle 9: Procedures should be designed that minimise the number of track miles flown.NOT METPARTIALMETSummary of Qualitative Assessment: routing to the IAF for the IAP.NOT METPARTIALMETDesign Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.NOT METPARTIALMETDesign Principle 11: rocedures should be developed to allow for alternative routes to offer respite.NOT METPARTIALMETDesign Principle 12: rocedure has been designed to comply with FASI (North) requirements.METMETDesign Principle 12a: rocedure has been designed to comply with FASI (North) requirements.METMETDesign Principle 12a: roacture has been designed to comply with FASI (North) requirements.METDesign Principle 12a: roacture has been designed to comply with FASI (North) requirements.METDesign Principle 12a: roacture has been designed to comply with FASI (North)		NOT MET	PARTIAL	MET	
fit within existing airspace constraints and boundaries. Image: Constraints and boundaries. Summary of Qualitative Assessment: The procedure is contained within existing airspace boundaries. Design Principle 7b: Procedures should be designed to enable more continuous descents. NOT MET PARTIAL MET Summary of Qualitative Assessment: The procedure incorporates a continuous descent profile. NOT MET PARTIAL MET Design Principle 9: Procedures should be designed that minimise the number of track miles flown. NOT MET PARTIAL MET Summary of Qualitative Assessment: This procedure represents the minimum practicable routing to the IAF for the IAP. MET Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users. NOT MET PARTIAL MET Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite. NOT MET PARTIAL MET Summary of Qualitative Assessment: No alternative routes have been developed for this Transition. The procedure has been designed to comply with FASI (North) requirements. MET Design Principle 12a: Procedures should be designed to comply with FASI (North) requirements. MET Su	Summary of Qualitative Assessment: Not evaluated for Tra	ansitions.			
boundaries.NOT METPARTIALMETDesign Principle 7b: Procedures should be designed to enable more continuous descents.NOT METPARTIALMETSummary of Qualitative Assessment: The procedure incorporates a continuous descent profile.NOT METPARTIALMETDesign Principle 9: Procedures should be designed that minimise the number of track miles flown.NOT METPARTIALMETSummary of Qualitative Assessment: routing to the IAF for the IAP.NOT METPARTIALMETDesign Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.NOT METPARTIALMETSummary of Qualitative Assessment: No change required to existing arrangements for Controlled Airspace.NOT METPARTIALMETDesign Principle 11: Procedures should be developed to allow for alternative routes to offer respite.NOT METPARTIALMETSummary of Qualitative Assessment: No alternative routes have been developed for this Transition. The procedure should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOS) workload.NOT METPARTIALMETSummary of Qualitative Assessment: All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. This procedure has been designed to integrate with the		NOT MET	PARTIAL	MET	
enable more continuous descents.Image: Continuous descents in the procedure incorporates a continuous descent profile.Design Principle 9: Procedures should be designed that minimise the number of track miles flown.NOT METPARTIALMETSummary of Qualitative Assessment: routing to the IAF for the IAP.Not met procedure represents the minimum practicable routing to the IAF for the IAP.METDesign Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.NOT MET PARTIALPARTIAL METDesign Principle 11: Procedures should be developed to allow for alternative routes to offer respite.NOT MET PARTIALPARTIAL METDesign Principle 12: Procedure has been designed to comply with FASI (North) requirements.METDesign Principle 12: ransition. The procedure has been designed to comply with FASI (North) requirements.METDesign Principle 12: ransition. The procedure should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOS) workload.NOT MET NOT MET PARTIALPARTIAL METDesign Principle 12: routing from ATC from STAR to IAP. This procedure has been designed to integrate with the		itained withi	n existing ai	rspace	
profile.NOT METPARTIALMETDesign Principle 9: Procedures should be designed that minimise the number of track miles flown.NOT METPARTIALMETSummary of Qualitative Assessment: routing to the IAF for the IAP.NOT METPARTIALMETDesign Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.NOT METPARTIALMETDesign Principle 11: Procedures should be altered for the benefit of alternative routes should be developed to allow for alternative routes to offer respite.NOT METPARTIALMETSummary of Qualitative Assessment: to allow for alternative routes to offer respite.NOT METPARTIALMETSummary of Qualitative Assessment: to allow for alternative routes to offer respite.NOT METPARTIALMETSummary of Qualitative Assessment: rransition. The procedure has been designed to comply with FASI (North) requirements.METDesign Principle 12a: Traffic Controllers (ATCOs) workload.NOT METPARTIALMETSummary of Qualitative Assessment: raffic Controllers (ATCOs) workload.NOT METPARTIALMET	9 1	NOT MET	PARTIAL	MET	
that minimise the number of track miles flown.Image: Constraint of the track miles flown.Summary of Qualitative Assessment:This procedure represents the minimum practicable routing to the IAF for the IAP.Design Principle 10:If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.NOT METPARTIALMETSummary of Qualitative Assessment:No change required to existing arrangements for Controlled Airspace.NOT METPARTIALMETDesign Principle 11:Procedures should be developed to allow for alternative routes to offer respite.NOT METPARTIALMETSummary of Qualitative Assessment:No alternative routes have been developed for this Transition. The procedure has been designed to comply with FASI (North) requirements.METDesign Principle 12a:Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOS) workload.NOT METPARTIALMETSummary of Qualitative Assessment:All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. This procedure has been designed to integrate with the		porates a co	ntinuous des	scent	
routing to the IAF for the IAP.Design Principle 10:If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.NOT METPARTIALMETSummary of Qualitative Assessment:No change required to existing arrangements for Controlled Airspace.NOT METPARTIALMETDesign Principle 11:Procedures should be developed to allow for alternative routes to offer respite.NOT METPARTIALMETSummary of Qualitative Assessment:No alternative routes have been developed for this Transition. The procedure has been designed to comply with FASI (North) requirements.METDesign Principle 12a:Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.NOT METPARTIALMETSummary of Qualitative Assessment:All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. This procedure has been designed to integrate with the	. .	NOT MET	PARTIAL	MET	
procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.Image: Control in the sense of the sense sense of the sense of t		esents the m	inimum prae	cticable	
Controlled Airspace.NOT METPARTIALMETDesign Principle 11: Procedures should be developed to allow for alternative routes to offer respite.NOT METPARTIALMETSummary of Qualitative Assessment: Transition. The procedure has been designed to comply with FASI (North) requirements.METMETDesign Principle 12a: Traffic Controllers (ATCOs) workload.NOT METPARTIALMETSummary of Qualitative Assessment: Traffic Controllers (ATCOs) workload.NOT METPARTIALMETSummary of Qualitative Assessment: Traffic From STAR to IAP. This procedure has been designed to integrate with the	procedures requires a smaller volume of airspace, airspace design or classification should be altered for	NOT MET	PARTIAL	MET	
to allow for alternative routes to offer respite.Summary of Qualitative Assessment:No alternative routes have been developed for this Transition. The procedure has been designed to comply with FASI (North) requirements.Design Principle 12a:Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.NOT MET 		to existing ar	rangements	for	
Transition. The procedure has been designed to comply with FASI (North) requirements. Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload. NOT MET PARTIAL MET Summary of Qualitative Assessment: All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. This procedure has been designed to integrate with the		NOT MET	PARTIAL	MET	
to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload. Image: Controllers (ATCOs) workload Summary of Qualitative Assessment: All aircraft arrivals have previously required tactical routing from ATC from STAR to IAP. This procedure has been designed to integrate with the					
routing from ATC from STAR to IAP. This procedure has been designed to integrate with the	to minimise the need for aircraft vectoring to reduce Air	NOT MET	PARTIAL	MET	

Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.				

