Airspace Change Organising Group

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Scottish Terminal Control Area (ScTMA) Cluster - Cumulative Analysis Framework Part 2 (CAF2) Report

Issue 2.0 (June 2025)

Contents

1 Executive Summary 4
2 Introduction 7
3 CAF2 Methodology 9
Analysis Period and Forecasting 9
Comparison 9
Combined CO_2e/Fuel Methodology 9
Methodology for Other Impact Categories 10
Other Shared Assumptions 10
Rounding 10
Safety 10
Annexes 10
4 Consultation Options 10
5 Interdependencies and Trade Offs 11
6 Cluster-Wide Baseline “Without Airspace Change” 12
L_{Aeq} for “Without Airspace Change” Baseline - Communities 15
N60 and N65 contours “Without Airspace Change” Baseline - Communities 19
Overflight Contours “Without Airspace Change” Baseline - Communities 22
Local Air Quality for “Without Airspace Change” Baseline - Communities 25
Greenhouse Gas Emissions for “Without Airspace Change” Baseline – Wider society 25
Tranquillity for “Without Airspace Change” Baseline – Wider society 26
Biodiversity Data for “Without Airspace Change” Baseline – Wider Society 29
Capacity/Resilience for “Without Airspace Change” Baseline - Wider society 32
Access – General Aviation 32
Economic Impact from Increased Effective Capacity for “Without Airspace Change” Baseline – General Aviation/Commercial Airlines 32
Fuel burn for “Without Airspace Change” Baseline – General Aviation/Commercial Airlines 32
Training Costs for “Without Airspace Change” Baseline – Commercial Airlines 33
Other Costs for “Without Airspace Change” Baseline – Commercial Airlines 33
Operational Costs for “Without Airspace Change” Baseline – Airport / ANSP 33
Deployment Costs for “Without Airspace Change” Baseline – Airport / ANSP 33
Other Costs for “Without Airspace Change” Baseline – Airport / ANSP 34
7 Collective Performance – Cluster-Wide “With Airspace Change” 35
Noise for Cluster-Wide “With Airspace Change” Proposal - Communities 37

L_{Aeq} for Cluster-Wide “With Airspace Change” Proposal - Communities 38
N60 and N65 contours for Cluster-Wide “With Airspace Change” Proposal - Communities 42
Overflight Contours for Cluster-Wide “With Airspace Change” Proposal - Communities 44
Local Air Quality for Cluster-Wide “With Airspace Change” Proposal - Communities 46
Greenhouse Gas Emissions for Cluster-Wide “With Airspace Change” Proposal – Wider society . 46
Tranquillity for Cluster-Wide “With Airspace Change” Proposal – Wider society 48
Biodiversity Data for Cluster-Wide “With Airspace Change” Proposal 51
Capacity/Resilience for Cluster-Wide “With Airspace Change” Proposal - Wider society 53
Access for Cluster-Wide “With Airspace Change” Proposal – General Aviation 54
Economic Impact from Increased Effective Capacity for Cluster-Wide “With Airspace Change” Proposal – General Aviation/Commercial Airlines 82
Fuel Burn for Cluster-Wide “With Airspace Change” Proposal – General Aviation/Commercial Airlines 82
Training Costs for Cluster-Wide “With Airspace Change” Proposal – Commercial Airlines 83
Other Costs for Cluster-Wide “With Airspace Change” Proposal – Commercial Airlines 83
Infrastructure Costs for Cluster-Wide “With Airspace Change” Proposal – Airport / ANSP 83
Operational Costs for Cluster-Wide “With Airspace Change” Proposal – Airport / ANSP 83
Deployment Costs for Cluster-Wide “With Airspace Change” Proposal – Airport / ANSP 83
Other Costs for Cluster-Wide “With Airspace Change” Proposal – Airport / ANSP 83
8 Cost Benefits Analysis 84
Notes for Cost Benefit Analysis: 84
List of figures and data tables 87

1 Executive Summary

1. This document provides information on the cumulative and collective performance of the Airspace Change Proposals (ACPs) in the Scottish Terminal Control Area (ScTMA) cluster (also referred to as the Scottish Airspace Modernisation). This cluster consists of separate ACPs for Glasgow Airport, Edinburgh Airport and NATS En-Route Limited (NERL); these three organisations are collectively referred to as the 'sponsors'). This document has been complied by the Airspace Change Organising Group (ACOG) in line with the Cumulative Analysis Framework method presented in the UK Airspace Change Masterplan (Iteration 3 ScTMA).

2. Each sponsor has undertaken a Full Options Appraisal in line with the CAA's CAP1616 requirements for airspace change. The sponsors' Full Options Appraisals provide detail at the local level, whereas this document provides an overview of cumulative and collective performance at a cluster-wide level.

3. Each of the three sponsors is presenting one option for consultation. This means there is one cluster-wide option for this document to consider comprising of the three component proposals.

4. The CAF2 data has been generated by combining information from each sponsor's Full Options Appraisal to show how the combined 'with airspace change' option for the cluster compares to the combined 'without airspace change' baseline. The comparison is undertaken for a 10 year period from 2027 (the implementation year) to 2036. The result is a suite of tables and diagrams to match those presented in the individual ACPs, but which show performance for the whole cluster, rather than for single ACP.

5. All the sponsors options are compatible with one another, so there are no interdependencies or trade-offs between the sponsors consultation options[1].

6. There are no cumulative impacts from noise or overflights in the cluster-wide option. Cumulative impacts in this case would relate to the situation where a location is overflown by new flight paths below 7000ft from both the Glasgow Airport and Edinburgh Airport proposed designs. The data shows there are no such cumulative impacts – this is demonstrated by the fact that there is no overlap between the noise and overflight contours for each airport's consultation options. Therefore, stakeholders with an interest in the noise or overflight effects from flights below 7000ft in specific areas should consult the relevant local ACP where local impacts are described in more detail.

7. The CAF2 collective results for the cluster are summarised below. For details, regarding each ACP please see the separate Full Options Appraisal submissions/consultations.

8. **Cost Benefit Analysis:** The cost benefit analysis figures summarised Table 1 show the cluster-wide option would provide an overall Net Present Value (NPV) benefit of c.£130m for the period 2027-2036.

[1] Interdependencies and trade offs identified during the design phase are captured in the CAF1 sections of the UK Airspace Modernisation Strategy Masterplan (Iteration 3 ScTMA).

Table 1: Cost benefit Analysis Summary for 2027-2036

Total NPV benefit	Noise NPV Benefit	CO_2e NPV Benefit	Fuel NPV Benefit	Delay NPV benefit	Infrastructure Costs	Operational Cost
£ 129,693,984	£ 31,566,333	£ 53,573,505	£ 36,472,681	£ 7,866,010	£ 244,050	-£ 28,594

9. Table 2 shows a summary of key collective statistics from the ScTMA cluster, which provide context for the monetised values in Table 1.

Table 2: CAF2 Summary Results for 2027-2036

Net people experiencing reduced daytime noise (LAeq)	Net people experiencing reduced nighttime noise (LAeq)	Greenhouse Gas Benefit (CO2e kT)	Fuel Benefit (kT)
39,973	53,358	219.8	69.1

10. **Noise**: the government identifies a level of noise above which there are potential adverse effects on health and quality of life. These levels are defined in the 'L_{Aeq}' noise metric which is the primary decision-making metric for noise. The population data for the L_{Aeq} metric showed that, in the cluster-wide 'with airspace change' option, some people would experience more noise above the levels defined by government, but in all cases these would be outnumbered by people experiencing less noise. Overall this results in a benefit from reduced noise which has been monetised at c. £32m over the 10 year analysis period (using the governments TAG workbook).

11. **Greenhouse Gases (CO_2e) and Fuel Burn**: these are both forecast to increase as a result of traffic growth in both the 'without airspace change' baseline and cluster-wide 'with airspace change' option. However, the CO_2e/fuel *per flight* is expected to fall, meaning that the rate of increase for overall CO_2e would be less as a result of the change. Overall, this results in a benefit from reduced CO2e which is valued at c. £51m over the 10 year analysis period. There is also a benefit from reduced fuel costs of c.£36m over the same period.

12. It should be noted that the CO_2e results represent what is referred to as 'enabled benefit' derived from computer modelling which rely on forecasts and assumptions. The modelling used is industry-leading, but the level of accuracy cannot be confirmed until it is assessed at the post implementation stage. Some results may be an overestimation, others may underestimate. However, under all scenarios it is anticipated that the proposed changes will enable a cluster-wide CO_2e benefit on average per flight.

13. **Capacity:** Flight numbers in the region are expected to grow at an equal rate either with or without the cluster wide change. However, the cluster-wide 'with airspace change' option is forecast to result in fewer minutes of delay: 46,746 minutes fewer in 2027, rising to 60,818 minutes fewer in 2036.

14. **General Aviation (GA):** Overall, the cluster-wide 'with airspace change' option will require approximately 700 cubic nautical miles (NM^3) of additional controlled airspace. However, this is a net figure and relates to over 1300 NM^3 of new controlled airspace that is required by the changes above 7000ft. This is to provide more efficient en-route connectivity, and is predominantly at higher altitudes and over the sea. As such this airspace is not expected to have a significant impact on General Aviation operations. Below 7,000ft there is a reduction in CAS of over 600 NM^3. The sponsors believe that much of the released airspace is in areas that will be beneficial for General Aviation.

15. No cumulative effects are identified with respect to General Aviation access. That is to say that there are no negative changes described in the individual ACPs that would be considered worse than described, when considered alongside the proposals in neighbouring ACPs.

16. Additionally, over 5,000 NM[3] of airspace has had classification reduced from Class A, mostly to Class C or Class D. This reduces the requirements for aircraft to be granted clearance to enter the airspace. Access to temporary reserved areas for gliding has also been maintained.

17. In conclusion, the cluster-wide ‘with airspace change’ option represents a significant £130m overall benefit which comprises of net benefits across the key performance criteria of noise, CO_2e, fuel and capacity.

2 Introduction

18. The UK's Airspace Modernisation Strategy (AMS) explains that achieving the objectives of airspace modernisation will maintain and improve the UK's high levels of aviation safety, boost efficiency, strengthen environmental sustainability and facilitate access for the ever-expanding range of competing airspace users.

19. Where changes are proposed that share the same airspace, there is benefit in taking forward those proposals concurrently, so that the proposals can be coordinated, competing demands can be assessed, and decisions made that are optimised for all users in aggregate. This rationale has been adopted for the UK's Future Airspace Strategy Implementation (FASI) airspace change programme, encompassing more than 20 airport Airspace Change Proposals (ACPs) across the UK.

