CAA CAP 1616 Options Appraisal Assessment (Initial)

Title of airspace change proposal		Liverpool Low Level Changes (Deployment4)	
Change sponsor		Liverpool John Lennon Airport	
Project no.		2015-09	
SARG project leader		[redacted]	
Case study commencement date	Click or tap to enter a date.	*Case study report as at*	Click or tap to enter a date.

Account Manager		Engage & Consult		IFP		OGC	
Tech Regulator		Environmental		Economist		ATM	

Instructions: In providing a response for each question, please ensure that the 'status' column is completed using one of the following options:

- yes
- no
- partially
- n/a

To aid the SARG project leader's efficient project management, please highlight the "status" cell for each question using one of the four colours to illustrate if it is:

Resolved - GREEN | Not Resolved – AMBER | Not Compliant – RED | Not Applicable - GREY

Guidance

*The broad principle of economic impact analysis is **proportionality**; is the level of analysis involved proportionate to the likely impact from that ACP. There are three broad levels of economic analysis; qualitative discussion, quantified through metrics, and monetised in £ terms. The more significant the impact, the greater should be the effort by sponsors to quantify and monetise the impact.*

1. Background – Identifying the Do Nothing (DN) /Do Minimum (DM) and Do Something (DS) scenarios		
1.1	Are the outcomes of DN/DM and DS scenarios clearly outlined in the proposal? The Sponsor has considered that the conventional Standard Instrument Departures (SIDs) can be assessed as a singular 'group base-line', for evaluation against the new SIDs, which are presented as a set of individual options. Given the explanation, that they consider the current procedures would all have the same outcome for the Design Principle	

	Evaluation, this satisfies the requirement of identifying the DN scenario. There are currently no transitions so the DN for this element of the options were considered as tactical routings, which were again were considered to have the same outcomes for the evaluation, and so are grouped together. The conventional approach procedures were considered as one DN option and the current straight-in GNSS approaches were also considered as a DN option. The explanations and evaluation answers now provide a satisfactory set of DN options. The other options presented provide the DS scenarios.		
1.1.1	Has the change sponsor produced an Options Appraisal (Phase I - Initial) which sets out how they have moved from the Statement of Need to the airspace change design options? [E12]	Yes. The Initial Options Appraisal (IOA) clearly shows how the sponsor followed the process set out in CAP 1616. The constraints applied at the start of Stage 2 and the need for options to be aligned with the Design Principles, only allowed for the 28 options presented to the stakeholders; this was the 'initial long list'. The list of 28 'possible' options was increased by 3 more options, in response to the engagement and stakeholder input. Two options were then removed as part of the Design Principal Evaluation (DPE). One of the options rejected during the DPE should not have met the 'constraints' applied so arguably would not have been in the DPE, however, it's inclusion has been justified on the grounds that it closely follows a conventional, current procedure, so was added for context and to ensure the stakeholders were aware of it during the options development. The remaining options were then appraised against the table of criteria in Appendix E of CAP 1616. The 21 options which were then taken forward as a consequence of the IOA were justified with qualitative statements.	
1.1.2	Does the list of options include a description of the change proposal	The DPE contains a description and small map diagram of each proposed option, which is either a SID, transition or approach procedure. There are also diagrams of lines on OS Maps, presented in the Design Options Images Document (Options Development Step	