Design Principle Evaluation	0	PTION NO:	Baseline	
Option Name: Approaches Baseline (Do Nothing)		REJEC	CT	
<i>Description of Option:</i> Retain the current procedures, which include conventional and GNSS approaches. All procedures rely on ground-based infrastructure (NDB) including the GNSS based approaches; the Missed Approach Procedures for the extant RNAV approaches reference the NDB and are therefore assessed alongside the conventional approaches.				
Design Principle 1: Procedures must be designed to MOT meet acceptable levels of flight safety.	T MET	PARTIAL	MET	
Summary of Qualitative Assessment: No change. Current proceed	dures a	are safe.		
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	T MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> A number of the procedure the LPL NDB at 2,500 ft, followed by a 'teardrop' flight path to in				
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	T MET	PARTIAL	MET	
Summary of Qualitative Assessment: Current procedures were a account sensitive areas. The requirement to be lined-up for fination inevitable that some schools will be overflown during the proce	al appr			
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	T MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> A number of the procedure the LPL NDB at 2,500 ft, followed by a 'teardrop' flight path to in				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	T MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.				
Design Principle 6: Procedures should be designed to enable more continuous climbs.	T MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for approach procedures.				
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	T MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> The procedure is contained within existing airspace boundaries.				
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedures do n profile.	ot enable a c	continuous d	escent	
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> A number of the proceeding aircraft via the LPL NDB at 2,500 ft, followed by a the final approach.				
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rrangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Alternate procedures approach procedures.	s are not dev	eloped for in	ndividual	
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The majority of the p intervention to establish on the final approach.	procedures r	ely on ATC		
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Although the ground-based beacons are more accurate at closer ranges, the conventional procedures still rely on the pilot interpreting the information received and don't represent actual tracks flown.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> Regardless of the type of approach flown, the procedures are basically the same and follow the same planned routing.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.NOT METPARTIALMET				
Summary of Qualitative Assessment: No change to existing arrangements.				

Design Principle Evaluation		OPTION NO:	APPCH 1	
Option Name: Approach 27 Option 1		ACCE	РТ	
Description of Option: Join the procedure not below 3,000 ft via the IAF at LIV05 or NEW8. Flyby waypoint LIV02 onto final approach. MAP – Climb straight ahead to 2,000 ft. Turn right to flyby waypoints 0127GPM01, 0127GPM02 and 0127GPM03 then direct to hold at 0127LPL, not below 2,000 ft.	431 430 457 457 457 457 457 457 457 457 457 457	19650 (500) MAIN CTAP D 2500 355 20091 PPOOLAPP 195 1000 PPOOLAPP 1	DU EUUTOWWOOD WARRINGTON UVARRINGTON UVARRINGTON UVARRINGTON UVAR UVAR VVAR VVAR VVAR VVAR VVAR VVAR	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT ME	T PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has levels of flight safety.	oeen desigr	ned to meet ac	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT ME	T PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has loptimum aircraft performance and with the minimum pr				
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT ME	T PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure flies over, or close to, a number of schools in the built-up areas of Warrington and Runcorn on final approach. The missed approach procedure routes in the vicinity of a number of schools and hospitals in Liverpool at 2,000 ft.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT ME	T PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to be flown at optimum aircraft performance and with the minimum practicable track miles flown. The missed approach procedure overflies residential areas of Liverpool.				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT ME	T PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is tere existing operational performance, and capacity.	chnically fly	yable and mair	ntains	

Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for approach procedures.				
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is comboundaries.	tained withi	in existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be continuous descent profile.	een designed	d to enable a		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure repre track miles flown.	sents the mi	nimum prac	ticable	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	o existing ar	rangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Alternate procedures approach procedures.	s are not dev	eloped for in	ndividual	
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Aircraft carrying out the Missed Approach Procedure are likely to be in direct conflict with aircraft carrying out an approach procedure. The hold point is the same as is currently used, so although ATC tactical intervention will be required, it will be no different to current procedures.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.NOT METPARTIALMET				
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.				

Design Principle Evaluation		OPTION NO:	APPCH 2	
Option Name: Approach 27 Option 2		REJEC	CT	
<i>Description of Option:</i> Join the procedure not below 3,000 ft via the IAF at LIV05 or NEW8. Flyby waypoint LIV02 onto final approach.	(355) LIVERPO 452,(305) cathodral D 25001-3500 c CARSTON 0 TOME	MAIN CTA D 2500'35 PL C 1 PL	DO BURTONWOOD CON TWARRINGTON SA BOURD DO TO DUERS ERRY WER SYLTON	
MAP – Climb straight ahead to 2,000 ft. Turn left to flyby waypoints 0227GPM01, 0227GPM02 and 0227GPM03 then direct to hold at 0227LPL, not below 2,000 ft.	Constant and a second and a sec	100 100 100 390 100 100 426 100 100 431 100 100 431 100 100 526 100 100 526 100 100 526 100 100 526 100 100 526 100 100 526 100 576 576 100 500 0 100 100	VIP 12 VIP 12 VI	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure has be levels of flight safety.	een design	ed to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be optimum aircraft performance. Extended track miles are f Area R311. Alternate routing has been assessed as option	flown due			
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure flies over, or close to, a number of schools in the built-up areas of Warrington and Runcorn on final approach. The missed approach procedure routes in the vicinity of a number of schools in Bebington at 2,000 ft.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to be flown at optimum aircraft performance. The missed approach procedure briefly overflies a residential area of Bebington. The majority of the missed approach procedure is flown over rural or industrial areas.				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.			
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for ap	proach proce	edures.	
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The missed approach the south, although at this point it enters Hawarden ATZ a		exits CAS at	2,000 ft to
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b continuous descent profile.	een designed	d to enable a	
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: The missed approach routing in order to avoid Restricted Area R311.	n procedure	follows exte	nded
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rangements	for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Alternate procedures are not developed for individual approach procedures.			
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Aircraft carrying out the Missed Approach Procedure are likely to be in direct conflict with aircraft carrying out an approach procedure. The hold point is the same as is currently used, so although ATC tactical intervention will be required, it will be no different to current procedures.			

Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The missed approach procedure impacts on Hawarden ATZ and RMZ.				

The Missed Approach Procedure for this approach would have an adverse effect on Hawarden operations which is unlikely to be mitigated through agreed procedures. This option has therefore been rejected.

Design Principle Evaluation		OPTION NO:	APPCH 3	
Option Name: Approach 27 Option 3		ACCE	РТ	
 Description of Option: Join the procedure not below 2,000 ft via the IAF at 0327IAF1 or 0327IAF2. Flyby existing GNSS waypoint INVEB onto final approach. MAP – Climb straight ahead to 2,000 ft. Turn right to flyby waypoints 0327GPM01, 0327GPM02 and 0327GPM03 then direct to hold at 0327LPL, not below 2,000 ft (MAP replicates Approach 27 Option 1). 	A 27 Abasso A 27	C12300 A C53 (5060) CTA D 22001 1 CTA D 22001 3500 1 CTA D 22001 3500 1 CTA D 2601 426 1 CTA D 2601 426 1 CTA D 201 426 1 CTA D CTA D 1 CTA D CTA D 1 CTA CTA D 201 1 CTA CTA D D 1 CTA CTA D D 1 CTA	P BURYORU MOOD WARKING TON UNAN ING TON ERS FERRY TATION TATION VRP TATION TATION VRP TATION TATION VRP TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATION TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATIONA TATION	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure has b levels of flight safety.	een designe	ed to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> This procedure uses Intermediate Fix, thus increasing the number of track mile potential for aircraft to spend extended periods in level fli The missed approach procedure represents the minimum	es flown. T ight at 2,00	here is also th 0 ft on the ap	ie proach.	
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure flies over, or close to, a number of schools in the built-up areas of Weaverham, Warrington and Runcorn on final approach. The missed approach procedure routes in the vicinity of a number of schools and hospitals in Liverpool at 2,000 ft.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure overflies residential areas of Warrington and Runcorn, potentially in level flight at 2,000 ft. The missed approach procedure overflies residential areas of Liverpool, also at 2,000 ft.				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.			
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Not evaluated for ap	proach proce	edures.	
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is corboundaries.	itained withi	n existing ai	rspace
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The initial approach potential to be flown at a level altitude of 2,000 ft, depend	-		e
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> By using the existing track miles flown is higher than the minimum.	waypoint IN	IVEB, the nu	mber of
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rangements	for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Alternate procedures are not developed for individual approach procedures.			
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Aircraft carrying out the Missed Approach Procedure are likely to be in direct conflict with aircraft carrying out an approach procedure. The hold point is the same as is currently used, so although ATC tactical intervention will be required, it will be no different to current procedures.			

Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.				

Design Principle Evaluation		OPTION NO:	APPCH 4	
Option Name: Approach 09 Option 1		ACCE	РТ	
<i>Description of Option:</i> Join the procedure not below 2,500 ft via the IAF at LIV12 or LIV20 or the IF at LIV11. Flyby waypoint LIV11 onto final approach.	Hard Construction of the second secon	ADDITION OF A DISCOMPANY AND A DISCOMPAN	1-5500 murrerwood f 1-5500 murrerwood f 1-5500 widdewe to 1-500	
MAP – Climb straight ahead to 2,500 ft. Turn right to flyby waypoints 0109GPM01, 0109GPM02 and 0109GPM03 then direct to hold at 0109LPL, not below 2,500 ft.	ADD UNVEL AND ADD ADD ADD ADD ADD ADD ADD ADD ADD	A second	WP 15 41 WP 25	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has b levels of flight safety.	een design	ed to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure incorprofile, to be flown at optimum aircraft performance and path.				
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure flies over, or close to, a number of schools in residential areas of Heswall and Bebington on final approach. The missed approach procedure routes in the vicinity of a number of schools in Runcorn and Frodsham, not below 2,500 ft.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has been designed to incorporate a continuous descent profile and represents the most direct routing to minimise track miles flown.				
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is tec existing operational performance, and capacity.	hnically fly	able and main	itains	

Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for approach procedures.				
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is conboundaries.	ntained withi	in existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has b continuous descent profile.	een designee	d to enable a		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The final and missed the minimum number of track miles flown.	approach pi	rocedure rep	oresents	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing a	rrangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Alternate procedures approach procedures.	s are not dev	veloped for in	ndividual	
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Aircraft carrying out the Missed Approach Procedure are likely to be in direct conflict with aircraft carrying out an approach procedure. The hold point is the same as is currently used, so although ATC tactical intervention will be required, it will be no different to current procedures.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Aircraft carrying out the Missed Approach Procedure are likely to be in direct conflict with Manchester operations. ATC intervention may be required to ensure deconfliction between LJLA and Manchester traffic.				

Design Principle Evaluation		OPTION NO:	APPCH 5
Option Name: Approach 09 Option 2		ACCE	РТ
<i>Description of Option:</i> Join the procedure not below 2,500 ft via the IAF at LIV12 or LIV20 or the IF at LIV11. Flyby waypoint LIV11 onto final approach.			D1-3500 AURTOWNOOD H9-800FU AVRINGTON 600 550 900 VVP2 PROLES FERV VVP2 PROLES FERV VVP2 PR
MAP – Climb straight ahead to 2,500 ft. Turn left to flyby waypoints 0209GPM01, 0209GPM02 and 0209GPM03 then direct to hold at 0209LPL, not below 2,500 ft.	LAGES CLASS	A STATE OF	AVE AT A SALE OF
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT ME	T PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has levels of flight safety.	been desigr	ned to meet ac	ceptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT ME	T PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure incorprofile, to be flown at optimum aircraft performance and path.			
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools country parks, high risk industrial sites.	NOT ME	T PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure flies schools in residential areas of Heswall and Bebington on approach procedure routes in the vicinity of a number o and Widnes, not below 2,500 ft.	final appro	oach. The miss	ed
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT ME	T PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has continuous descent profile and represents the most dire flown, but overflies residential areas of Runcorn, Warrin	ct routing t	o minimise tra	
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT ME	T PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is te existing operational performance, and capacity.	chnically fly	yable and mair	ntains

Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Not evaluated for application of the second secon	proach proce	edures.	
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is conboundaries.	itained withi	in existing ai	rspace
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b continuous descent profile.	een designee	d to enable a	
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The final and missed the minimum number of track miles flown.	approach pi	rocedure rep	presents
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing a	rrangements	for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Alternate procedures approach procedures.	s are not dev	veloped for in	ndividual
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET
Summary of Qualitative Assessment: Aircraft carrying out are likely to be in direct conflict with aircraft carrying out point is the same as is currently used, so although ATC tac it will be no different to current procedures.	an approach	n procedure.	The hold
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET

<i>Summary of Qualitative Assessment:</i> Introduction of PBN accurate route keeping meaning tracks over the ground fl	-							
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET					
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.								
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET					
<i>Summary of Qualitative Assessment:</i> No impact on other a	viation oper	ators.						

Design Principle Evaluation		OPTION NO:	APPCH 6
Option Name: Approach 09 Option 3		ACCE	PT
 Description of Option: Join the procedure not below 2,500 ft via the IAF at LIV12 or LIV20 or the IF at LIV11. Flyby waypoint LIV11 onto final approach. MAP – Climb straight ahead to 2,500 ft. Turn 			
left to flyby waypoints 0209GPM01, 0209GPM02 and 0209GPM03 then direct to hold at LIV11(2), not below 2,500 ft.	PRICE AND	A COLORED SOLITATION DE COLORED SOLITATIO DE COLORED SOLITATICOLORED SOLITATICOLORED SOL	Ten and a second
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT ME	Г PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has levels of flight safety.	been desigr	ied to meet ac	ceptable
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT ME	Γ PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure incorpofile, to be flown at optimum aircraft performance an path. The Missed Approach Procedure routes the aircraprocedure.	d represents	the most dire	ct flight
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools country parks, high risk industrial sites.	NOT ME	Γ PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure flie schools in residential areas of Heswall and Bebington of approach procedure routes in the vicinity of a number of Huyton, Liverpool and Birkenhead, and over or close to including Alder Hey Children's Hospital, not below 2,50	n final appro f schools in hospitals in	ach. The miss Runcorn, War	ed rington,
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT ME	Γ PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has continuous descent profile and represents the most dire flown, but overflies residential areas of Runcorn, Warrin Birkenhead, not below 2,500 ft.	ect routing to	o minimise tra	ck miles
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT ME	Г PARTIAL	MET

<i>Summary of Qualitative Assessment:</i> The procedure is tech existing operational performance, and capacity.	hnically flyal	ble and main	itains
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Not evaluated for application of the set	proach proce	edures.	
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure is conboundaries.	itained withi	n existing ai	rspace
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b continuous descent profile.	een designed	l to enable a	
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The approach proceed number of track miles flown. Although the Hold for the M further than the current conventional hold position, the rectowards the approach procedure.	issed Approa	ach Procedu	re is
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rangements	for
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> Alternate procedures approach procedures.	s are not dev	eloped for in	ndividual
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET
<i>Summary of Qualitative Assessment:</i> The procedure has b required input from ATC.	een designed	l to minimis	e the

Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET							
<i>Summary of Qualitative Assessment:</i> Introduction of PBN accurate route keeping meaning tracks over the ground fl	1									
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET							
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.										
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET							
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.										

4 Technical Criteria Evaluation of Design Options

4.1 Technical Criteria Evaluation

The technical criteria detailed in Appendix F to CAP 1616 form the basic structure on which the change sponsor builds a formal airspace change proposal. The tables in this section show how each of the developed options complies with the technical criteria detailed in Appendix F to CAP 1616, identifying where plans will need to be established to resolve any issues that may arise, as follows:

- A green box indicates that the specified option is **compliant** with or has no impact on the relevant technical criteria.
- An orange box means that the specified option is **not fully compliant** with the relevant technical criteria but mitigation is possible through agreed operating procedures or agreements.
- A red box indicates that the specified option is **not compliant** with the relevant technical criteria and that there will be no possible plans available to mitigate the issue.