20. A region of airspace above central Scotland is shared by Glasgow Airport, Edinburgh Airport and NATS En-route Limited (NERL), each of whom is progressing their own ACP under CAA CAP1616. This is referred to as the Scottish Terminal Control Area (ScTMA) cluster. The ACPs in the ScTMA cluster must adhere to CAP1616 guidance and the UK Airspace Change Masterplan (Iteration 3 ScTMA). Note that the term ScTMA cluster, which is used in this document and the Masterplan, is interchangeable with the term Scottish Airspace Modernisation, which is a more generic term used in consultation).

21. The Masterplan presents a Cumulative Analysis Framework (CAF) to capture information on interdependencies and trade-offs between ACPs. This is to ensure that cumulative and collective performance has been considered by the sponsors in a cluster when progressing their individual, but linked ACPs through the CAP1616 process.

22. The CAF has 3 parts as shown in Table 1 overleaf.

23. CAF Part 1 (CAF1) provides a basis for sponsors to resolve design conflicts in advance of the Full Options Appraisal. As such CAF1 was completed earlier in the process and is reported in UK Airspace Change Masterplan (Iteration 3 ScTMA).

24. This report is for CAF Part 2 (CAF2) which provides information on how the consultation options in the three separate ACPs within the ScTMA cluster work together as a system. CAF2 is generated by combining information from each of the sponsors Full Options Appraisals. The result is a suite of tables and diagrams to match those presented in the Full Options Appraisals but which show 'cumulative' and 'collective' performance for the whole cluster, rather than performance for a single ACP. The CAF2 report has been collated from, and on behalf of, the individual ACPs by the Airspace Change organising Group (ACOG). For information about the role and function of ACOG see the ACOG website

25. CAF3 will be produced at stage 4 of the CAP1616 process. It will combine information from each of the sponsors Final Options Appraisal, which take into account any changes made by the sponsors to their designs following public consultation.

Table 3: CAF Stages as Summarised in ScTMA Masterplan Iteration 3

CAF Phase	Key characteristics and use	Link to CAP1616 and Masterplan
CAF1: Review of Route Interdependencies, Design Conflicts and Trade-Offs	• Provides an assessment of design conflicts and trade-offs between route options in interdependent ACPs • Provides a basis for sponsors to resolve design conflicts considering collective performance (including cumulative impacts) • Trade-off information may be drawn from Initial Options Appraisals • Qualitative, with additional quantitative assessment added where necessary	• Prior to sponsors starting CAP1616 Full Options Appraisal • Outputs will be presented in the Stage 3 Consult Gateway submissions and Masterplan Iteration 3 • CAF1 information in Masterplan Iteration 3 demonstrates how cumulative impact, collective impact and trade-offs have been accounted for in the design pre-consultation
CAF2: Full CAF	• Identifies cumulative impact of consultation options • Generation of information to describe collective cluster -wide performance and trade-offs for consultation options • Comparison between cluster-wide consultation option(s) and the cluster-wide baseline • Information drawn from Full Options Appraisals	• After each sponsor in the cluster has completed Full Options Appraisal • Outputs are presented in the Stage 3 Consult Gateway submissions (and Masterplan Iteration 4 which will be produced after consultation)
CAF3: Final CAF	• Identifies cumulative impacts of final designs • Generation of information to describe collective performance and trade-offs in the final cluster-wide design • Comparison between final cluster-wide design and the cluster-wide baseline • Information drawn from Final Options Appraisals	• After each sponsor in the cluster has completed Final Options Appraisal • Outputs will be presented in Masterplan Iteration 4 • Comparison of CAF3 and CAF2 output in Masterplan Iteration 4 will demonstrate how cumulative impact, collective impact and trade-offs have been affected by the design updates in Stage 4

3 CAF2 Methodology

26. CAF2 provides information on how the consultation options in the three separate ACPs in the ScTMA cluster work together as a system. CAF2 is generated by combining information from each sponsors Full Options Appraisals. The result is a suite of tables and diagrams to match those presented in the Full Options Appraisals in the cluster's individual ACPs, but which show 'cumulative' and 'collective' performance for the whole cluster, rather than the performance for a single ACP.

27. **Cumulative data** helps individual stakeholders identify where and how they may be affected by more than one ACP, for example a community may be overflown by 10 aircraft a day from one ACP and 20 from another ACP – giving a cumulative overflight impact from both ACPs of 30 over flights per day for that community. (Note that for ScTMA the CAF shows there are no such cumulative impacts because of the distance between Glasgow and Edinburgh Airports – this is demonstrated through the data presented in this report and its annexes).

28. **Collective data** describes the overall performance of all the ACPs when considered as a cluster. This is of relevance to stakeholders with interests which are not location specific. For example those interested in climate change may have little interest in how much CO_2e individual ACPs generate as it is the total effect of the cluster on global climate change that is most relevant to them.

29. In both cumulative and collective cases the methodology is, in the simplest terms, to add together the performance data from the individual CAP1616 Full Options Appraisals within the cluster, and present an equivalent for the cluster level performance. For full details of the methodology for CAF2 see the Masterplan Appendices 1 and 2.

30. Note that the focus of CAF2 is on the quantitative data. It does not seek to collate and repeat the local qualitative assessment unless they are deemed significant to the overall case for change. For full local detail see the individual ACPs.

Analysis Period and Forecasting

31. Implementation is currently planned for 2027. Each of the contributing Full Option Appraisal annual analyses have therefore used the 2027 and 2036, respectively as the year of implementation (year 1), and year 10 following implementation. The rest of this document presents ScTMA cluster data for this analysis period.

32. 'Current-day' information is also required by CAP1616 and presented here on a collective basis. This data relates to 2023, apart from the Glasgow Airport noise data for which the latest year available at the time of analysis was 2022. The collective noise data for the 'current year' is therefore a composite of 2023 data for Edinburgh Airport and 2022 data for Glasgow Airport. It should therefore be considered as indicative of 'current day' impacts rather than a definite set of results for a specific year.

Comparison

33. The following sections present information on the collective performance of the ScTMA cluster. Section 6 presents the baseline data and sections 7 and 8 show how the performance of the cluster-wide 'with airspace change' option differs from the 'without airspace change' baseline. The data behind the comparisons is presented in the annexes.

Combined CO_2e/Fuel Methodology

34. The nature of CO_2e benefits make it necessary for interdependent ACPs to collaborate to analyse CO_2e, rather than progressing entirely separate analyses. This shared methodology is presented in Annex A.

Methodology for Other Impact Categories

35. There is no interdependency between the ScTMA sponsors assessment for the other appraisal impact categories including noise and overflight. Therefore, they have progressed them independently and details of their methodologies are included the individual ACPs.

Other Shared Assumptions

36. There are a number of assumptions that underpin full options appraisal. Assumptions that have been shared between sponsors are listed in Annex C.

Rounding

37. In their Full Options Appraisal sponsors have rounded the result they have presented. CAF2 has worked from the data provided by sponsors, which in some cases has been unrounded source data, and then applied the same rounding protocol. This means that the CAF2 results are an accurate collective representation of the data supplied, but in places may not exactly match the sum of the rounded data presented in the individual Full Options Appraisals.

Safety

38. This document is focussed on the option appraisal impact categories rather than safety. Sponsors have captured safety assurance information relevant to their changes, and to how their changes interface with neighbouring ACPs, in their respective ACPs.

Annexes

39. This document and its annexes present the Tables and Figures in the same way as the individual Full Options Appraisals they are built from. These appraisals sought to present data in the main report that is most relevant to each category, with the annexes presenting any remaining data sets/figures. The CAF2 report and annexes follows the same principles with the distribution of data between the main report and annexes matching the airport submissions as far as practical (given the difference in presentation between the Full Options Appraisals).

4 Consultation Options

40. The consultation options being presented by each sponsor are as listed in Table 4.

Table 4: ACP Consultation Options

Sponsor	Sponsor Option
NERL	Option 1 – Modernised ATS Route Structure including providing connectivity to Standard Instrument Departure route end points, STARs and holding facilities.
Glasgow Airport	Option 5 - PBN Approach Transitions with vectors. PBN Standard Instrument Departure routes with no offsets
Edinburgh Airport	Option 1 – PBN Standard Instrument Departure routes and Approach Transitions with vectoring only for safety and weather

5 Interdependencies and Trade Offs

41. In developing their Stage 2 options into viable options for the cluster, sponsors have considered interdependencies between the ACPs. Interdependencies encountered in the generation of a viable cluster-wide design are reported in the ScTMA Masterplan Iteration 3.

42. Following the development of viable cluster-wide designs, sponsors have performed Full Options Appraisals on their ACP options to determine which will be presented in their consultation material (their 'consultation options').

43. In the case of the ScTMA cluster, there were no interdependencies between the sponsors options for the Full Options Appraisal. This means that none of the options in one ACP's Full Options Appraisal were dependent on another sponsor choosing a specific option for their ACP.

44. By extension, this also means that there were no interdependencies or trade-offs to consider with respect to the consultation option assessed in CAF2 (i.e. all combinations of consultation options are compatible)[2].

45. While there may be no interdependencies or trade-offs between consultation options, there remains a requirement for CAF2 to describe cumulative performance (or lack of in this case) and collective performance. This information is provided in this CAF2 report (and annexes) so that stakeholders can assess how the ScTMA cluster as a whole may affect them.

