CAA CAP 1616 Options Appraisal Assessment (Phase I Initial)

Title of Airspace Change Proposal:	Edinburgh Airport FASI (ScTMA cluster)		
Change Sponsor:	Edinburgh Airport Ltd		
ACP Project Ref Number:	ACP-2019-32		
Case study commencement date:	27/01/2023	**Case study report as at:**	24/02/2023

Account Manager: [redacted]	**Airspace Regulator (Engagement & Consultation):** [redacted]	**IFP:** [redacted]	**OGC:** [redacted]
Airspace Regulator (Technical): [redacted]	**Airspace Regulator (Environmental):** [redacted]	**Airspace Regulator (Economist):** [redacted]	**ATM (Inspector ATS Ops):** [redacted]

Instructions

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.

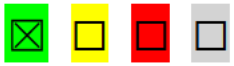
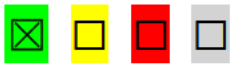
1. Background – Identifying the impact of the options (including Do Nothing (DN) / Do Minimum (DM))			Status
1.1	**Are the outcomes of the Initial Options Appraisal (IOA) (Phase I) clearly outlined in the proposal?**		☒ ☐ ☐ ☐
1.1.1	Has the change sponsor completed an Initial Options Appraisal? [E12]	Yes, the sponsor has completed an Initial Options Appraisal (IOA) for baseline options considered for arrival and departure procedures together with all the viable options taken forward from Step 2A to Step 2B.	☒ ☐ ☐ ☐
1.1.2	Does the Initial Options Appraisal include: - a comprehensive list of viable options; - a clear description of the baseline scenario; - an indication of the environmental impacts; - a high-level assessment of costs and benefit involved	Yes, the IOA includes comprehensive list of viable options for departure and arrival group. CAP 1616 Table E2 is provided for each proposed option. The baseline options are also described and analysed in the same way with Table E2 tables for RWY24 and RWY06 departure and arrival procedures and RWY24 and RWY06 Do Nothing options are considered as their baseline and Modernised Baseline for departure and arrival procedures will form their Do Minimum Options. The sponsor has qualitatively assessed high-level costs and benefits involved with the airspace change proposed which is put through to achieve modernisation, enable capacity increase and minimise environmental effect of the new flight paths. The sponsor has stated that the do-nothing is to *"continue with current procedures with no additional design"* while the do-minimum is the modernised version of the baseline with RNAV. In terms of environmental metrics and assessment methodologies, the sponsor has presented Category C noise modelling results and used referenced sources of data. Other metrics have been qualitatively described.	☒ ☐ ☐ ☐

1.1.3	Has the sponsor stated on what criteria the comprehensive list of viable options has been assessed?	Yes, the sponsor explained the high-level criteria for each impact; for example, the change in the inner, central and outer track length of each SID range were analysed to describe GHG (greenhouse gas) and fuel burn impact.	☒ ☐ ☐ ☐
1.1.4	Where options have been discounted as part of the IOA exercise, does the change sponsor clearly set out why?	The Sponsor has chosen to keep all viable options analysed qualitatively at Step 2B and stated options will progress through two further evaluations in Stage 3 and Stage 4 where options will be quantitively assessed.	☐ ☐ ☐ ☒
1.1.5	Has the change sponsor indicated their preferred option(s) as a result of the IOA (Phase I - Initial)? [E12]	The change sponsor has not indicated their preferred option/options as they are looking into swathes which are broad to encompass a range of potential flight path options. So, the appraisal is based on a qualitative discussion of the relative benefits and disbenefits of potential flight path options within each swathe based on nominal tracks along the inner and outer edges of each swathe plus a central track. It is stated in the IOA that detailed quantitative analysis and comparisons of the preferred SID options against the existing and RNAV-overlaid baselines will be provided in Stage 3, once the SIDs have been defined.	☐ ☐ ☐ ☒
1.1.6	Does the IOA (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)?	Yes, the sponsor has stated WebTAG assessments for GHG and noise impact will be available at Stage 3. They couldn't provide details of evidence they will collect and justify the reason that it requires a complete system design of arrivals and departures plus noise modelling with a forecast schedule and fleet mix, which is very detailed and time-consuming for them at this stage. CAA concluded that their approach and justification is reasonable/proportionate taking into account the number of arrival and departure options and the subsequent permutations when combining these procedures.	☒ ☐ ☐ ☐
1.1.7	Does the plan for evidence gathering cover all reasonable impacts of the change? [E12]	The sponsor has provided their justification that explains why they've concluded it'd be disproportionate to collect	☒ ☐ ☐ ☐