4.2 Standard Instrument Departures

Oper	ational Impact	SID 27 AGGER Option 1	SID 27 AGGER Option 2	SID 27 AGGER Option 3	SID 27 WAL Option 1	SID 27 WAL Option 2	SID 27 TEMP2	SID 09 AGGER Option 1	SID 09 AGGER Option 2	SID 09 CAVEN Option 1	SID 09 CAVEN Option 2	SID 09 CAVEN Option 3	SID 09 CAVEN Option 4	SID 09 CORKA Option 1	SID 09 CORKA Option 2	SID 09 CORKA Option 3
	An analysis of the impact of the change on all airspace users, airfields and traffic levels must be provided, and include an outline concept of operations describing how operations within the new airspace will be managed. Specifically, consideration should be given to:					Evid	lence	of con	ıplian	ice/ m	nitigat	tion				
а	Impact on IFR general air traffic and operational air traffic or on VFR General Aviation (GA) traffic flow in or through the area															
b	Impact on VFR operations (including VFR routes where applicable)															

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ter. Easier	. Friendlier.											r				
		SID 27 AGGER Option 1	SID 27 AGGER Option 2	SID 27 AGGER Option 3	SID 27 WAL Option 1	SID 27 WAL Option 2	SID 27 TEMP2	SID 09 AGGER Option 1	SID 09 AGGER Option 2	SID 09 CAVEN Option 1	SID 09 CAVEN Option 2	SID 09 CAVEN Option 3	SID 09 CAVEN Option 4	SID 09 CORKA Option 1	SID 09 CORKA Option 2	SID 09 CORKA Option 3
С	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds															
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	1	1	1, 2	1	1	1,2	1	1	1	1, 2	1, 2	1	1	1	1
e	Any flight planning restrictions and/or route requirements															
Supp	orting Infrastructure/Resources															
	General Requirements					Evic	lence	of cor	npliar	nce/ n	nitiga	tion				
а	Evidence to support RNAV and conventional navigation as appropriate															
b	Evidence to support primary and secondary surveillance radar (SSR)															

 ¹ Operating agreements required with Manchester Airport and NATS
 ² Operating agreement may be required with Hawarden

LiverpoolJohn LennonAirport

ence of communications infrastructure iding R/T coverage						SID	SID 09 AGGER Option 1	SID 09 AGGER Option	SID 09 CAVEN Option 1	SID 09 CAVEN Option	SID 09 CAVEN Option 3	SID 09 CAVEN Option 4	SID 09 CORKA Option	SID 09 CORKA Option	SID 09 CORKA Option
effects of failure of equipment, redures and/or personnel with respect te overall management of the airspace t be considered	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
ctive responses to the failure modes will enable the functions associated airspace to be carried out	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
ear statement on SSR code assignment lirements															
ence of sufficient numbers of suitably ified staff required to provide air traffic ices following the implementation of a nge															
	tive responses to the failure modes will enable the functions associated airspace to be carried out ar statement on SSR code assignment irements ence of sufficient numbers of suitably ified staff required to provide air traffic ices following the implementation of a	 the considered the considered the considered the considered the considered attive responses to the failure modes will enable the functions associated airspace to be carried out ar statement on SSR code assignment irements ence of sufficient numbers of suitably ified staff required to provide air traffic ices following the implementation of a ge 	tive responses to the failure modes will enable the functions associated airspace to be carried out44ar statement on SSR code assignment irementsence of sufficient numbers of suitably ified staff required to provide air traffic ices following the implementation of a ge	tive responses to the failure modes will enable the functions associated airspace to be carried out444ar statement on SSR code assignment irementsImage: Code assignment irementsImage: Code assignment airspace to be carried outImage: Code assignment irementsImage: Code assignment irements	tive responses to the failure modes will enable the functions associated airspace to be carried out ar statement on SSR code assignment irements ence of sufficient numbers of suitably ified staff required to provide air traffic ices following the implementation of a ge	tive responses to the failure modes will enable the functions associated airspace to be carried out ar statement on SSR code assignment irements ence of sufficient numbers of suitably ified staff required to provide air traffic ices following the implementation of a ge	tive responses to the failure modes will enable the functions associated airspace to be carried out444444ar statement on SSR code assignment irementsImage: Code assignment i	the consideredImage: Second Secon	tive responses to the failure modes will enable the functions associated airspace to be carried out ar statement on SSR code assignment irements ence of sufficient numbers of suitably ified staff required to provide air traffic cess following the implementation of a ge	tive responses to the failure modes will enable the functions associated airspace to be carried out 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	the consideredImage: Second Secon	tive responses to the failure modes will enable the functions associated airspace to be carried out444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444 <td>tive responses to the failure modes will enable the functions associated airspace to be carried out444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444<td>the consideredImage: Second secon</td><td>the consideredImage: Second Secon</td></td>	tive responses to the failure modes will enable the functions associated airspace to be carried out444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444444 <td>the consideredImage: Second secon</td> <td>the consideredImage: Second Secon</td>	the consideredImage: Second secon	the consideredImage: Second Secon

³ Operating procedures will need to be developed in case of failures ⁴ Operating procedures will need to be developed in case of failures

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aster. Easie	r. Friendlier.	SID 27 AGGER Option 1	SID 27 AGGER Option 2	SID 27 AGGER Option 3	SID 27 WAL Option 1	SID 27 WAL Option 2	SID 27 TEMP2	SID 09 AGGER Option 1	SID 09 AGGER Option 2	SID 09 CAVEN Option 1	SID 09 CAVEN Option 2	SID 09 CAVEN Option 3	SID 09 CAVEN Option 4	SID 09 CORKA Option 1	SID 09 CORKA Option 2	SID 09 CORKA Option 3
	General Requirements					Evid	ence	of con	nplian	ce/m	itigat	ion				
a	The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and non-radar environments															
b	Where an additional airspace structure is required for radar control purposes, the dimensions shall be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer.															
с	The Air Traffic Management system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures															



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		SID 27 AGGER Option 1	SID 27 AGGER Option 2	SID 27 AGGER Option 3	SID 27 WAL Option 1	SID 27 WAL Option 2	SID 27 TEMP2	SID 09 AGGER Option 1	SID 09 AGGER Option 2	SID 09 CAVEN Option 1	SID 09 CAVEN Option 2	SID 09 CAVEN Option 3	SID 09 CAVEN Option 4	SID 09 CORKA Option 1	SID 09 CORKA Option 2	SID 09 CORKA Option 3
d	Air traffic control procedures are to ensure required separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures															
e	Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable															
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation															
g	Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified															

	. Friendlier.	SID 27 AGGER Option 1	SID 27 AGGER Option 2	SID 27 AGGER Option 3	SID 27 WAL Option 1	SID 27 WAL Option 2	SID 27 TEMP2	SID 09 AGGER Option 1	SID 09 AGGER Option 2	SID 09 CAVEN Option 1	SID 09 CAVEN Option 2	SID 09 CAVEN Option 3	SID 09 CAVEN Option 4	SID 09 CORKA Option 1	SID 09 CORKA Option 2	SID 09 CORKA Option 3
h	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace															
i	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered	5	5	5, 6	5	5	5, 6	5	5	5	5, 6	5, 6	5	5	5	5
j	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests															
	ATS Route Requirements	Evidence of compliance/ mitigation														

⁵ Operating agreements required with Manchester Airport and NATS ⁶ Operating agreement may be required with Hawarden

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Lenne	onAir	port	
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			SID 27 AGGER Option 1	SID 27 AGGER Option 2	SID 27 AGGER Option 3	SID 27 WAL Option 1	SID 27 WAL Option 2	SID 27 TEMP2	SID 09 AGGER Option 1	SID 09 AGGER Option 2	SID 09 CAVEN Option 1	SID 09 CAVEN Option 2	SID 09 CAVEN Option 3	SID 09 CAVEN Option 4	SID 09 CORKA Option 1	SID 09 CORKA Option 2	SID 09 CORKA Option 3
	a	There must be sufficient accurate navigational guidance based on in-line VOR/DME or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/Eurocontrol standards															
	b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task															
	с	All new routes should be designed to accommodate P-RNAV navigational requirements															
		Terminal Airspace Requirements					Evid	lence	of com	plian	ice/ m	nitigat	ion				
	a	The airspace structure shall be of sufficient dimensions to contain appropriate procedures, holding patterns and their associated protected areas															