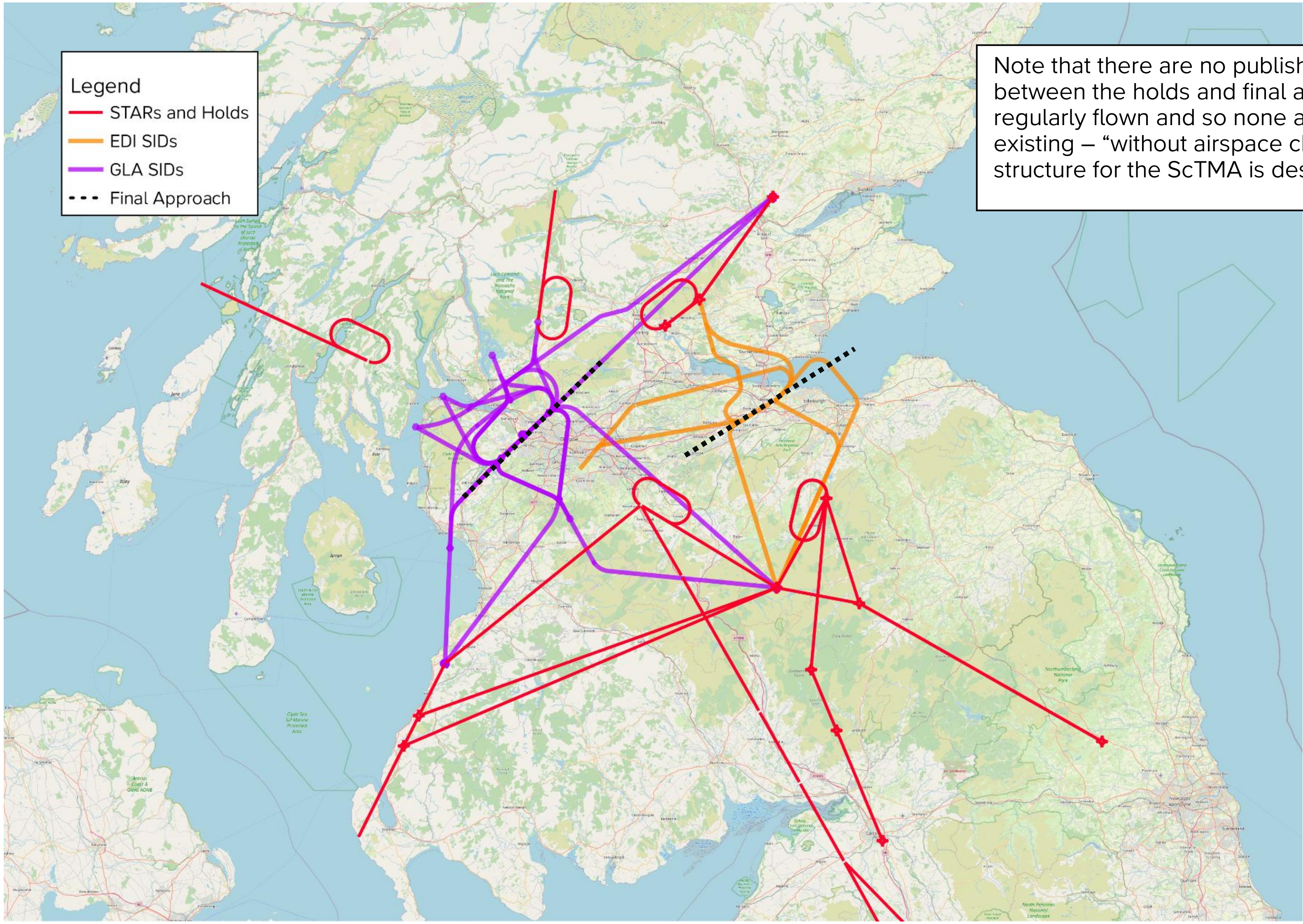
[2] Note that while there were no trade-offs between the *consultation options* assessed in CAF2, there were two design conflicts and associated trade-offs between the NERL and Glasgow Airport ACPs that were identified in the design phase. These occurred in the design process prior to Full Options Appraisl and were documented through th CAF1 process. For further details of the design conflicts see Appendix C of the Masterplan..

6 Cluster-Wide Baseline “Without Airspace Change”

46. All sponsors have analysed a Baseline performance for their part of the cluster-wide design. This section collates that data to provide information on the cluster-wide baseline performance for a ‘current year’ (this is based on last full year of data available when the sponsors undertook the analysis, which was either 2023 or 2022 depending on the analysis in question), together with projected performance for the years 2027 (year of implementation) and 2036 (10 years following implementation).

47. Figure 1 shows the existing, published, departure and arrival route structure for Edinburgh and Glasgow Airports for reference (note that there are no published arrival routes below 7000ft that are regularly flown and so none are shown). Above and beyond these routes lies the network of routes that provide onward connections for Glasgow and Edinburgh Airports, and which are used by other flights crossing the region (these include routes above 7000ft used by Prestwick Airport flights). These are not shown on Figure 1 because the diagram would become too crowded and difficult to interpret. The existing “without airspace change” airspace structure for the ScTMA is fully described in the UK AIP. Details of the specific structures that are proposed to change can be found in the individual ACP submissions/consultations.

48. Figure 2 show the pattern of overflights seen today on these routes below 7000ft. This shows flight paths from a 2 week period covering both Easterly and Westerly operations at each airport. This figure is provided for information only. For detailed descriptions of the scope of the changes below and above 7,000ft please see the individual ACP submissions/consultations.



Note that there are no published arrival routes between the holds and final approach that are regularly flown and so none are shown. The full existing – "without airspace change" airspace structure for the ScTMA is described in the UK AIP.

Figure 1: 'Without Airspace Change' Standard Instrument Departures, Holds and Standard Arrivals Routes for Edinburgh and Glasgow Airports

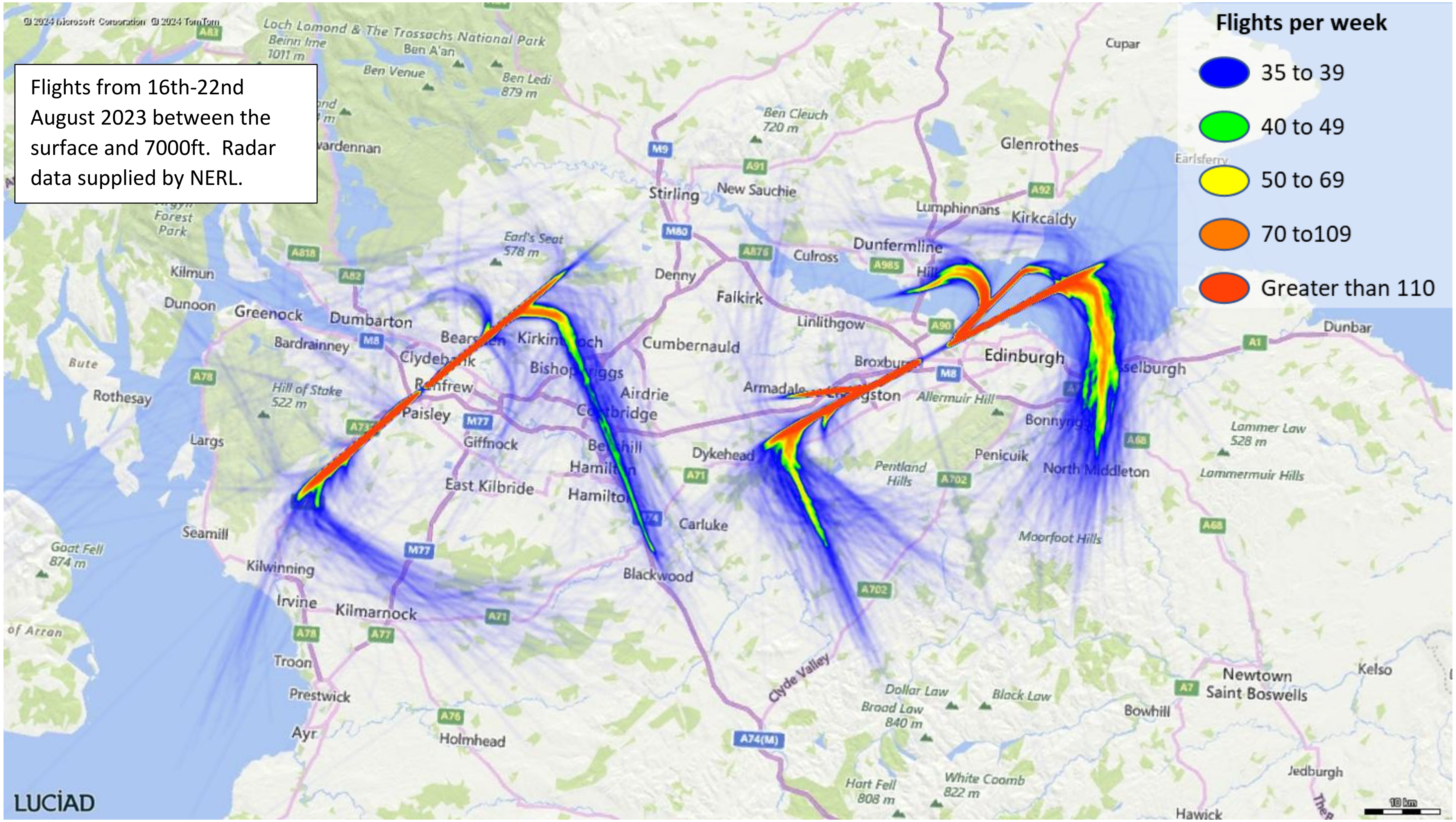


Figure 2: Current Day Glasgow and Edinburgh Airport Flight Paths Below 7000ft for Easterly and Westerly Operations

L_{Aeq} for “Without Airspace Change” Baseline - Communities

49. The following tables show collective L_{Aeq} noise contour data for the ‘without airspace change’ current day scenario (2022/2023[3]), 2027 (year of implementation) and 2036 (10 years following implementation).For each contour band, the area of the contour is presented along with the total population, total households and number of potentially noise sensitive buildings within each band.

50. The contour figures are provided in Annex D. In all case these show there is considerable distance between the contours at the different airports and so there is no cumulative impact to consider. For more detailed views of contours or each airport, please see the individual ACP submissions/consultation material relevant to the area of interest.

[3] The current year is the latest full year sample available at the time the sponsor commenced its analysis. For Glasgow Airport the year used was 2022, for Edinburgh Airport the year used was 2023)

Table 5: $L_{Aeq, 16 Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day

Year	Scenario	Metric	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2022 (GLA) 2023 (EDI)	Without Airspace Change	$L_{Aeq16hr}$	51	86.98	47,100	101,500	34	1	18	28	226
			54	47.87	15,400	32,600	9	0	5	10	132
			57	25.26	4,200	8,700	1	0	1	2	66
			60	12.98	1,300	2,600	1	0	1	1	23
			63	6.76	200	400	0	0	0	0	3
			66	2.13	100	100	0	0	0	0	0
			69	1.14	0	0	0	0	0	0	0
			72	0.68	0	0	0	0	0	0	0

Table 6: $L_{Aeq, 16 Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027

Year	Scenario	Metric	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2027	Without Airspace Change	$L_{Aeq16hr}$	51	108.06	58,700	126,800	50	1	20	33	257
			54	59.93	22,100	47,000	16	0	10	18	162
			57	32.52	6,500	13,800	4	0	1	4	81
			60	16.83	2,100	4,300	1	0	1	2	44
			63	8.64	200	500	0	0	0	0	10
			66	2.9	100	200	0	0	0	0	1
			69	1.52	0	0	0	0	0	0	0
			72	0.86	0	0	0	0	0	0	0

Table 7: $L_{Aeq,\ 16\ Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036

Year	Scenario	Metric	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2036	Without Airspace Change	$L_{Aeq16hr}$	51	121.53	64,700	139,800	54	1	22	39	284
			54	68.14	27,200	58,400	21	1	11	21	177
			57	37.37	8,100	17,300	6	0	1	5	101
			60	19.59	2,400	4,900	1	0	1	2	49
			63	10.11	500	900	0	0	0	0	15
			66	3.48	200	300	0	0	0	0	1
			69	1.81	<100	<100	0	0	0	0	0
			72	1	0	0	0	0	0	0	0