		evidence and explain the method to be applied to fill in any gaps to develop the next phase of the options appraisal. As the airspace change scope is too broad and they are just considering swathes at Stage 2B, they couldn't give all the information for their plan at the next step. However, they've touched on each impact that needs to be assessed for a typical airspace change and try to explain their aim to provide all the required quantitative and monetised analysis. They try to use justifications for each typical impact including environmental impact along with fuel burn and capacity. The submission includes very limited and high-level information on work required to be undertaken at Stage 3 (WebTAG for noise and air quality, consideration of respite). The sponsor has identified some evidence gaps in the Stage 2 environmental options appraisal based on the methodology followed, stating further quantified assessments will be performed at Stage 3. The sponsor makes no reference to overflight contours (as per CAP1498) or operational diagrams.	

2. Impacts of the proposed airspace change					**Status**
2.1	**Are there direct impacts on the following:**				☒ ☐ ☐ ☐
2.1.1	*Examples of costs considered (please add costs that have been discussed, and any reasonable costs that the Airspace Regulator (Technical) feels have NOT been addressed)*				
2.1.2	Airport/ANSPs	Not applicable	Qualitative	Quantified	Monetised
	- Infrastructure		X	N/A	N/A
	- Operation		X	N/A	N/A
	- Deployment		X	N/A	N/A
	- Other(s)	X			

2.1.3	Commercial Airlines/General Aviation	Not applicable	Qualitative	Quantified	Monetised
	- Training		X	N/A	N/A
	- Economic impact from increased effective capacity		X	N/A	N/A
	- Fuel burn		X	N/A	N/A
	- Other(s)	X			
2.1.4	General Aviation	Not applicable	Qualitative	Quantified	Monetised
	- Access		X	N/A	N/A
2.1.5	Military	Not applicable	Qualitative	Quantified	Monetised
		X			
2.1.6	Wider society, i.e., wider economic benefits, capacity resilience	Not applicable	Qualitative	Quantified	Monetised
			X	N/A	N/A
2.1.7	Other (provide details)	Not applicable	Qualitative	Quantified	Monetised
		X			

2.2 	**Are there direct beneficial impacts on air traffic control / management systems? Provide details.** The IOA indicates that removal of Nav Aids reduces maintenance budgets and over the long term will reduce costs. From an ATM perspective, the ability to depart aircraft in a more efficient manner will reduce unnecessary delays and thus has the potential to have a beneficial effect on controller workload. (PH)	
2.3	**Where impacts have been monetised, what is the overall value (expressed in net present value (NPV)) of the project?** N/A – The sponsor has just carried out a qualitative analysis at this initial step of the options appraisal because the departure and arrival options are only considering swathes based on nominal tracks rather than actual tracks. The IOA states once the SIDs have been defined, detailed quantitative analysis will be provided at Stage 3.	
2.4	**Has the sponsor provided an accurate and proportionate assessment of the proposed airspace change impacts?** Yes, the sponsor has provided the minimum requirement for initial options appraisal which is the qualitative discussion of the typical airspace change impacts. All the typical impacts were assessed qualitatively and the justification for the proportionality for Stage 2 has been well explained by the sponsor.	

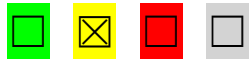
3. Changes in air traffic movements and projections				Status
3.1	**If the proposed airspace change has an impact on the following factors, have they been addressed in the proposal?**			☒ ☐ ☐ ☐
		Not applicable	Qualitative	Quantified/ Monetised
3.1.1	Number of aircraft movements		X	N/A
3.1.2	Number of air passengers / cargo	X		
3.1.3	Type of aircraft movements (i.e., fleet mix)		N/A	N/A
3.1.4	Distance travelled		X	N/A
3.1.5	Operational complexities for users of airspace		X	N/A
3.1.6	Flight time savings / Delays		N/A	N/A
3.1.7	Other impacts	X		
	Comments: The sponsor stated in the IOA that one of the three drivers is capacity increase that would be achieved with the design of new flight paths. The sponsor aims to increase capacity by reducing departure intervals and having included some early turns for SIDs which will aid capacity increase if the sponsor cannot achieve the time interval reduction. The sponsor has not looked into fleet mix change at Stage 2 but they indicated in the IOA that fleet mix is one of the potential factors that may influence the relationship between track miles and GHG emissions. So, they stated this will be better defined in Stage 3 when a quantitative assessment is developed based on the preferred flight path options, vertical flight profiles and aircraft fleet mix. In terms of distance travelled, the sponsor has provided in the IOA indicative range of inner track lengths for each existing SID and then provided an approximate comparison of the change for central and outer track length. The IOA highlighted for arrivals that full systemisation may result in potential capacity constraints during busy periods. They've concluded that full systemisation overall is likely to deliver a moderately less efficient operation than an approach including vectoring.			
3.2	• Has the sponsor used the most up-to-date, credible and clearly referenced source of data to develop the 10 years traffic forecast and considered the available guidelines (i.e., the Green Book and TAG models) in a proportionate and accurate manner? [B11 and E11]			☒ ☐ ☐ ☐