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		SID 27 AGGER Option 1	SID 27 AGGER Option	SID 27 AGGER Option	SID 27 WAL Option 1	SID 27 WAL Option 2	SID 27 TEMP2	SID 09 AGGER Option 1	SID 09 AGGER Option	SID 09 CAVEN Option 1	SID 09 CAVEN Option	SID 09 CAVEN Option	SID 09 CAVEN Option	SID 09 CORKA Option	SID 09 CORKA Option	SID 09 CORKA Option
b	There shall be effective integration of departure and arrival routes associated with the airspace structure and linking to designated runways and published instrument approach procedures (IAPs)															
С	Where possible, there shall be suitable linking routes between the proposed terminal airspace and existing en-route airspace structure															
d	The airspace structure shall be designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace															
e	Suitable arrangements for the control of all classes of aircraft (including transits) operating within or adjacent to the airspace in question, in all meteorological conditions and under all flight rules, shall be in place or will be put into effect by the change sponsor upon implementation of the change in question (if these do not already exist)															

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		SID 27 A(SID 27 A(SID 27 A(SID 27 W	SID 27 W	SID 27 TEMP2	SID 09 A0	SID 09 A(SID 09 CA	SID 09 CA	SID 09 CA	SID 09 CA	SID 09 CC	SID 09 CC	SID 09 CC
f	The change sponsor shall ensure that sufficient visual reference points are established within or adjacent to the subject airspace to facilitate the effective integration of VFR arrivals, departures and transits of the airspace with IFR traffic															
g	There shall be suitable availability of radar control facilities															
h	All new procedures should, wherever possible, incorporate Continuous Descent Approach (CDA) profiles after aircraft leave the holding facility associated with that procedure															
	Off-Route Airspace Requirements					Evid	ence	of con	nplian	ice/ n	nitigat	tion				
a	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered															

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			SID 27 AGGER Option 1	SID 27 AGGER Option 2	SID 27 AGGER Option 3	SID 27 WAL Option 1	SID 27 WAL Option 2	SID 27 TEMP2	SID 09 AGGER Option 1	SID 09 AGGER Option 2	SID 09 CAVEN Option 1	SID 09 CAVEN Option 2	SID 09 CAVEN Option 3	SID 09 CAVEN Option 4	SID 09 CORKA Option 1	SID 09 CORKA Option 2	SID 09 CORKA Option 3
b	(military low flyin microlight site etc airspace structure operating agreem procedures can b	ny other aviation activity ng, gliding, parachuting, c) in the vicinity of the new e and no suitable nents or air traffic control e devised, the change to resolve any conflicting															
Envi	ronmental Assess	ment															
	Theme	Content	Assessment of Impact														
а	Assessment of noise impacts	Consideration of noise impacts	7	8		9			10		11	10		12	10	11	
b	Assessment of CO ₂ emissions	Consideration of the impacts on CO ₂ emissions															

⁷ Initial turn immediately after take-off will require high engine power setting to achieve

 ⁸ Routing over Liverpool city
 ⁹ Extended routing over Birkenhead

¹⁰ Routing over Runcorn immediately after take-off

¹¹ Routing over Widnes, Huyton and Liverpool city

¹² Routing over Huyton and Liverpool city

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			SID 27 AGGER Option 1	SID 27 AGGER Option 2	SID 27 AGGER Option 3	SID 27 WAL Option 1	SID 27 WAL Option 2	SID 27 TEMP2	SID 09 AGGER Option 1	SID 09 AGGER Option 2	SID 09 CAVEN Option 1	SID 09 CAVEN Option 2	SID 09 CAVEN Option 3	SID 09 CAVEN Option 4	SID 09 CORKA Option 1	SID 09 CORKA Option 2	SID 09 CORKA Option 3
С	Assessment of local air quality	Consideration of the impacts on local air quality															
d	Assessment of impacts upon tranquillity	Consideration of any impact upon tranquillity, notably on AONB or National Parks															

Table 4 – Technical Criteria Evaluation of Standard Instrument Departures

One	rational Impact	Trans 27 DIOUF	Trans 27 NOMSU	Trans 27 VEGUN	Trans 27 VEGUN (CC05)	Trans 09 DIOUF	Trans 09 NOMSU	Trans 09 VEGUN	
ope	An analysis of the impact of the change on all airspace users, airfields and traffic levels must be provided, and include an outline concept of operations describing how operations within the new airspace will be managed. Specifically, consideration should be given to:	Evidence of compliance/ mitigation							
а	Impact on IFR general air traffic and operational air traffic or on VFR General Aviation (GA) traffic flow in or through the area								
b	Impact on VFR operations (including VFR routes where applicable)								
С	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds								
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	13	13	13	13	13	13	13	
е	Any flight planning restrictions and/or route requirements								

 $^{^{\}rm 13}$ Operating agreements required with Manchester Airport and NATS

	Trans 27 DIOUF	Trans 27 NOMSU	Trans 27 VEGUN	Trans 27 VEGUN (CC05)	Trans 09 DIOUF	Trans 09 NOMSU	Trans 09 VEGUN
	F	Fvidenc	re of co	mnlian	ce/mi	tigatior	
		1 nucine		mpnun		ingution	•
avigation as appropriate							
rveillance radar (SSR)							
luding R/T coverage							
and/or personnel with respect							

Supporting Infrastructure/Resources

	General Requirements]	Eviden	ce of co	mplian	ice/ mi	tigatio	1
а	Evidence to support RNAV and conventional navigation as appropriate							
b	Evidence to support primary and secondary surveillance radar (SSR)							
С	Evidence of communications infrastructure including R/T coverage							
d	The effects of failure of equipment, procedures and/or personnel with respect to the overall management of the airspace must be considered							
e	Effective responses to the failure modes that will enable the functions associated with airspace to be carried out							
f	A clear statement on SSR code assignment requirements							
g	Evidence of sufficient numbers of suitably qualified staff required to provide air traffic services following the implementation of a change							
Airsp	ace and Infrastructure							
	General Requirements]	Eviden	ce of co	mplian	ice/ mi	tigatio	1

ıster. Easier.	Friendlier.	Ľ.	n.	N	N (CC05)	н	N.	Z
		Trans 27 DIOUF	Trans 27 NOMSU	Trans 27 VEGUN	Trans 27 VEGUN (CC05)	Trans 09 DIOUF	Trans 09 NOMSU	Trans 09 VEGUN
a	The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and non-radar environments							
b	Where an additional airspace structure is required for radar control purposes, the dimensions shall be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer.							
с	The Air Traffic Management system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures							
d	Air traffic control procedures are to ensure required separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures							
e	Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable							
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation							

rster. Easier.	Friendlier.	is 27 DIOUF	IS 27 NOMSU	is 27 VEGUN	Trans 27 VEGUN (CC05)	Trans 09 DIOUF	Trans 09 NOMSU	Trans 09 VEGUN
		Trans 2	Trans 1	Trans 2	Trai	Traı	Trai	Trai
g	Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified							
h	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace							
i	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered	14	14	14	14	14	14	14
j	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests							
	ATS Route Requirements	1	Eviden	ce of co	mplian	ce/ mi	tigation	1
a	There must be sufficient accurate navigational guidance based on in-line VOR/DME or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/Eurocontrol standards							

¹⁴ Operating agreements required with Manchester Airport and NATS

ster. Easier.	Friendlier.	Trans 27 DIOUF	Trans 27 NOMSU	Trans 27 VEGUN	Trans 27 VEGUN (CC05)	Trans 09 DIOUF	Trans 09 NOMSU	Trans 09 VEGUN
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task							
С	All new routes should be designed to accommodate P-RNAV navigational requirements							
		Evidence of compliance/ mitigation						
	Terminal Airspace Requirements	I	Eviden	ce of co	mplian	ce/ mi	tigatio	n
a	Terminal Airspace RequirementsThe airspace structure shall be of sufficient dimensions to contain appropriate procedures, holding patterns and their associated protected areas	I	Eviden	ce of co	mplian	ice/ mi	tigation	n
a b	The airspace structure shall be of sufficient dimensions to contain appropriate	I	Eviden	ce of co	mplian	ce/ mi	tigation	n
	The airspace structure shall be of sufficient dimensions to contain appropriate procedures, holding patterns and their associated protected areas There shall be effective integration of departure and arrival routes associated with the airspace structure and linking to designated runways and published	I	Eviden	ce of co	mplian	ce/ mi	tigation	