Table 8: $L_{Aeq,\ 8\ Hr}$, Night-Time Cluster-Wide "Without Airspace Change" Baseline, Current Day

Year	Scenario	Metric	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2022 (GLA) 2023 (EDI)	Without Airspace Change	L_{Aeq8hr}	45	134.62	69,800	150,600	63	1	25	50	291
			48	76.42	34,400	73,100	31	0	17	26	191
			51	40.52	12,400	25,400	10	0	5	12	112
			54	20.44	2,600	5,100	1	0	1	2	58
			57	10.5	900	1,800	1	0	1	0	17
			60	3	100	200	0	0	0	0	2
			63	1.51	0	0	0	0	0	0	0
			66	0.81	0	0	0	0	0	0	0
			69	0.5	0	0	0	0	0	0	0
			72	0.31	0	0	0	0	0	0	0

Table 9: $L_{Aeq, 8 Hr}$, Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2027

Year	Scenario	Metric	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2027	Without Airspace Change	L_{Aeq8hr}	45	151.19	75,500	163,300	66	1	27	55	336
			48	85.87	45,500	97,700	35	1	19	28	209
			51	46.44	15,000	31,200	13	0	6	14	122
			54	23.72	2,900	6,000	1	0	1	2	64
			57	12.17	1,100	2,300	1	0	1	1	24
			60	3.59	200	300	0	0	0	0	3
			63	1.85	<100	<100	0	0	0	0	0
			66	0.95	0	0	0	0	0	0	0
			69	0.56	0	0	0	0	0	0	0
			72	0.36	0	0	0	0	0	0	0

Table 10: $L_{Aeq, 8 Hr}$, Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2036

Year	Scenario	Metric	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2036	Without Airspace Change	L_{Aeq8hr}	45	167.66	80,100	173,200	68	1	28	58	360
			48	95.89	50,100	107,700	38	1	19	28	232
			51	52.48	18,200	38,100	15	0	8	17	138
			54	27.26	3,800	7,800	1	0	1	2	70
			57	14.01	1,400	2,700	1	0	1	1	36
			60	4.39	200	500	0	0	0	0	7
			63	2.25	100	100	0	0	0	0	0
			66	1.13	0	0	0	0	0	0	0
			69	0.64	0	0	0	0	0	0	0
			72	0.41	0	0	0	0	0	0	0

N60 and N65 contours "Without Airspace Change" Baseline - Communities

51. The following tables show collective N65 and N60 noise contour data for the 'without airspace change' current day scenario (2022/2023 [4]), the year of proposed implementation (2027) and 10 years following proposed implementation (2036). For each contour band, the area within the contour is presented along with the population and number of potentially noise sensitive buildings within each band.

52. The contour figures are provided in Annex D. In all case these show there is sufficient distance between the contours at the different airports to assume there is no cumulative impact to consider. For more detailed views of contours or each airport, please see the individual ACP submissions/consultation material relevant to the area of interest.

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[4] The current year is the latest full year sample available at the time the sponsor commenced its analysis. For Glasgow Airport the year used was 2022, for Edinburgh Airport the year used was 2023)

Table 11: N65 Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day

Year	Scenario	Metric	Contour (Flights per Day)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2022 (GLA) 2023 (EDI)	Without Airspace Change	N65 (Day)	5	229.53	102,900	220,500	80	1	36	78	583
			10	182.45	85,400	184,600	73	1	31	65	374
			20	138.44	70,800	153,300	64	1	25	50	298
			50	78.89	35,900	77,700	26	1	17	26	211
			100	30.61	6,000	13,000	4	0	3	1	106
			200	2.28	0	0	0	0	0	0	0

Table 12: N65 Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027

Year	Scenario	Metric	Contour (Flights per Day)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2027	Without Airspace Change	N65 (Day)	5	256.16	112,300	240,200	82	1	39	83	692
			10	203.44	90,100	194,200	74	1	33	66	427
			20	157.17	76,500	165,800	68	1	27	53	323
			50	99.17	49,700	107,600	34	1	18	34	241
			100	48.01	14,300	31,100	8	1	5	7	144
			200	3.99	<100	100	0	0	0	0	0

Table 13: N65 Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036

Year	Scenario	Metric	Contour (Flights per Day)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2036	Without Airspace Change	N65 (Day)	5	268.28	116,500	249,300	83	1	39	85	744
			10	212.19	94,300	202,800	74	1	35	67	441
			20	166.05	79,100	171,200	72	1	28	56	353
			50	107.9	53,800	116,900	41	1	19	36	253
			100	54.32	19,600	43,100	11	1	7	9	152
			200	20.03	3,900	8,300	3	0	2	1	77

Table 14: N60 Night-Time Cluster-Wide "Without Airspace Change" Baseline, Current Day

Year	Scenario	Metric	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2022 (GLA) 2023 (EDI)	Without Airspace Change	N60 (Night)	5	258.09	117,600	251,000	85	1	41	88	669
			10	157.74	75,800	163,500	67	1	27	51	348
			20	58.24	14,700	32,100	8	1	6	2	130
			50	1.15	0	0	0	0	0	0	0

Table 15: N60 Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2027

Year	Scenario	Metric	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2027	Without Airspace Change	N60 (Night)	5	281.63	125,300	267,600	89	1	41	97	741
			10	170.54	82,600	177,500	69	1	27	57	370
			20	78.46	26,900	59,300	13	1	7	3	187
			50	2.76	<100	<100	0	0	0	0	1

Table 16: N60 Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2036

Year	Scenario	Metric	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2036	Without Airspace Change	N60 (Night)	5	306.39	134,300	287,600	94	2	42	98	776
			10	190.89	92,700	199,900	74	1	32	61	405
			20	89.07	32,100	70,700	24	1	7	7	212
			50	3.31	<100	100	0	0	0	0	6

Overflight Contours "Without Airspace Change" Baseline - Communities

53. The following tables show collective overflight data for the 'without airspace change' current day scenario (2022/2023[5]), the year of proposed implementation (2027) and 10 years following proposed implementation (2036). For each contour band, the area within the contour is presented along with the population and number of potentially noise sensitive buildings within each band.

54. The contour figures are provided in Annex D. In all case these show there is sufficient distance between the contours at the different airports to assume there is no cumulative impact to consider. For more detailed views of contours or each airport, please see the individual ACP submissions/consultation material relevant to the area of interest.

[5] The current year is the latest full year sample available at the time the sponsor commenced its analysis. For Glasgow Airport the year used was 2022, for Edinburgh Airport the year used was 2023)

Table 17: Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day

Year	Scenario	Metric	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2022 (GLA) 2023 (EDI)	Without Airspace Change	Overflights Day	5	1385.97	367,400	797,400	273	8	109	254	3,510
			10	743.34	250,100	549,400	187	6	81	165	2,130
			20	370.3	150,700	331,400	113	4	58	104	1,182
			50	76.36	33,600	74,000	27	1	8	18	77
			100	18.27	5,700	12,700	3	1	3	1	5

Table 18: Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027

Year	Scenario	Metric	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2027	Without Airspace Change	Overflights Day	5	1765.27	450,500	972,600	331	13	136	328	4,296
			10	941.45	278,200	611,000	210	7	89	186	2,338
			20	501.44	191,500	421,900	139	5	69	123	1,659
			50	107.57	43,400	94,600	32	1	11	27	123
			100	31.85	13,800	30,700	6	1	6	2	17

Table 19: Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036

Year	Scenario	Metric	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2036	Without Airspace Change	Overflights Day	5	1990.36	485,800	1,048,900	353	21	149	345	4,878
			10	1089.14	290,900	638,800	220	7	95	191	2,521
			20	581.44	212,800	468,700	152	5	74	129	1,871
			50	123.08	48,000	104,600	34	1	12	29	146
			100	47.85	20,700	46,300	18	1	7	9	33
			200	4.59	2,800	6,200	3	0	1	0	3

Table 20: Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, Current Day

Year	Scenario	Metric	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2022 (GLA) 2023 (EDI)	Without Airspace Change	Overflights Night	5	239.86	85,600	187,600	57	2	34	39	764
			10	64.5	24,800	54,300	20	1	10	13	61
			20	15.93	3,900	8,700	3	0	3	1	5

Table 21: Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2027

Year	Scenario	Metric	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2027	Without Airspace Change	Overflights Night	5	292.23	104,100	228,900	68	3	38	49	1,136
			10	88.18	38,500	84,100	30	1	10	22	83
			20	25.17	9,300	20,700	4	1	6	2	10

Table 22: Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2036

Year	Scenario	Metric	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2036	Without Airspace Change	Overflights Night	5	366.89	124,500	274,300	80	4	41	59	1,389
			10	105.86	43,900	95,900	32	1	12	24	119
			20	33.26	12,300	27,400	6	1	6	2	19

Local Air Quality for "Without Airspace Change" Baseline - Communities

55. The individual ACPs include an assessment of potential Loal Air Quality impacts from each proposal. In each case they conclude that the nature of the change unlikely to have a significant impact on local air quality and the impact is considered negligible. Local air quality is not assessed further for any options and so is not considered further in this CAF2 assessment.

Greenhouse Gas Emissions for "Without Airspace Change" Baseline – Wider society

56. Annual and per flight greenhouse gas emissions are presented in Table 23 for the 'without airspace change' scenario[6].

Table 23: CO_2e "Without Airspace Change" Baseline, Current Day (2023) and 2027-2036

Year	Annual total GHG emissions (KtCO2e)	Average GHG emissions per flight (kgCO2e)
2023	1208.9	5,961.1
2027	1569.1	6,067.9
2028	1591.3	6,077.1
2029	1613.4	6,086.0
2030	1635.5	6,094.7
2031	1657.7	6,103.2
2032	1679.8	6,111.5
2033	1702.0	6,119.6
2034	1724.1	6,127.5
2035	1746.2	6,135.2
2036	1768.4	6,142.8

57. The impact of CO_2e is not location specific and so there is no cumulative impact to consider.

[6] Please refer to the greenhouse gas emissions methodology section provided in Annex B for contextual information on how the use of planned flight data in the NERL modelling may affect this result

Tranquillity for "Without Airspace Change" Baseline – Wider society

58. The following tables show the collective area and number of locations/spaces that are relevant to the consideration of tranquillity and sit within the L_{Aeq}, N65, N60 and overflight contours. These data cover the 'without airspace change' current day scenario (2022/2023[7]), the year of proposed implementation (2027) and 10 years following proposed implementation (2036). As can be seen in the tables there are a number of Candidate Quiet Areas (CQA), Country Park, Gardens and designated Landscapes and Scheduled Ancient Monuments (SAMs) that are overflown, but no National Scenic Areas (NSA) or National Parks that are overflown below 7,000ft more than five times a day/night in the baseline. For maps of the receptors see the individual ACP Full Options Appraisal submissions.