		2A).	
1.1.3	Has the sponsor stated on what criteria the longlist of options has been assessed?	The criteria that the sponsor applied are stated and as were aligned to the Design Principles (safety, lower emissions, noise reduction, maintenance and improvement of operations, reduction of people overflown) 26 of the options met the criteria and the 2 that arguably didn't, had their inclusion justified.	
1.1.4	Where options have been discounted, does the change sponsor clearly set out why?	There were no options discounted from the initial long list. The change sponsor goes on to give qualitative statements as to why some of the options have been discounted as part of the Initial Options Appraisal.	
1.1.5	Has the change sponsor indicated their preferred option in the Options Appraisal (Phase I - Initial)? [E12]	The change sponsor indicated the preferred option for each of the procedures en-route entry/exit point, where relevant, with a qualitative statement. Only one preferred approach option for each runway is being taken forward. The two preferred options are justified for a few different reasons. They both have repositioned the hold over the sea in order to reduce noise and people overflown, but this will increase distance flown if a missed approach is executed. Trans 27 VEGUN (CC05), is taken forward as it is 'required'. The reason for doing this is stated as 'deconfliction' from Manchester, which is justified.	
1.1.6	Does the Initial Options Appraisal (Phase I - Initial) detail what evidence the change sponsor will collect, and how, to fill in any evidence gaps and how this will be used to develop the Options Appraisal (Phase II - Full)? Does the plan for evidence gathering cover all reasonable impacts of the change? [E12]	The Initial Options Appraisal Table provided by the change sponsor provides the evidence the change sponsor will collect to quantify proportionate cost and benefits which are deployment costs of PBN/RNAV procedures and the potential savings in operational costs. It is also stated in Appraisal Table that PBN	

		introduction will deliver benefits in terms of increasing airspace capacity leading to more predictable routes, fewer on-ground and in-air delays experienced by airlines. This may have an economic benefit to airlines in the context of being an enabler for increased air transport movements, passenger numbers and cargo tonnage carried. However, LJLA claimed it is not proportionate for them to predict the precise economic benefit to commercial airlines as any increase in individual airline capacity will depend on private commercial business characteristics or the same way to assess the economic benefit to the GA community but they are expected to benefit from increased predictability of commercial airline movements which is predicted to lead to a reduced on-ground and in-air delays for all users which may have a positive impact on GA costs. The change sponsor stated in their Initial Options Appraisal Form – 6.2 that the extant procedures are carried through for further assessment during the Full Options Appraisal in order to make a comparison of the proposed procedure against the baseline levels of noise, emissions, fuel burn, and other stakeholder impacts.			
Direct impact on air traffic control					**Status**
2.1	**Are there direct cost impacts on air traffic control / management systems? If so, please provide below details of the factors considered and the level in which this has been analysed.**				
2.1.1	*Examples of costs considered (please add costs that have been discussed, and any reasonable costs that the tech reg feels have NOT been addressed)*	Not applicable	Qualitative Assessment	Quantified	Monetised

2.1.2	Infrastructure changes	X			
2.1.3	Deployment		X		
2.1.4	Day-to-day operational costs / workload / risks	X			
2.1.5	Other (provide details)	X			
2.1.6	**Comments** The change sponsor claimed that all options relate to the implementation of PBN and no additional infrastructure is required to maintain extant conventional procedures. The sponsor also stated no operational costs are attributable to maintaining the extant procedure. The sponsor provided the qualitative assessment for deployment costs and claimed they are attributable to the introduction of PBN procedures rather than the individual IFP options themselves. It is further stated in the Initial Options Appraisal Tables Issue 4 that costs will include ATCO training and competency (based on understanding aircraft performance and ATC procedures relating to RNAV), aerodrome documentation and procedures updates.				
2.2	**Are there direct beneficial impacts on air traffic control / management systems?** **If so, please provide details and how they have been addressed:**				
2.2.1	*Examples of benefits considered*	Not applicable	Qualitative Assessment	Quantified	Monetised
2.2.2	Reduced work-load	X			
2.2.3	Reduced complexity / risk	X			
2.2.4	Other (provide details)		X		
2.2.5	Details The sponsor emphasised ICAO list Improved Operational Efficiency as a benefit delivered by the introduction of PBN. LJLA predicts that operational efficiency will improve and there may be potential for a net reduction in operational costs. LJLA expects that any change in operational costs will be the same regardless of which option is chosen and the change sponsor confirmed this will be considered further at Full Options Appraisal stage.				