ister. Easier.	Friendlier.		1					
		Trans 27 DIOUF	Trans 27 NOMSU	Trans 27 VEGUN	Trans 27 VEGUN (CC05)	Trans 09 DIOUF	Trans 09 NOMSU	Trans 09 VEGUN
e	Suitable arrangements for the control of all classes of aircraft (including transits) operating within or adjacent to the airspace in question, in all meteorological conditions and under all flight rules, shall be in place or will be put into effect by the change sponsor upon implementation of the change in question (if these do not already exist)							
f	The change sponsor shall ensure that sufficient visual reference points are established within or adjacent to the subject airspace to facilitate the effective integration of VFR arrivals, departures and transits of the airspace with IFR traffic							
g	There shall be suitable availability of radar control facilities							
h	All new procedures should, wherever possible, incorporate Continuous Descent Approach (CDA) profiles after aircraft leave the holding facility associated with that procedure							
	Off-Route Airspace Requirements	Evidence of compliance/ mitigation			I			
а	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered							

ster. Easier. Friendlier.										
ster, Easter,	Friendlief.		Trans 27 DIOUF	Trans 27 NOMSU	Trans 27 VEGUN	Trans 27 VEGUN (CC05)	Trans 09 DIOUF	Trans 09 NOMSU	Trans 09 VEGUN	
b	b Should there be any other aviation activity (military low flying, gliding, parachuting, microlight site etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests									
Envir	onmental Assessment									
	Theme	Content		1	Assessr	nent of	Impac	t		
а	Assessment of noise impacts	Consideration of noise impacts								
b	Assessment of CO ₂ emissions	Consideration of the impacts on CO ₂ emissions								
С	Assessment of local air quality	Consideration of the impacts on local air quality								
d	Assessment of impacts upon tranquillity	Consideration of any impact upon tranquillity, notably on Areas of Outstanding Natural Beauty or National Parks								

Table 5 – Technical Criteria Evaluation of Transitions

4.4 Instrument Approach Procedures

One	rational Impact	Approach 27 Option 1	Approach 27 Option 2	Approach 27 Option 3	Approach 09 Option 1	Approach 09 Option 2	Approach 09 Option 3
I	An analysis of the impact of the change on all airspace users, airfields and traffic levels must be provided, and include an outline concept of operations describing how operations within the new airspace will be managed. Specifically, consideration should be given to:	Evid	ence o	f comp	liance/	mitiga	ition
а	Impact on IFR general air traffic and operational air traffic or on VFR General Aviation (GA) traffic flow in or through the area						
b	Impact on VFR operations (including VFR routes where applicable)						
С	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds						
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace		15				
e	Any flight planning restrictions and/or route requirements						
Supp	orting Infrastructure/Resources						

¹⁵ Operating arrangements with Hawarden will be required to facilitate Missed Approach Procedure

ster. Easier.	Friendlier.						
		Approach 27 Option 1	Approach 27 Option 2	Approach 27 Option 3	Approach 09 Option 1	Approach 09 Option 2	Approach 09 Option 3
	General Requirements	Evid	ence of	f comp	liance/	mitiga	ition
а	Evidence to support RNAV and conventional navigation as appropriate						
b	Evidence to support primary and secondary surveillance radar (SSR)						
с	Evidence of communications infrastructure including R/T coverage						
d	The effects of failure of equipment, procedures and/or personnel with respect to the overall management of the airspace must be considered						
e	Effective responses to the failure modes that will enable the functions associated with airspace to be carried out						
f	A clear statement on SSR code assignment requirements						
g	Evidence of sufficient numbers of suitably qualified staff required to provide air traffic services following the implementation of a change						
Airsp	ace and Infrastructure						

ISTOF. EQSIO	r. Friendlier.	Approach 27 Option 1	Approach 27 Option 2	Approach 27 Option 3	Approach 09 Option 1	Approach 09 Option 2	Approach 09 Option 3
	General Requirements	Evid	ence of	compl	iance/	mitiga	tion
a	The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and non-radar environments		16				
b	Where an additional airspace structure is required for radar control purposes, the dimensions shall be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer.		17				
C	The Air Traffic Management system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures						
d	Air traffic control procedures are to ensure required separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures						
e	Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable						

 ¹⁶ MAP not fully contained within CAS
 ¹⁷ No additional airspace available; procedure infringes Hawarden ATZ/RMZ

ter. Easier.	Friendlier.						
		Approach 27 Option 1	Approach 27 Option 2	Approach 27 Option 3	Approach 09 Option 1	Approach 09 Option 2	Approach 09 Option 3
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation						
g	Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified						
h	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace						
i	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered	18	18, 19	18	18	18	18
j	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests		19				
	ATS Route Requirements	Evid	ence o	f comp	liance/	mitiga	ition

 ¹⁸ Operating agreements required with Manchester Airport and NATS
 ¹⁹ Operating arrangements with Hawarden will be required to facilitate Missed Approach Procedure

ster. Easier	Friendlier.						
		Approach 27 Option 1	Approach 27 Option 2	Approach 27 Option 3	Approach 09 Option 1	Approach 09 Option 2	Approach 09 Option 3
а	There must be sufficient accurate navigational guidance based on in-line VOR/DME or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/Eurocontrol standards						
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task						
с	All new routes should be designed to accommodate P-RNAV navigational requirements						
	Terminal Airspace Requirements	Evid	ence of	f comp	liance/	mitiga	tion
а	The airspace structure shall be of sufficient dimensions to contain appropriate procedures, holding patterns and their associated protected areas		20				
b	There shall be effective integration of departure and arrival routes associated with the airspace structure and linking to designated runways and published instrument approach procedures (IAPs)						
с	Where possible, there shall be suitable linking routes between the proposed terminal airspace and existing en-route airspace structure						
d	The airspace structure shall be designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace						

 $^{\rm 20}$ MAP not fully contained within CAS

ister. Easier.	Friendlier.						
		Approach 27 Option 1	Approach 27 Option 2	Approach 27 Option 3	Approach 09 Option 1	Approach 09 Option 2	Approach 09 Option 3
e	Suitable arrangements for the control of all classes of aircraft (including transits) operating within or adjacent to the airspace in question, in all meteorological conditions and under all flight rules, shall be in place or will be put into effect by the change sponsor upon implementation of the change in question (if these do not already exist)						
f	The change sponsor shall ensure that sufficient visual reference points are established within or adjacent to the subject airspace to facilitate the effective integration of VFR arrivals, departures and transits of the airspace with IFR traffic						
g	There shall be suitable availability of radar control facilities						
h	All new procedures should, wherever possible, incorporate Continuous Descent Approach (CDA) profiles after aircraft leave the holding facility associated with that procedure						
	Off-Route Airspace Requirements	Evidence of compliance/ mitigation			tion		
а	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered		21				

²¹ Operating arrangements with Hawarden will be required to facilitate Missed Approach Procedure

ter. Eαsier.	Friendlier.		Approach 27 Option 1	Approach 27 Option 2	Approach 27 Option 3	Approach 09 Option 1	Approach 09 Option 2	Approach 09 Option 3
b	microlight site etc) in the vicin	tion activity (military low flying, gliding, parachuting, ity of the new airspace structure and no suitable affic control procedures can be devised, the change y conflicting interests						
Envir	onmental Assessment							
	Theme	Content	Asses	sment	of Imp	act		
а	Assessment of noise impacts	Consideration of noise impacts	22		23		24	25
b	Assessment of CO ₂ emissions	Consideration of the impacts on CO ₂ emissions						
С	Assessment of local air quality	Consideration of the impacts on local air quality						
d	Assessment of impacts upon tranquillity	Consideration of any impact upon tranquillity, notably on Areas of Outstanding Natural Beauty or National Parks						

Table 6 – Technical Criteria Evaluation of Instrument Approach Procedures

²² The Missed Approach Procedure overflies residential areas of Liverpool

²³ Current procedures route via NDB(L) LPL and include 'teardrop' routing onto approach

²⁴ The Missed Approach Procedure overflies residential areas of Runcorn, Warrington and Widnes

²⁵ The Missed Approach Procedure overflies residential areas of Runcorn, Warrington, Liverpool and Birkenhead

5 Updated Designs Following Engagement

5.1 Stakeholder Evaluation of Design Options

Following a review of the design options by the stakeholders that had contributed to the development of the Design Principles, 3 alternate options have been developed and included in the Design Principle Evaluation and Technical Criteria Evaluation. Table 7 contains a summary of the post-engagement options under consideration.