59. The tranquillity data is based on the noise and overflight contours, for which it has already been concluded there is no cumulative impact, there is likewise no cumulative impact to consider regarding locations/spaces relevant to the consideration of tranquillity. For a more detailed view of how noise and overflight contours affect particular locations, please see the individual ACP submissions/consultation material relevant to that area.

Table 24: Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day

Year	Scenario	Metric	Contour (dB)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)
2022 (GLA) 2023 (EDI)	Without Airspace Change	$L_{Aeq16hr}$	51	1	0.07	5	3.69	4	5.28	0	0	0	0	14	0.35
			54	0	0	4	1	4	3.8	0	0	0	0	10	0.22
			57	0	0	2	0.24	3	1.91	0	0	0	0	8	0.15
			60	0	0	0	0	3	0.84	0	0	0	0	5	0.05
			63	0	0	0	0	2	0.36	0	0	0	0	4	0.04
			66	0	0	0	0	1	0.03	0	0	0	0	2	0.02
			69	0	0	0	0	0	0	0	0	0	0	1	0
			72	0	0	0	0	0	0	0	0	0	0	0	0

[7] The current year is the latest full year sample available at the time the sponsor commenced its analysis. For Glasgow Airport the year used was 2022, for Edinburgh Airport the year used was 2023)

Table 25: Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027

Year	Scenario	Metric	Contour (dB)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
2027	Without Airspace Change	$L_{Aeq16hr}$	51	1	0.13	5	4.43	5	6	0	0	0	0	21	0.4
			54	1	0	5	2.17	4	4.53	0	0	0	0	13	0.26
			57	0	0	4	0.58	4	2.76	0	0	0	0	8	0.19
			60	0	0	0	0	3	1.25	0	0	0	0	8	0.09
			63	0	0	0	0	2	0.56	0	0	0	0	4	0.04
			66	0	0	0	0	1	0.16	0	0	0	0	3	0.02
			69	0	0	0	0	0	0	0	0	0	0	2	0
			72	0	0	0	0	0	0	0	0	0	0	0	0

Table 26: Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036

Year	Scenario	Metric	Contour (dB)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
2036	Without Airspace Change	$L_{Aeq16hr}$	51	1	0.2	5	4.74	5	6.48	0	0	0	0	22	0.41
			54	1	0.02	5	3.11	4	4.93	0	0	0	0	13	0.28
			57	0	0	4	0.76	4	3.34	0	0	0	0	9	0.2
			60	0	0	1	0.02	3	1.61	0	0	0	0	8	0.12
			63	0	0	0	0	3	0.71	0	0	0	0	4	0.04
			66	0	0	0	0	2	0.25	0	0	0	0	3	0.02
			69	0	0	0	0	1	0	0	0	0	0	2	0.01
			72	0	0	0	0	0	0	0	0	0	0	1	0

Table 27: Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day

Year	Scenario	Metric	Contour (Flights per Day)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)
2022 (GLA) 2023 (EDI)	Without Airspace Change	Overflights Day	5	10	14.8	10	7.17	31	37.99	0	0	0	0	230	6.02
			10	5	10.29	9	6.45	20	29.27	0	0	0	0	131	4.08
			20	3	4.23	7	4.93	11	14.93	0	0	0	0	76	2.72
			50	0	0	3	0.68	3	0.66	0	0	0	0	13	0.45
			100	0	0	1	0.38	2	0.24	0	0	0	0	3	0.09

Table 28: Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027

Year	Scenario	Metric	Contour (Flights per Day)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)
2027	Without Airspace Change	Overflights Day	5	10	15.79	13	7.82	34	41.43	0	0	0	0	261	6.76
			10	6	10.91	10	6.8	25	30.75	0	0	0	0	166	4.71
			20	4	7.2	7	5.68	17	22.92	0	0	0	0	100	3.49
			50	0	0	4	2.38	3	2.41	0	0	0	0	16	0.55
			100	0	0	2	0.51	2	0.4	0	0	0	0	5	0.32

Table 29: Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036

Year	Scenario	Metric	Contour (Flights per Day)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)
2036	Without Airspace Change	Overflights Day	5	10	16.28	13	8.07	38	44.65	0	0	0	0	306	7.58
			10	6	12.5	10	6.93	25	33.43	0	0	0	0	195	5.25
			20	4	7.77	8	5.94	18	24.6	0	0	0	0	107	3.7
			50	0	0	4	2.75	3	2.74	0	0	0	0	17	0.58
			100	0	0	2	0.57	2	0.5	0	0	0	0	9	0.38
			200	0	0	0	0	1	0	0	0	0	0	2	0.03

Biodiversity Data for "Without Airspace Change" Baseline – Wider Society

60. The ACPs identify that their changes would not result in likely significant effects on the conservation objectives of any European site. The flights in the baseline do not overlap below the HRA scoping level of 3,000ft and so there are no cumulative effects to consider.

61. However, the sponsors have provided the following tables to show the number and area of European Sites (RAMSAR, SAC, SPA) that are collectively overflown below 7,000ft for the 'without airspace change' current day scenario (2022/2023[8]), the year of proposed implementation (2027) and 10 years following proposed implementation (2036). For maps showing these areas see the individual ACP appraisals.

Table 30: Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, Current Day

Year	Scenario	Metric	Contour (Flights per Day)	RAMSAR		SAC		SPA	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
2022 (GLA) 2023 (EDI)	Without Airspace Change	Overflights Day	5	16	13.9	8	19.77	19	243.46
			10	13	8.01	2	0.38	15	186.8
			20	7	5.9	0	0	9	101.11
			50	1	0.62	0	0	3	17.08
			100	1	0.38	0	0	3	8.62

[8] The current year is the latest full year sample available at the time the sponsor commenced its analysis. For Glasgow Airport the year used was 2022, for Edinburgh Airport the year used was 2023)

Table 31: Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2027

Year	Scenario	Metric	Contour (Flights per Day)	RAMSAR		SAC		SPA	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
2027	Without Airspace Change	Overflights Day	5	17	16.51	9	30	21	277.21
			10	14	10.32	7	2.51	17	204.68
			20	11	6.89	0	0	13	121.24
			50	1	2.28	0	0	3	26.8
			100	1	0.51	0	0	3	12.22

Table 32: Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "Without Airspace Change" Baseline, 2036

Year	Scenario	Metric	Contour (Flights per Day)	RAMSAR		SAC		SPA	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
2036	Without Airspace Change	Overflights Day	5	17	17.73	9	32.09	22	294.9
			10	16	12	8	13.59	19	220.41
			20	11	7.23	0	0	13	143.6
			50	1	2.63	0	0	3	36.04
			100	1	0.57	0	0	3	14.36
			200	0	0	0	0	0	0

Table 33: Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, Current Day

Year	Scenario	Metric	Contour (Flights per Day)	RAMSAR		SAC		SPA	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
2022 (GLA) 2023 (EDI)	Without Airspace Change	Overflights Night	5	4	3.67	0	0	6	75.89
			10	1	0.64	0	0	3	18.55
			20	1	0.45	0	0	3	9.99

Table 34: Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2027

Year	Scenario	Metric	Contour (Flights per Day)	RAMSAR		SAC		SPA	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
2027	Without Airspace Change	Overflights Night	5	4	4.41	0	0	6	87.22
			10	1	0.66	0	0	3	20.46
			20	1	0.49	0	0	3	11.4

Table 35: Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "Without Airspace Change" Baseline, 2036

Year	Scenario	Metric	Contour (Flights per Day)	RAMSAR		SAC		SPA	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
2036	Without Airspace Change	Overflights Night	5	6	5.27	0	0	8	107.81
			10	1	0.69	0	0	3	27.07
			20	1	0.55	0	0	3	13.58

Capacity/Resilience for "Without Airspace Change" Baseline - Wider society

62. Table 36 shows Glasgow Airport's modelled pre-departure ground delay for 2027 and 2036 whereas and NERLs has modelled network delay for the same periods. Edinburgh presented only qualitative information relating to delay so are not represented in this table.

Table 36: Pre-departure Ground Dealy and Network Delay for "Without Airspace Change" Baseline, 2027 & 2036

Without Airspace Change	Delay Minutes	
	2027	2036
Pre Departure Ground Delay (Glasgow Only)	46,989	62,320
Network Delay	114,971	176,051

Access – General Aviation

63. Details of the existing controlled airspace structures can be found in Section ENR 6.6 and 6.7 in the UK AIP.

Economic Impact from Increased Effective Capacity for "Without Airspace Change" Baseline – General Aviation/Commercial Airlines

64. The current cost of the delay figures from Table 36 have been monetised by the sponsors. See the individual ACPs for description of the values used to monetise the delay. This monetised value represents baseline from which the economic impact of increased effective capacity is calculated. This monetisation is captured in the Cost Benefit Section 8.

Fuel burn for "Without Airspace Change" Baseline – General Aviation/Commercial Airlines

65. Fuel burn is proportional to CO_2e and so is calculated by the same method/assumptions as described in Annex A.

Table 37: Fuel Burn for "Without Airspace Change" Baseline, Current Day (2023) and 2027-2036 & Total[9]

Year	Annual total fuel burn (Kt)	Annual Fuel Burn Cost (£) 2024 prices	Average Fuel Burn per Flight (kg)
2023	380.2	£ 260,785,756	1,874.5
2027	493.4	£ 338,489,871	1,908.2
2028	500.4	£ 343,265,898	1,911.0
2029	507.4	£ 348,041,924	1,913.8
2030	514.3	£ 352,817,951	1,916.6
2031	521.3	£ 357,593,977	1,919.2
2032	528.2	£362,370,004	1,921.9
2033	535.2	£ 367,146,030	1,924.4
2034	542.2	£ 371,922,057	1,926.9
2035	549.1	£ 376,698,083	1,929.3
2036	556.1	£ 381,474,110	1,931.7

Training Costs for "Without Airspace Change" Baseline – Commercial Airlines

66. This category relates to costs incurred through changing the airspace and so it is zero for the "without Airspace change" baseline.

Other Costs for "Without Airspace Change" Baseline – Commercial Airlines

67. This category relates to costs incurred through changing the airspace and so it is zero for the "without Airspace change" baseline.

Operational Costs for "Without Airspace Change" Baseline – Airport / ANSP

68. This category relates to costs incurred through changing the airspace and so it is zero for the "without Airspace change" baseline.

Deployment Costs for "Without Airspace Change" Baseline – Airport / ANSP

69. This category relates to costs incurred through changing the airspace and so it is zero for the "without Airspace change" baseline.

[9] The costs shown are not discounted – see Section 8 for Net Present Value calculations

Other Costs for “Without Airspace Change” Baseline – Airport / ANSP

70. This category relates to costs incurred through changing the airspace and so it is zero for the “without Airspace change” baseline.