The sponsor has provided two sets of traffic forecast for Edinburgh Airport to show the effect of pandemic on capacity. The traffic forecast that has been produced by the Edinburgh Airport Aero team from 2019 to 2045 is as follows:

	Peak demand in 2022			Peak demand in 2019		
Year	Peak A Flights	Peak D Flights	Peak A+ D	Peak A Flights	Peak D Flights	Peak A+ D
2019	23	25	38	22	26	37
2023	23	25	38	24	29	40
2024	24	26	41	25	30	42
2025	25	26	43	25	31	42
2026	25	27	44	26	31	43
2027	26	28	46	27	33	45
2028	26	28	46	27	33	46
2029	26	28	45	28	34	46
2030	27	28	46	28	34	47
2031	27	29	46	29	35	48
2032	27	29	47	29	36	49
2033	28	30	47	30	37	51
2034	28	30	48	31	38	52
2035	28	30	48	31	38	52
2036	29	31	48	32	39	53
2037	29	31	49	32	40	54
2038	29	32	49	33	41	56
2039	30	32	50	34	42	57
2040	30	33	50	34	42	58
2041	31	33	51	35	43	59
2042	31	34	51	35	44	59
2043	32	34	52	36	44	60
2044	32	35	52			
2045	32	35	53			

- Has the sponsor explained the methodology adopted to reach its input and analysis results? [B11 and E11]
  The sponsor has not detailed the methodology applied to reach traffic figures of arrivals and departures in upcoming years and how per hour total flights have been calculated. This will be flagged up for sponsor's awareness and further improvements in the next phases of the options appraisal.

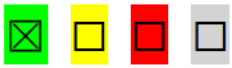
  The sponsor's Category C noise modelling (mean track and flight profile) has been based on 2019 summer radar data. The sponsor provided ERCD with traffic forecasts by route and ICAO aircraft type for 2022 and 2032, stating 2019 data projection as the source. The average summer day and night forecast movements have been provided in the ERCD Technical Note along with modelling methodology and assumptions. The sponsor also mentions the peak hour traffic forecast for both pre and post pandemic scenarios which has been developed by Edinburgh Airport Aero team but only the pre-pandemic annual traffic data has been included. The data used for noise modelling is not the same as it considers the impact from Covid19 and therefore an updated forecast.



	The population data supplied by WSP has used the Ordnance Survey AddressBase Plus database to identify individual households in the project GIS. The population data has then been generated by multiplying the number of households by the average household size for that area/region (from the 2011 Census). Additionally, the sponsor has also provided a 'Tranquillity Assessment Baseline Report (September 2019)', a 'Stage 1B – Biodiversity (September 2019)' report and a 'Health Screening Assessment (October 2019)'.	
3.3	**Has the sponsor developed an assessment of the following environmental aspects?** The sponsor has included a qualitative description of the impacts on environmental metrics that is supported by noise modelling and some other quantified data. Noise: LAeq, N65 and N60, 100% mode contours developed by ERCD for 2022 and 2032 as per Category C standards overlaid on Ordnance Survey maps demonstrating areas, populations and households impacted. The sponsor also describes communities likely to be overflown by each design option swathe. GHG emissions: comparisons of track lengths as a proxy for fuel burn and emissions Air quality: estimation of the overflight footprints of the design option swathes below 1,000 ft. and number of residential properties overflown under this height. Tranquillity: no AONBs and NPs are impacted, however, consideration of community identified tranquil areas overflown by each design option swathe. Biodiversity: The sponsor states that previous assessments concluded no Likely Significant Effects on identified European Protected sites, however, this will be reviewed at Stage 3 as flight paths are refined.	☒ ☐ ☐ ☐

		Not applicable	Qualitative	Quantified	Monetised
3.3.1	Noise		X	X	
3.3.2	Operational diagrams		X		
3.3.3	Overflight		X		
3.3.4	CO2 emissions		X		
3.3.5	Local air quality		X		
3.3.6	Tranquillity		X		
3.3.7	Biodiversity		X		

3.4	**What is the monetised impact (i.e., Net Present Value (NPV)) of 3.3? (Provide comments)** N/A – Please refer to the answer provided for Question 2.3.