Procedure	Basic Description
Post-Engagement SID 27 AGGER	This option includes a right hand turn direct to AGGER that remains over the River Mersey during the initial turn after take-off. The nominal routing is between the routing taken by SID 27 AGGER options 1 and 2.
Post-Engagement Approach 27	The initial approach remains the same as Approach 27 options 1 and 2. The position of the hold has been moved to a position over the sea to the west of LJLA in the vicinity of Wallasey.
Post-Engagement Approach 09	This procedure is the same as Approach 09 option 3 except that the direction of the hold has been adjusted so that the aircraft will remain over the sea when in the hold.

Table 7 – Summary of Post-Engagement Options Under Consideration

A summary of how these options have responded to the Design Principles is included at Table 8 below.

	Post-Engagement SID27 AGGER	Post-Engagement Approach 27	Post-Engagement Approach 09
DP 1			
DP 2			
DP 3			
DP 4a			
DP 4b			
DP6			
DP 7a			
DP 7b			
DP 9			
DP 10			
DP 11			
DP 12a			
DP 12b			
DP 14			
DP 15			

Table 8 – Design Principle Evaluation Overview of Post-Engagement Options

5.2 Design Principle Evaluation of Post-Engagement Design Options

Design Principle Evaluation		OPTION NO	: PE 1		
Option Name: Runway 27 SID AGGER Post-Engagement		ACCEP	Т		
Description of Option: Climb straight ahead then turn right to fly direct to overfly AGGER, achieving a height of approximately 11,000 ft by AGGER.					
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> The procedure has be levels of flight safety.	een designe	d to meet acco	eptable		
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> The procedure has be optimum aircraft performance and represents the most di			at		
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> The procedure remains the initial right hand turn after take-off. A school and a hoc close to the planned flightpath; aircraft will be above approximation of the planned flightpath; aircraft will be above approximation of the planned flightpath; aircraft will be above approximation of the planned flightpath; aircraft will be above approximation of the planned flightpath; aircraft will be above approximation of the planned flightpath; aircraft will be above approximation of the planned flightpath; aircraft will be above approximation of the planned flightpath of the planned	spital, with	in built-up are	eas, are		
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET		
<i>Summary of Qualitative Assessment:</i> The procedure is designed to incorporate a continuous climb profile to minimise the impact of noise. Routing takes the aircraft over populated areas of Liverpool but will be above approximately 4,000 ft before flying over this area. Routing to avoid populated areas would have an adverse effect on DP 2 and DP 9.					
Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET		

<i>Summary of Qualitative Assessment:</i> The procedure is technically flyable and maintains existing operational performance, and capacity.				
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure incor	porates a co	ntinuous clir	nb profile.	
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is corboundaries.	itained withi	n existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for SII	Ds.			
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: This route represent	s the most d	irect track to	O AGGER.	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing ar	rangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Option to route to th AGGER – to be assessed as an alternative SID option.	e south of th	e airport to :	route to	
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Although the procedure has been designed to integrate with the en-route structure, the size and complexity of the airspace around LJLA means that there is potential conflict between this SID and other LJLA procedures, which may lead to an increase in ATC workload.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	

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<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.					
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET		
Summary of Qualitative Assessment: Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.					
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.NOT METPARTIALMET					
Summary of Qualitative Assessment: No impact on other aviation operators.					

Design Principle Evaluation		OPTION NO): PE 2	
Option Name: Approach 27 Post-Engagement		ACCEI	РТ	
 Description of Option: Join the procedure not below 3,000 ft via the IAF at LIV05 or NEW8. Flyby waypoint LIV02 onto final approach. MAP – Climb straight ahead to 2,500 ft. Turn right direct to hold oversea, not below 2,500 ft. 	The second secon			
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has blevels of flight safety.	een designe	d to meet acc	eptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Positioning the hold an increase in track miles flown. However, the climb stra approach will reduce the cockpit workload, allowing the issues that may have caused an unsuccessful landing. An would have an adverse effect on DP 3 and DP 4a.	ight ahead af pilots the tim	fter the misse to deal wit	ed h any	
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure flies over, or close to, a number of schools in the built-up areas of Warrington and Runcorn on final approach. The missed approach procedure routes over Eastham Country Park and in the vicinity of a number of schools in Bebington and Birkenhead at or above 2,500 ft. Amending the position of the hold would have a different effect on this DP as well as an adverse effect on DP 2 and DP 4a.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment The procedure has be optimum aircraft performance. The missed approach pro residential area of Bebington and Birkenhead. The major procedure is flown over rural parts of the Wirral and the Amending the position of the hold would have a different	ocedure brief ity of the mis hold is positi	ly overflies a ssed approac oned over th	h	

Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is tec existing operational performance, and capacity.	hnically flya	ble and mair	ntains	
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for ap	proach proce	edures.		
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is cor boundaries.	ntained withi	in existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has b continuous descent profile.	een designee	d to enable a		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Positioning the hold an increase in track miles flown. However, the climb strat approach will reduce the cockpit workload, allowing the p issues that may have caused an unsuccessful landing. Am would have a different effect on this DP as well as an adve	ight ahead af pilots the tim ending the p	fter the miss le to deal wit osition of th	ed th any e hold	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required to Controlled Airspace.	to existing an	rrangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Alternate procedures are not developed for individual approach procedures.				
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> The procedure has been designed to minimise the required input from ATC.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: No impact on other aviation operators.				

Design Principle Evaluation		OPTION NO	D: PE 3	
Option Name: Approach 09 Post-Engagement		ACCE	PT	
<i>Description of Option:</i> Join the procedure not below 2,500 ft via the IAF at LIV12 or LIV20 or the IF at LIV11. Flyby waypoint LIV11 onto final approach.	FFC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC-3500 FC			
MAP – Climb straight ahead to 2,500 ft. Turn left direct to hold oversea, not below 2,500 ft.			THAN STORES	
Design Principle 1: Procedures must be designed to meet acceptable levels of flight safety.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure has be levels of flight safety.	een designe	d to meet acc	ceptable	
Design Principle 2: Procedures must be designed to minimise aircraft emissions to reduce air pollution.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure incorporates a continuous descent profile, to be flown at optimum aircraft performance and represents the most direct flight path. The Missed Approach Procedure routes the aircraft back to the re-join the approach procedure with the hold positioned over the sea.				
Design Principle 3: Procedures should be designed to avoid overflight of sensitive areas, e.g. hospitals, schools, country parks, high risk industrial sites.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure flies over, or close to, a number of schools in residential areas of Heswall and Bebington on final approach. The missed approach procedure routes in the vicinity of a number of schools in Runcorn, Warrington, Huyton, Liverpool and Birkenhead, and over or close to hospitals in Prescot and Liverpool, including Alder Hey Children's Hospital, not below 2,500 ft. Alternate routing to the hold would have an adverse effect on DP 2, DP 4a and DP 9.				
Design Principle 4a: Procedures must be designed to minimise the impact of noise below 7,000ft.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: The procedure has be continuous descent profile and represents the most direct flown, but overflies residential areas of Runcorn, Warring Birkenhead, not below 2,500 ft. The hold is positioned so Alternate routing would have an adverse effect on DP 2, D	t routing to r ton, Huyton, aircraft rem	ninimise trad Liverpool an ain over the	ck miles 1d	