7 Collective Performance – Cluster-Wide “With Airspace Change”

This section presents data showing the difference between Cluster “With Airspace Change” Proposal and the Baseline data set. The absolute results are also presented for key primary metrics, with absolute values for secondary and other metrics presented in Annex E.

71. Figure 3 shows the set of routes associated with the proposed cluster-wide “With Airspace Change” option. These include the PBN Standard Instrument Departures routes and PBN approach transitions from the Edinburgh and Glasgow Airport ACPs, and the holds and Standard Instrument Arrival routes for both airports that are included in the NERL ACP. These are provided for reference only, for details see the relevant ACP submission/consultation. Above and beyond these routes lies the network of routes for which NERL is also proposing change (these include routes above 7000ft used by Prestwick Airport flights). These are not shown on Figure 1 as the diagram would become too crowded; for this detail see the NERL ACP.

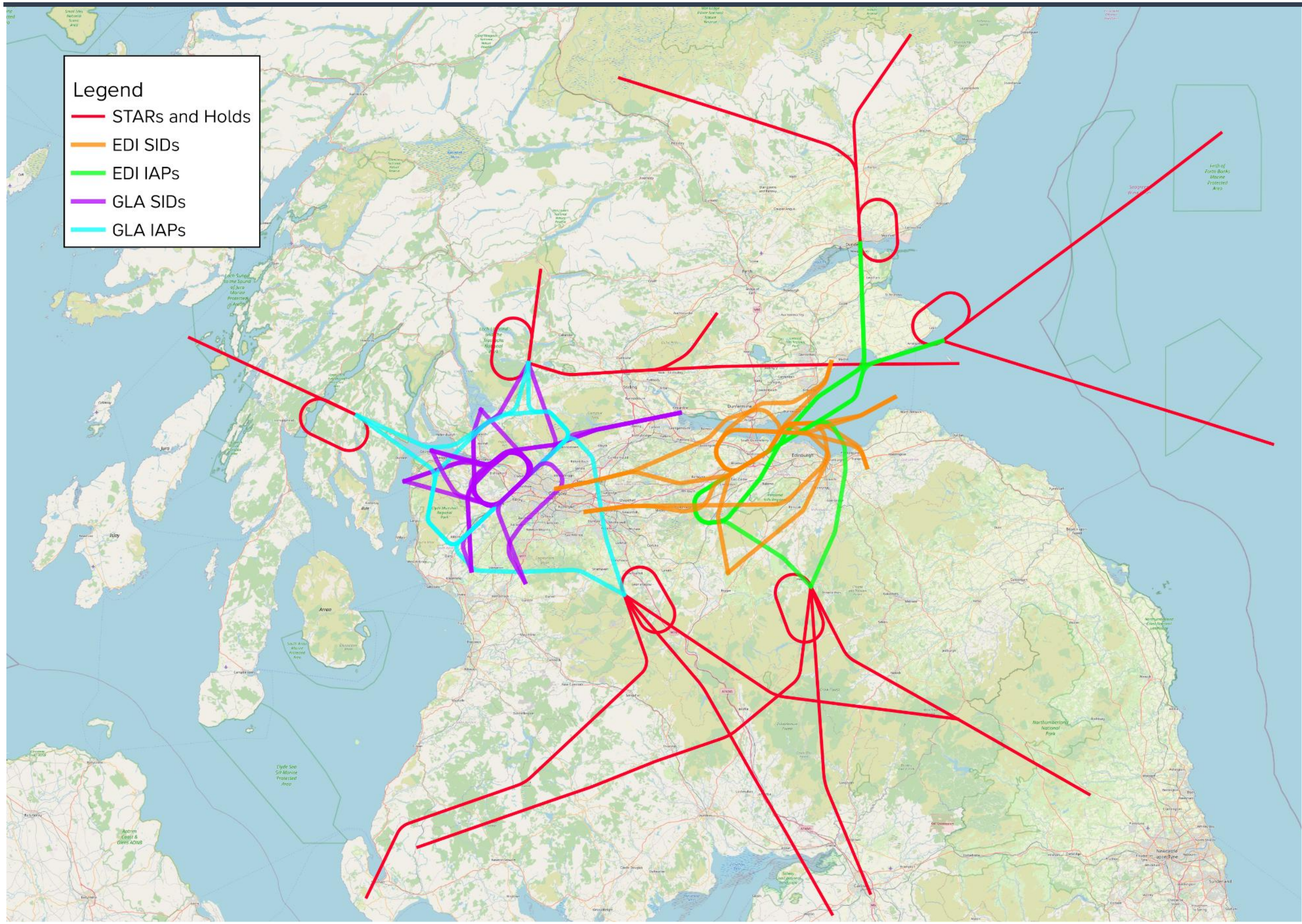


Figure 3: Cluster-Wide "With Airspace Change" Proposal Standard Instrument Departures (SIDs), Approach Transitions (IAPs), Standard Arrival Routes (STARs)and Holds for Edinburgh and Glasgow Airports

Noise for Cluster-Wide "With Airspace Change" Proposal - Communities

72. The output from the 'TAG noise workbook – aviation' is a primary measure of the adverse effects to health and quality of life for the purpose of the CAA's decision-making on a proposal (CAP1616i, November 2023, Parar 5.17).

73. TAG has been used by each sponsor to assess total adverse noise effects over a 10-year appraisal period (2027 – 2036). The individual assessments have been aggregated for this report.

74. The collective full TAG assessment results are presented in Table 38. The monetised net present value (NPV) of L_{Aeq} noise changes of this option is c.£32m (2024 prices). This positive value reflects a net benefit (i.e. a reduction in total adverse effects on health and quality of life from noise).

75. However, it should be noted that the population data also in Table 38 shows that this net benefit includes some people would experience more noise, albeit that all cases these would be outnumbered by people experiencing less noise. . The monetised difference is captured in the cost benefit analysis (see Section 88).

Table 38: Cluster-Wide "With Airspace Change" Proposal TAG Noise Assessment Results

NPV Total Noise (2024 prices)	NPV Sleep (2024 prices)	NPV Amenity (2024 prices)	NPV AMI (2024 prices)	NPV Stroke (2024 prices)	NPV Dementia (2024 prices)	individuals experiencing increased daytime noise in forecast year	individuals experiencing reduced daytime noise in forecast year	individuals experiencing increased night time noise in forecast year	individuals experiencing reduced night time noise in forecast year
£31,566,333	£19,576,635	£8,467,515	£35,742	£1,389,597	£2,096,844	8,756	48,729	21,472	74,830

L_{Aeq} for Cluster-Wide "With Airspace Change" Proposal - Communities

76. The TAG results are based on L_{Aeq} contour analysis. The difference between Cluster-Wide "With Airspace Change" Proposal and the baseline in term of L_{Aeq} contour statistics is presented below. All the associated contour diagrams are provided in the Annex E. In all case the contour diagrams show there is sufficient distance between the contours at the different airports to assume there is no cumulative impact to consider.

Table 39: Comparison Table for $L_{Aeq,\ 16\ Hr}$, ,Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027

Scenario	Metric	Year	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison $L_{Aeq16hr}$	2027	51	-3.53	-6,300	-13,900	-7	0	0	-1	-8
			54	-1.57	-2,500	-5,600	-2	0	-1	-1	-2
			57	-0.31	-200	-500	0	0	0	-1	-3
			60	-0.01	-100	-200	0	0	0	0	-3
			63	-0.02	0	-100	0	0	0	0	0
			66	-0.02	0	0	0	0	0	0	0
			69	0	0	0	0	0	0	0	0
			72	0	0	0	0	0	0	0	0

Table 40: Comparison Table for $L_{Aeq,\ 16\ Hr}$, ,Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036

Scenario	Metric	Year	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison $L_{Aeq16hr}$	2036	51	-2.76	-5,400	-12,000	-4	0	0	-6	0
			54	-1.88	-3,700	-8,000	-4	0	1	-2	3
			57	-0.52	-700	-1,600	-1	0	0	0	-14
			60	-0.02	-100	-100	0	0	0	0	-1
			63	-0.03	-100	-200	0	0	0	0	-3
			66	-0.02	0	0	0	0	0	0	0
			69	0.01	0	0	0	0	0	0	0
			72	-0.01	0	0	0	0	0	0	0

Table 41: Comparison Table for $L_{Aeq,\ 8\ Hr}$, ,Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027

Scenario	Metric	Year	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison L_{Aeq8hr}	2027	45	-2.53	-4,500	-10,400	-8	0	1	-5	-19
			48	-5.73	-11,100	-24,700	-6	0	-2	-3	-11
			51	-1.77	-2,200	-4,900	-5	0	0	-4	-5
			54	-0.12	0	100	0	0	0	0	-3
			57	0	0	-100	0	0	0	0	-2
			60	-0.01	0	0	0	0	0	0	1
			63	-0.02	0	0	0	0	0	0	0
			66	0	0	0	0	0	0	0	0
			69	0	0	0	0	0	0	0	0
			72	0	0	0	0	0	0	0	0

Table 42: Comparison Table for $L_{Aeq,\ 8\ Hr}$, Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036

Scenario	Metric	Year	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison L_{Aeq8hr}	2036	45	0.01	-2,800	-6,900	-7	0	1	-3	8
			48	-5.46	-4,700	-10,100	-3	0	-1	-2	-22
			51	-1.93	-3,200	-7,100	-5	0	-2	-5	-11
			54	-0.2	-300	-700	0	0	0	0	1
			57	0.04	0	0	0	0	0	0	0
			60	-0.04	0	0	0	0	0	0	0
			63	-0.01	0	0	0	0	0	0	0
			66	0.01	0	0	0	0	0	0	0
			69	0	0	0	0	0	0	0	0
			72	0	0	0	0	0	0	0	0

77. As L_{Aeq} is the primary noise metric the absolute values are also provided for reference below.

Table 43: $L_{Aeq,\ 16\ Hr}$, ,Daytime Cluster-Wide "With Airspace Change" Proposal, 2027

Year	Scenario	Metric	Contour (dB)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2027	With Airspace Change	$L_{Aeq16hr}$	51	104.53	52,400	112,900	43	1	20	32	249
			54	58.36	19,500	41,500	14	0	9	17	160
			57	32.21	6,300	13,300	4	0	1	3	78
			60	16.82	2,000	4,100	1	0	1	2	41
			63	8.62	200	400	0	0	0	0	10
			66	2.88	100	200	0	0	0	0	1
			69	1.52	0	0	0	0	0	0	0
			72	0.86	0	0	0	0	0	0	0

Table 44: $L_{Aeq,\ 16\ Hr}$, ,Daytime Cluster-Wide "With Airspace Change" Proposal, 2036