4. Economic Indicators of the ACP		Status
4.1	**What are the qualitative / strategic impacts described in the ACP?** The IOA emphasises that the three drivers of the airspace change are modernisation, capacity and minimising the environmental effect of the new flight paths.	
4.2	**What is the overall monetised and non-monetised (quantified) impact of the proposed airspace change?** At Stage 2, the sponsor has only provided the qualitative analysis to meet with the minimum requirement of the initial options appraisal. The IOA provides qualitative discussion of the potential impacts of aircraft operations within the departure and approach swathes for RWY06 and RWY24. Therefore, the sponsor concluded it'd be proportionate for them to provide a detailed quantitative analysis and comparisons of the preferred SID options against the existing and RNAV-overlaid baselines at Full Options Appraisal.	
4.3	**What is the Net Present Value of the proposed options? Has the sponsor used this information to progress/discount options? Has the sponsor provided the benefits-costs ratio (BCR) of the proposed options and used it to support the choice of the preferred options? [E44]** N/A – the sponsor has only qualitatively analysed the potential impacts of aircraft operations within the departure and approach swathes for RWY06 and RWY24. Therefore, the sponsor decided to keep all the options for Stage 3 to further analyse with detailed quantitative analysis. The comparisons of the preferred SID options against the existing and RNAV-overlaid baselines	
4.3.1	**If the preferred option does not have the highest NPV or BCR, then has the sponsor justified the reasons to progress this option? [B50 and E23]** The sponsor stated in the IOA that the preferred SID options against the existing and RNAV-overlaid baselines will be provided in Stage 3, once the SIDs have been defined with detailed quantitative analysis.	
4.4	**Have the sponsors provided reasonable justification for the proportionality of analysis above?** Yes, the sponsor provided the minimum requirement for Stage 2 which is qualitative discussion of the typical airspace change impacts. The sponsor stated it'd be disproportionate for them to provide quantitative analysis at this stage as they are only considering swathes not actual tracks yet.	

5. Other aspects	
5.1	N/A

6. Summary of the Initial Options Appraisal & Conclusions

6.1	The initial options appraisal is based around a qualitative assessment as explained throughout this report. The Initial appraisal sets out how the change sponsor moves from its Statement of Need to a comprehensive list of potential flight path options within each swathe based on nominal tracks along the inner and outer edges of each swathe plus a central track. The Initial appraisal must contain the following and all items have been duly provided in the IOA by the sponsor: • the comprehensive list of viable options including baseline options for departure and arrival procedures • the fully described baseline scenarios • the description of the change proposal • the indicator of the likely noise impacts • the high-level assessment of costs and benefits involved • the criteria for assessing the list of options • the application of those criteria to the list to develop the shortlist of options • the shortlist options described qualitatively • what evidence the change sponsor will collect, and how, to fill in its evidence gaps and to develop the Full appraisal There is one recommendation below in the 'Outstanding issues' section to highlight where the sponsor could provide more clarity with respect to their traffic forecast provided in their IOA. This has been highlighted to raise awareness of the sponsor for further improvement in Stage 3 and to avoid any additional work the sponsor might conduct after they do all the analysis for Stage 3.

Outstanding issues

Serial	Issue	Action required
1	The methodology adopted to reach input and analysis results in relation to traffic forecast provided in the IOA is missing.	The sponsor should have provided explanation for the methodology adopted to carry out the arrival and departure flights forecast from 2019 to 2045 [CAP E11]. The sponsor should also provide the annual traffic forecast at Stage 3 as explained in CAP 1616 Appendix B31-B34. **03/03/2023: The change sponsor has satisfactorily addressed this post Gateway action.**
2	-	
3	-	

CAA Initial Options Appraisal Completed by	Name	Signature	Date
Airspace Regulator (Economist)	[redacted]	[redacted]	03/03/2023
Airspace Regulator (Environmental)	[redacted]		03/03/2023