Design Principle 4b: Procedures should be designed to be technically flyable and maintain existing operational performance, and capacity.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is tech existing operational performance, and capacity.	hnically flyal	ble and mair	ntains	
Design Principle 6: Procedures should be designed to enable more continuous climbs.	NOT MET	PARTIAL	MET	
Summary of Qualitative Assessment: Not evaluated for app	proach proce	edures.		
Design Principle 7a: Procedures should be designed to fit within existing airspace constraints and boundaries.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure is conboundaries.	tained withi	n existing ai	rspace	
Design Principle 7b: Procedures should be designed to enable more continuous descents.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The procedure has be continuous descent profile.	een designed	l to enable a		
Design Principle 9: Procedures should be designed that minimise the number of track miles flown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> The approach proceed number of track miles flown. Although the Hold for the M further than the current conventional hold position, the rectowards the approach procedure.	issed Approa	ach Procedu	re is	
Design Principle 10: If the design of the new procedures requires a smaller volume of airspace, airspace design or classification should be altered for the benefit of other airspace users.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No change required t Controlled Airspace.	to existing ar	rangements	for	
Design Principle 11: Procedures should be developed to allow for alternative routes to offer respite.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Alternate procedures are not developed for individual approach procedures.				
Design Principle 12a: Procedures should be designed to minimise the need for aircraft vectoring to reduce Air Traffic Controllers (ATCOs) workload.	NOT MET	PARTIAL	MET	

<i>Summary of Qualitative Assessment:</i> The procedure has been designed to minimise the required input from ATC.				
Design Principle 12b: Procedures should be designed to concentrate routes to minimise the numbers overflown.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 14: Procedures should be designed to ensure predictability of tracks for consistency of operations.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> Introduction of PBN procedures will lead to more accurate route keeping meaning tracks over the ground flown will be more consistent.				
Design Principle 15: Procedures should be designed to include alternative routes to avoid other aviation operators.	NOT MET	PARTIAL	MET	
<i>Summary of Qualitative Assessment:</i> No impact on other aviation operators.				



5.3 Post-Engagement Design Options Technical Criteria Evaluation

		Post-Engagement SID27 AGGER	Post-Engagement Approach 27	Post-Engagement Approach 09
Ope	rational Impact			
	An analysis of the impact of the change on all airspace users, airfields and traffic levels must be provided, and include an outline concept of operations describing how operations within the new airspace will be managed. Specifically, consideration should be given to:	Evidence of compliance mitigation		oliance/
а	Impact on IFR general air traffic and operational air traffic or on VFR General Aviation (GA) traffic flow in or through the area			
b	Impact on VFR operations (including VFR routes where applicable)			
С	Consequential effects on procedures and capacity, i.e. on SIDs, STARs, and/or holding patterns. Details of existing or planned routes and holds			
d	Impact on aerodromes and other specific activities within or adjacent to the proposed airspace	26		
e	Any flight planning restrictions and/or route requirements			
Supp	orting Infrastructure/Resources			

²⁶ Operating agreements required with Manchester Airport and NATS

ster. Easier		Post-Engagement SID27 AGGER	Post-Engagement Approach 27	Post-Engagement Approach 09
	General Requirements	Evidenc mitigati	e of comp on	oliance/
a	Evidence to support RNAV and conventional navigation as appropriate			
b	Evidence to support primary and secondary surveillance radar (SSR)			
с	Evidence of communications infrastructure including R/T coverage			
d	The effects of failure of equipment, procedures and/or personnel with respect to the overall management of the airspace must be considered	27		
e	Effective responses to the failure modes that will enable the functions associated with airspace to be carried out	28		
f	A clear statement on SSR code assignment requirements			
g	Evidence of sufficient numbers of suitably qualified staff required to provide air traffic services following the implementation of a change			
Airsp	ace and Infrastructure			

 ²⁷ Operating procedures will need to be developed in case of failures
 ²⁸ Operating procedures will need to be developed in case of failures

ster. Easier	Friendlier.]
		Post-Engagement SID27 AGGER	Post-Engagement Approach 27	Post-Engagement Approach 09
	General Requirements	Evidenc mitigati	e of comp on	oliance/
а	The airspace structure must be of sufficient dimensions with regard to expected aircraft navigation performance and manoeuvrability to fully contain horizontal and vertical flight activity in both radar and non-radar environments			
b	Where an additional airspace structure is required for radar control purposes, the dimensions shall be such that radar control manoeuvres can be contained within the structure, allowing a safety buffer.			
с	The Air Traffic Management system must be adequate to ensure that prescribed separation can be maintained between aircraft within the airspace structure and safe management of interfaces with other airspace structures			
d	Air traffic control procedures are to ensure required separation between traffic inside a new airspace structure and traffic within existing adjacent or other new airspace structures			
e	Within the constraints of safety and efficiency, the airspace classification should permit access to as many classes of user as practicable			
f	There must be assurance, as far as practicable, against unauthorised incursions. This is usually done through the classification and promulgation			
g	Pilots shall be notified of any failure of navigational facilities and of any suitable alternative facilities available and the method of identifying failure and notification should be specified			

ister. Easier.	Friendlier.			1
		Post-Engagement SID27 AGGER	Post-Engagement Approach 27	Post-Engagement Approach 09
h	There must be sufficient R/T coverage to support the Air Traffic Management system within the totality of proposed controlled airspace			
i	If the new structure lies close to another airspace structure or overlaps an associated airspace structure, the need for operating agreements shall be considered	29	29	29
j	Should there be any other aviation activity (low flying, gliding, parachuting, microlight site, etc) in the vicinity of the new airspace structure and no suitable operating agreements or air traffic control procedures can be devised, the change sponsor shall act to resolve any conflicting interests			
	ATS Route Requirements	Evidence of compliance/ mitigation		oliance/
a	There must be sufficient accurate navigational guidance based on in-line VOR/DME or NDB or by approved RNAV derived sources, to contain the aircraft within the route to the published RNP value in accordance with ICAO/Eurocontrol standards			
b	Where ATS routes adjoin terminal airspace there shall be suitable link routes as necessary for the ATM task			
с	All new routes should be designed to accommodate P-RNAV navigational requirements			
	Terminal Airspace Requirements	Evidence of compliance/ mitigation		oliance/

²⁹ Operating agreements required with Manchester Airport and NATS

ster. Easier.	Friendlier.		ster. Easier. Friendlier.						
		Post-Engagement SID27 AGGER	Post-Engagement Approach 27	Post-Engagement Approach 09					
а	The airspace structure shall be of sufficient dimensions to contain appropriate procedures, holding patterns and their associated protected areas								
b	There shall be effective integration of departure and arrival routes associated with the airspace structure and linking to designated runways and published instrument approach procedures (IAPs)								
С	Where possible, there shall be suitable linking routes between the proposed terminal airspace and existing en-route airspace structure								
d	The airspace structure shall be designed to ensure that adequate and appropriate terrain clearance can be readily applied within and adjacent to the proposed airspace								
e	Suitable arrangements for the control of all classes of aircraft (including transits) operating within or adjacent to the airspace in question, in all meteorological conditions and under all flight rules, shall be in place or will be put into effect by the change sponsor upon implementation of the change in question (if these do not already exist)								
f	The change sponsor shall ensure that sufficient visual reference points are established within or adjacent to the subject airspace to facilitate the effective integration of VFR arrivals, departures and transits of the airspace with IFR traffic								
g	There shall be suitable availability of radar control facilities								
h	All new procedures should, wherever possible, incorporate Continuous Descent Approach (CDA) profiles after aircraft leave the holding facility associated with that procedure								

ster. Easier	r. Friendlier.				
			Post-Engagement SID27 AGGER	Post-Engagement Approach 27	Post-Engagement Approach 09
	Off-Route Airspace Requiren	nents	Evidence of compliance/ mitigation		
а		o another airspace structure or overlaps an associated airspace ng agreements shall be considered			
b	etc) in the vicinity of the new a	tion activity (military low flying, gliding, parachuting, microlight site irspace structure and no suitable operating agreements or air traffic ised, the change sponsor shall act to resolve any conflicting interests			
Envir	ronmental Assessment				
	Theme	Content	Assessment of Impact		pact
а	Assessment of noise impacts	Consideration of noise impacts			
b	Assessment of CO ₂ emissions	Consideration of the impacts on CO ₂ emissions			
С	Assessment of local air quality	Consideration of the impacts on local air quality			
d	Assessment of impacts upon tranquillity	Consideration of any impact upon tranquillity, notably on Areas of Outstanding Natural Beauty or National Parks			

Table 9 – Technical Criteria Evaluation of Post-Engagement Design Options