Year	Scenario	Metric	Contour (dB)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2036	With Airspace Change	$L_{Aeq16hr}$	51	118.77	59,300	127,800	50	1	22	33	284
			54	66.26	23,600	50,300	17	1	12	19	180
			57	36.85	7,400	15,700	5	0	1	5	87
			60	19.57	2,400	4,800	1	0	1	2	48
			63	10.08	400	700	0	0	0	0	12
			66	3.46	200	300	0	0	0	0	1
			69	1.82	<100	<100	0	0	0	0	0
			72	0.99	0	0	0	0	0	0	0

Table 45: $L_{Aeq, 8 Hr}$, ,Night-Time Cluster-Wide "With Airspace Change" Proposal, 2027

Year	Scenario	Metric	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2027	With Airspace Change	L_{Aeq8hr}	45	148.66	71,000	152,800	58	1	28	50	317
			48	80.14	34,400	73,000	29	1	17	25	198
			51	44.67	12,800	26,300	8	0	6	10	117
			54	23.6	2,900	6,000	1	0	1	2	61
			57	12.17	1,100	2,300	1	0	1	1	22
			60	3.58	200	300	0	0	0	0	4
			63	1.83	<100	<100	0	0	0	0	0
			66	0.95	0	0	0	0	0	0	0
			69	0.56	0	0	0	0	0	0	0
			72	0.36	0	0	0	0	0	0	0

Table 46: $L_{Aeq, 8 Hr}$, ,Night-Time Cluster-Wide "With Airspace Change" Proposal 2036

Year	Scenario	Metric	Contour (dB)	Area (km²)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
2036	With Airspace Change	L_{Aeq8hr}	45	167.67	77,200	166,300	61	1	29	55	368
			48	90.43	45,400	97,600	35	1	18	26	210
			51	50.55	15,000	31,000	10	0	6	12	127
			54	27.06	3,500	7,100	1	0	1	2	71
			57	14.05	1,400	2,700	1	0	1	1	36
			60	4.35	200	500	0	0	0	0	7
			63	2.24	100	100	0	0	0	0	0
			66	1.14	0	0	0	0	0	0	0
			69	0.64	0	0	0	0	0	0	0
			72	0.41	0	0	0	0	0	0	0

N60 and N65 contours for Cluster-Wide "With Airspace Change" Proposal - Communities

78. Number above contours show the locations where the number of events (i.e., flights) exceeds a pre-determined noise level, expressed in dB L_{ASmax}. For example, N65 contours show the number of events where the noise level from those flights exceeds 65 dB L_{ASmax}.

79. Number above contours are described in CAP1616i as secondary metrics and are not monetised or used to determine 'adverse noise effects'. Difference tables are presented below for information. The tables below show the difference in each contour band compared to the 'without airspace change' scenario. Absolute values and the contour diagrams are provided in Annex E. In all case the contour diagrams show there is sufficient distance between the contours at the different airports to assume there is no cumulative impact to consider.

Table 47: Comparison Table for N65,Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027

Scenario	Metric	Year	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison N65 (Day)	2027	5	50.92	900	1,900	1	0	5	6	31
			10	23.04	4,700	10,500	0	0	0	3	82
			20	-0.1	-2,000	-4,800	-3	0	1	-4	41
			50	-3.62	-5,400	-11,800	-5	0	0	-4	-2
			100	-1.51	-1,100	-2,400	0	0	0	0	-2
			200	0	0	0	0	0	0	0	0

Table 48: Comparison Table for N65 ,Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036

Scenario	Metric	Year	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison N65 (Day)	2036	5	54.73	-1,000	-2,500	0	0	6	5	31
			10	22.85	3,700	8,300	3	0	-2	3	81
			20	1.65	-1,800	-4,100	-6	0	0	-4	41
			50	-4.28	-6,100	-13,400	-9	0	0	-4	-10
			100	-2.01	-2,400	-5,400	-3	0	0	0	-4
			200	-2.25	-1,900	-4,000	-3	0	-2	-1	-26

Table 49: Comparison Table for N60 ,Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027

Scenario	Metric	Year	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison N60 (Night)	2027	5	17.36	-7,600	-16,800	-5	0	-2	-7	-63
			10	-11.52	-2,000	-4,400	-4	0	2	-4	-21
			20	-4.74	-5,100	-11,400	-4	0	-1	-1	-20
			50	0	0	0	0	0	0	0	0

Table 50: Comparison Table for N60 , Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036

Scenario	Metric	Year	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison N60 (Night)	2036	5	30.67	-11,900	-26,400	-8	-1	-3	-7	-52
			10	-8.6	-1,100	-2,600	-4	0	0	-5	-29
			20	-2.19	-4,800	-10,800	-8	0	0	-3	-3
			50	0	0	0	0	0	0	0	0

Overflight Contours for Cluster-Wide "With Airspace Change" Proposal - Communities

80. The measurement of 'overflight' is a secondary metric that can be useful for explaining the impacts of airspace change proposals.

81. Overflight contours are described in CAP1616i as secondary metrics and are not monetised or used to determine 'adverse noise effects'. The overflight metric is defined in CAP1498[10].

82. Difference tables are presented below for information. The tables below show the difference in each contour band compared to the 'without airspace change' scenario. Absolute values and the contour diagrams are provided in Annex E. In all case the contour diagrams show there is sufficient distance between the contours at the different airports to assume there is no cumulative impact to consider.

Table 51: Comparison Table for Overflight, Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027

Scenario	Metric	Year	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison Overflights Day	2027	5	-418.19	-114,800	-251,700	-76	-6	-27	-61	-1,426
			10	-51.94	-103,900	-228,500	-66	-5	-15	-35	-361
			20	40.49	-93,500	-206,100	-72	-4	-25	-57	-1,048
			50	126.86	7,400	16,300	-6	0	4	-3	140
			100	45.04	2,500	5,300	0	0	0	0	48

Table 52: Comparison Table for Overflight, Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036

Scenario	Metric	Year	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison Overflights Day	2036	5	-581.7	-126,800	-279,800	-81	-14	-35	-39	-1,791
			10	-97.34	-98,700	-217,000	-63	-5	-16	-30	-387
			20	27.59	-96,900	-213,700	-70	-4	-27	-52	-839
			50	198.1	11,400	25,500	-3	0	6	-2	184
			100	64.44	600	1,000	-9	0	2	-6	76
			200	2.38	-2,300	-5,200	-3	0	-1	0	3

[10] Note that the 48.5 degree cone definition of overflight has been used by all sponsors.

Table 53: Comparison Table for Overflight, Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027

Scenario	Metric	Year	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison Overflights Night	2027	5	170.43	-28,600	-63,800	-25	-2	-10	-16	-417
			10	69.18	-1,500	-3,600	-12	0	4	-11	116
			20	-1.65	-4,800	-10,700	-1	-1	-3	-1	0

Table 54: Comparison Table for Overflight, Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036

Scenario	Metric	Year	Contour (Flights per Day)	Area (km^2)	Total Households	Total Population	Number of Schools	Number of Hospitals	Number of Carehomes	Number of Places of Worship	Number of Listed Buildings
With Airspace Change	Comparison Overflights Night	2036	5	125.2	-44,200	-98,400	-30	-3	-13	-23	-463
			10	96.43	1,400	3,000	-8	0	3	-7	117
			20	66.31	4,900	10,900	1	0	1	-1	84

Local Air Quality for Cluster-Wide "With Airspace Change" Proposal - Communities

83. Not considered further – see para 55.

Greenhouse Gas Emissions for Cluster-Wide "With Airspace Change" Proposal – Wider society

84. TAG has been used to assess the greenhouse gas impact over a 10-year appraisal period. The change in CO_2e emissions over the 10-year appraisal period is a reduction of 219.8kT of which 127.7kT is traded in the UK ETS and 92.0kT is not[11]. This results in a total monetised net present value (NPV) benefit of £54m (including monetisation of both traded and non traded).

85. Annual greenhouse gas emissions (CO_2e) are presented in Table 55 for "With Airspace Change" Proposal[12].

Table 55: Comparison Table for CO_2e, Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027-2036 & Total

Year	Without Airspace Change		With Aispace Change		Difference	
	Annual total GHG emissions (KtCO2e)	Average GHG emissions per flight (kgCO2e)	Annual total GHG emissions (KtCO2e)	Average GHG emissions per flight (kgCO2e)	Annual total GHG emissions (KtCO2e)	Average GHG emissions per flight (kgCO2e)
2027	1,569.1	6,067.9	1,550.3	5,995.1	- 18.8	- 72.9
2028	1,591.3	6,077.1	1,571.7	6,002.5	- 19.5	- 74.6
2029	1,613.4	6,086.0	1,593.2	6,009.7	- 20.2	- 76.3
2030	1,635.5	6,094.7	1,614.6	6,016.7	- 20.9	- 78.0
2031	1,657.7	6,103.2	1,636.0	6,023.6	- 21.6	- 79.6
2032	1,679.8	6,111.5	1,657.5	6,030.3	- 22.3	- 81.2
2033	1,702.0	6,119.6	1,678.9	6,036.8	- 23.0	- 82.8
2034	1,724.1	6,127.5	1,700.4	6,043.2	- 23.7	- 84.3
2035	1,746.2	6,135.2	1,721.8	6,049.5	- 24.4	- 85.8
2036	1,768.4	6,142.8	1,743.3	6,055.6	- 25.1	- 87.2

[11] These figures are rounded (see paragraph 37 in Section 3)

[12] Please refer to the greenhouse gas emissions methodology section provided in Annex B for contextual information on how the use of planned flight data in the NERL modelling may affect this result

Tranquillity for Cluster-Wide "With Airspace Change" Proposal – Wider society

86. The difference to impact on designated tranquil sites of cluster-wide "With Airspace Change" proposal for daytime noise and overflight metrics, and for both 2027 and 2036 are shown below. Contour diagrams are provided in Annex E.