2.3	**Where monetised, what is the net monetised impact on air traffic control (in net present value) over the project period?** **N/A**	
2.4	**Are the direct impacts on air traffic management analysed accurately and proportionately?** The change sponsor provided a thorough high-level analysis for each SID, transition and approach procedure. The costs and benefits to airport and ANSPs were described accurately and in line with the CAP1616 requirements of initial options appraisal. The direct impacts on air traffic management were analysed qualitatively in a proportionate approach in terms of infrastructure, operational and deployment costs.	

3. Changes in air traffic movements / projections					**Status**
3.1.	**What is the impact of the ACP on the following and has it been addressed in the ACP proposal?**				
		Not impacted / not applicable	Qualitative Assessment	Quantified	Monetised
3.1.1	Number of aircraft movements	X			
3.1.2	Type of aircraft movement		X		
3.1.3	Distance travelled		X		
3.1.4	Area flown over / affected		X		
3.1.5	Other impacts		X		
3.1.6	Details The change sponsor claimed RNAV procedures are predicted to facilitate continuous climb/descent profiles and optimum aircraft performance. The sponsor also provided the assessment of areas overflown and affected for each option. Some of the options are rejected by the sponsor like SID 27 AGGER Option 2 because they fly over a school at 2000ft and a hospital at 4000ft within built up areas even though they facilitate flown at optimum aircraft performance and minimise noise by incorporating continuous climb. The preferred options listed by the sponsor do have similar contradictions like PE SID 27 AGGER Option 1b; the sponsor stated it is the preferred				

	option compared to the option above because it facilitates flown at optimum aircraft performance and minimise noise by incorporating continuous climb. However, aircraft remain over the River Mersey during the initial right hand turn after take-off. It is further stated the procedure avoids direct overflight of sensitive areas although a school and a hospital are close to the planned flightpath and aircraft will be above approximately 4,000 ft at these points.				
3.2	**Has the forecasting of traffic done reasonably using best available guidance (e.g. DfT WebTAG, the Green Book, Academic sources…etc?)** It is stated on LJLA Initial Options Appraisal Issue 1 document, the process is carried out in accordance with the guidance in CAP1616, and in conjunction with The Green Book and the Department of Transport's WebTAG.				
3.3	**What is the impact of the above changes on the following factors?**				
		Not impacted / not applicable	Qualitative Assessment	Quantified	Monetised
3.3.1	Noise		X		
3.3.2	Fuel Burn		X		
3.3.3	CO2 Emissions		X		
3.3.4	Operational complexities for users of air space		X		
3.3.5	Number of air passengers / cargo		X		
3.3.6	Flight time savings / Delays		X		
3.3.7	Air Quality	X			
3.3.8	Tranquillity	X			
3.4	Are the traffic forecast and the associated impacts analysed proportionately and accurately according to available guidelines (e.g. WebTAG or the Green Book?) See 3.2 above. Whilst this ACP is not predicated on growth the sponsor does state that it will "*also help to protect capacity for any future growth*".				
3.5	What is the total monetised impact of 3.2? (Provide details) N/A				

4. Benefits of ACP					Status
4.1	**Does the ACP impact refer to the following groups and how they are impacted by the ACP?**				
		Not impacted / Not applicable	Qualitative Assessment	Quantified	Monetised
4.1.1	Air Passengers		X		
4.1.2	Air Cargo Users		X		
4.1.3	General aviation users		X		
4.1.4	Airlines		X		
4.1.5	Airports		X		
4.1.6	Local communities		X		
4.1.7	Wider Public / Economy		X		
4.1.8	Details LJLA provided an excel table named Initial Options Appraisal Tables Issue 4 to show each criteria and how are the above groups affected from each viable option analysed qualitatively. It is stated by the sponsor that with the introduction of PBN, GA community is expected to benefit from increased predictability of commercial airline movements which is predicted to lead to reduced on-ground and in-air delays for all users that may have a positive impact on GA costs. Environment: Consulted with LJLACC and NMSC, local environmental impacts Noise Air Pollution and sensitive areas considered (see above) no further references found. As this ACP impacts at and below 7,000ft in line with the altitude priorities set out by the Department for transport in the air Navigation Guidance 2017, this ACP will consider and produce analysis on the local environmental effects i.e. on noise, and Local air quality where required. This is also consistent with the design principle adopted for the change that reads; Minimise noise Avoid overflying sensitive areas below 7000ft				
4.2.	**How are the above groups impacted by the ACP, especially (but not exclusively) looking at the following factors:**				

		Not impacted / not applicable	Qualitative Assessment	Quantified	Monetised
4.2.1	Improved journey time for customers of air travel		X		
4.2.2	Increase choice of frequency and destinations from airport	X			
4.2.3	Reduced price due to additional competition because of new capacity	X			
4.2.4	Wider economic benefits		X		
4.2.5	Other impacts	X			
4.2.6	Details Generally, LJLA claimed that PBN introduction will deliver benefits in terms of increasing airspace capacity leading to more predictable routes, fewer on-ground and in-air delays experienced by airlines and it is further claimed that this will bring benefits to wider society by enabling capacity and resilience improvement.				

4.3	What is the overall monetised impacts associated with 4.1 and 4.2 the above? N/A	
4.4	What are the non-monetised but quantified impacts of the above? (Insert details of description) N/A	
4.5	What are the qualitative / strategic impacts described above? Please see comments on Section 2.1.6, 2.2.5, 3.1.6, 4.1.8 and 4.2.6 for corresponding qualitative / strategic impacts.	
4.6	What is the overall monetised benefits-costs ratio (BCR) of the policy? Is it more than 1? N/A	
4.7	**Have the sponsors provided reasonable justification for the proportionality of analysis above?** Yes, the change sponsor considered the costs and benefits of the PBN/RNAV introduction on potential stakeholders in a proportionate approach. They also provided their justification on the economic impact from increased effective capacity for commercial airlines; LJLA stated it is not proportionate for LJLA to predict the precise economic benefit and potential other costs to commercial airlines because there may be costs associated with maintaining legacy systems to continue flying conventional navigation but there are too many variables to consider these effectively like aircraft types / onboard system capability etc. They also confirmed that at Stage 3 Full Options Appraisal will be carried out for quantitative assessment.	
4.8	**If the BCR is less than 1, are the quantitative and qualitative strategic impacts proportional to the costs of the ACP?** **N/A**	

5	Other aspects	
5.1	N/A	

6	Summary of Assessment of Economic Impacts & Conclusions
6.1	According to the qualitative analysis provided for each procedure, it is claimed by the sponsor that there will be benefits with the implementation of PBN procedures. In summary, LJLA claimed they would be able to meet airline demand for PBN infrastructure and improve the resilience and redundancy of its airport operations. They also stated this would also help to increase capacity for future growth. It is further claimed by LJLA that introduction of PBN procedures would drive new procedure designs that minimise delays, reduce track miles with most direct routes and continuous climb/descent and reduces the required input from ATC. In terms of the environmental benefit of PBN infrastructure, LJLA claimed the benefits would be on the numbers overflown; more accurate route keeping associated with PBN minimises the spread of people overflown versus current operations. However, improvement on operational efficiency might have adverse impacts on noise in case the procedures would require overflying school, hospital and populated area when there is no option to avoid without increasing emissions and track miles. So, the quantified/monetised analysis is crucial to understand the total impact of the change; to assess if the adverse environmental impacts are offset by the benefits.

Outstanding issues?		
Serial	Issue	Action required
1		
2		

CAA Options Appraisal Completed by	Name	Signature	Date
Airspace Regulator Technical	[redacted]		30/05/2019

Economist	[redacted]		19/06/2019
Environmentalist	[redacted]		20/06/2019
ATM	[redacted]		29/05/2019