Table 56: Comparison Table for Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime, Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027

Scenario	Metric	Year	Contour (dB)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)
With Airspace Change	Comparison $L_{Aeq16hr}$	2027	51	0	-0.01	0	0.98	0	0.36	0	0	0	0	-2	-0.01
			54	0	0	0	-0.12	0	0.38	0	0	0	0	-2	-0.01
			57	0	0	0	-0.05	-1	0.03	0	0	0	0	0	-0.01
			60	0	0	0	0	0	-0.01	0	0	0	0	0	0
			63	0	0	0	0	0	-0.04	0	0	0	0	0	0
			66	0	0	0	0	0	-0.03	0	0	0	0	0	0
			69	0	0	0	0	0	0	0	0	0	0	0	0
			72	0	0	0	0	0	0	0	0	0	0	0	0

Table 57: Comparison Table for Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime, Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036

Scenario	Metric	Year	Contour (dB)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)
With Airspace Change	Comparison $L_{Aeq16hr}$	2036	51	0	-0.02	0	1.02	0	0.36	0	0	0	0	0	0
			54	0	0	0	0.13	0	0.37	0	0	0	0	-1	-0.02
			57	0	0	0	-0.08	0	0.1	0	0	0	0	0	-0.01
			60	0	0	0	-0.01	0	-0.03	0	0	0	0	0	-0.01
			63	0	0	0	0	0	-0.03	0	0	0	0	0	0
			66	0	0	0	0	-1	-0.03	0	0	0	0	0	0
			69	0	0	0	0	0	0	0	0	0	0	0	0
			72	0	0	0	0	0	0	0	0	0	0	0	0

Table 58: Table for Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime, Cluster-Wide "With Airspace Change" Proposal, 2027

Year	Scenario	Metric	Contour (dB)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)
2027	With Airspace Change	$L_{Aeq16hr}$	51	1	0.12	5	5.41	5	6.36	0	0	0	0	19	0.39
			54	1	0	5	2.05	4	4.91	0	0	0	0	11	0.25
			57	0	0	4	0.53	3	2.79	0	0	0	0	8	0.18
			60	0	0	0	0	3	1.24	0	0	0	0	8	0.09
			63	0	0	0	0	2	0.52	0	0	0	0	4	0.04
			66	0	0	0	0	1	0.13	0	0	0	0	3	0.02
			69	0	0	0	0	0	0	0	0	0	0	2	0
			72	0	0	0	0	0	0	0	0	0	0	0	0

Table 59: Table for Tranquillity Sites in Relation to $L_{Aeq,\ 16\ Hr}$, Daytime, Cluster-Wide "With Airspace Change" Proposal, 2036

Year	Scenario	Metric	Contour (dB)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)
2036	With Airspace Change	$L_{Aeq16hr}$	51	1	0.18	5	5.76	5	6.84	0	0	0	0	22	0.41
			54	1	0.02	5	3.24	4	5.3	0	0	0	0	12	0.26
			57	0	0	4	0.68	4	3.44	0	0	0	0	9	0.19
			60	0	0	1	0.01	3	1.58	0	0	0	0	8	0.11
			63	0	0	0	0	3	0.68	0	0	0	0	4	0.04
			66	0	0	0	0	1	0.22	0	0	0	0	3	0.02
			69	0	0	0	0	1	0	0	0	0	0	2	0.01
			72	0	0	0	0	0	0	0	0	0	0	1	0

Table 60: Comparison Table for Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027

Scenario	Metric	Year	Contour (Flights per Day)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)
With Airspace Change	Comparison Overflights Day	2027	5	0	5.93	6	-0.1	-10	-18.43	1	1.66	1	0.27	-78	-2.77
			10	2	7.33	1	-0.56	-11	-20.31	1	0.32	0	0	-51	-2.3
			20	1	-1.44	-2	-0.61	-9	-17.32	0	0	0	0	-23	-1.6
			50	2	1.55	1	0.49	2	0.88	0	0	0	0	22	0.62
			100	1	0	0	0.08	1	0.87	0	0	0	0	17	0.41

Table 61: Comparison Table for Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036

Scenario	Metric	Year	Contour (Flights per Day)	Country Parks		CQA		Gardens and Designated Landscapes		National Parks		NSA		SAMs	
				Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)	Total	Area (km²)
With Airspace Change	Comparison Overflights Day	2036	5	0	5.71	7	-0.03	-14	-20.77	1	2.71	1	0.41	-121	-3.4
			10	2	6.32	2	-0.41	-8	-17.89	1	0.51	0	0	-65	-2.51
			20	1	-1.38	-3	-0.8	-9	-18.82	0	0	0	0	-22	-1.72
			50	3	1.99	1	1.76	3	1.72	0	0	0	0	32	0.83
			100	1	0.02	1	0.1	2	0.93	0	0	0	0	16	0.38
			200	0	0	0	0	0	0.01	0	0	0	0	1	0.24

Biodiversity Data for Cluster-Wide "With Airspace Change" Proposal

87. The ACPs identify that their changes would not result in likely significant effects on the conservation objectives of any European site. The proposals do not overlap below the HRA scoping level of 3,000ft and so there are no cumulative effects to consider for the cluster -wide design..

88. However, the sponsors have provided the following tables to show the difference to impact on designated biodiversity sites of cluster-wide "With Airspace Change" proposal for daytime and nighttime overflight metrics, and for both 2027 and 2036 are shown below. Absolute values and the contour diagrams are provided in Annex E.

Table 62: Comparison Table for Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027

Scenario	Metric	Year	Contour (Flights per Day)	RAMSAR		SAC		SPA	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
With Airspace Change	Comparison Overflights Day	2027	5	-8	-5.11	-2	-13.27	-6	-38.8
			10	-9	-4.01	-1	12.64	-7	-1.93
			20	-7	-1.58	3	10.63	-7	27.79
			50	2	0.54	2	6.93	2	33.02
			100	1	0.08	0	0	1	20.9

Table 63: Comparison Table for Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036

Scenario	Metric	Year	Contour (Flights per Day)	RAMSAR		SAC		SPA	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
With Airspace Change	Comparison Overflights Day	2036	5	-8	-4.74	-2	-15.08	-7	-48.14
			10	-9	-5.3	-2	1.91	-7	-2.7
			20	-6	-1.68	3	11.14	-4	28.77
			50	3	2.33	3	8.92	3	57.54
			100	2	0.11	1	0.04	2	22.69
			200	0	0	0	0	1	3.94

Table 64: Comparison Table for Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027

Scenario	Metric	Year	Contour (Flights per Day)	RAMSAR		SAC		SPA	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
With Airspace Change	Comparison Overflights Night	2027	5	1	0.9	3	1.02	3	77.26
			10	2	0.18	1	0.08	2	22.59
			20	0	-0.04	0	0	0	2.52

Table 65: Comparison Table for Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036

Scenario	Metric	Year	Contour (Flights per Day)	RAMSAR		SAC		SPA	
				Total	Area (km^2)	Total	Area (km^2)	Total	Area (km^2)
With Airspace Change	Comparison Overflights Night	2036	5	-1	0.21	3	1.1	1	66.59
			10	2	0.2	1	0.12	2	18.3
			20	2	0.11	0	0	2	22.52

Capacity/Resilience for Cluster-Wide “With Airspace Change” Proposal - Wider society

89. Table 66 shows the reduction in pre-departure ground delay and network delay. Edinburgh Airport’s proposal presented only qualitative assessment relating to delay so are not represented in Table 36. This qualitative assessment identified potential benefits to their delay as a result of new routes that avoid some of the busiest downstream sectors over the North of England

Table 66: Comparison Table for Delay, Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2027-2036 & Total

With Airspace Change	Delay Minutes	
	2027	2036
Pre Departure Ground Delay (Glasgow Only)	35,772	52,336
Reduction in Pre Departure Ground Delay (Glasgow Only)	11,217	9,983
Network Delay	150,500	226,886
Reduction in Network Delay	35,529	50,835
Total Reduction	46,746	60,818

90. Both Edinburgh and Glasgow Airport identify that the published procedures today rely on conventional ground-based navigation aids called Very High Frequency Omnidirectional Range (VOR). This equipment is due to be decommissioned as part of a NERL UK wide programme under the Airspace Modernisation Programme. PBN routes would enable Edinburgh to continue operating as the VORs are decommissioned.

91. **Controlled airspace (CAS)** is airspace of defined dimensions within which an air traffic control (ATC) service is provided in accordance with the airspace classification. Its purpose is to create a known air traffic environment to achieve the objectives of the ATC service to prevent collisions between aircraft and to expedite and maintain an orderly flow of air traffic.

92. Different types of airspace are classified by a lettering system specified by ICAO. Class A to E airspace is known as “controlled airspace”; Class G airspace is “uncontrolled airspace”. The airspace classification type establishes the extent to which airspace users must comply with various regulations (embracing, for example, aircraft equipage, pilot qualification and applicable Rules of the Air) and the types of air traffic services that are provided in the airspace.

93. In the UK, controlled airspace is established primarily to protect commercial air transport passenger flights from other flights and is where Air Traffic Control (ATC) needs to have positive control over aircraft flying in the airspace in order to maintain safe separation between them. Uncontrolled airspace is airspace where aircraft are able to fly freely without being constrained by instructions from ATC, unless they request such a service.

94. Controlled airspace contains the network of corridors (known as Airways or the Route Network) which link the busy airspace surrounding the major airports. The controlled airspace around the major airports is designated variously as Control Zones (CTR), from the ground upwards to a specified upper limit; Control Areas (CTA), from a specified base level and Terminal Control Areas (TMA) which are larger CTAs normally encompassing a number of airports and extend from a specified base level above the ground to a specified upper limit. This can be seen in Figure 4.

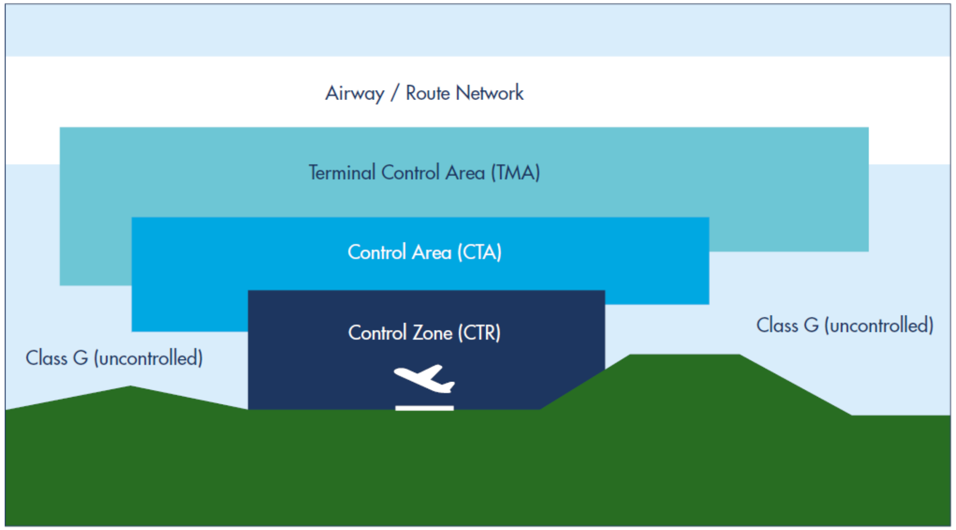


Figure 4: Illustrative example of CAS structures

95. Airspace change must account for the needs of all airspace users and ensure that the amount of proposed CAS is the minimum necessary to achieve safe and efficient operations. The remainder of the section presents information on the cluster-wide “With Airspace Change” proposal to describe the scale of proposed CAS and its potential impact on airspace accessibility for the General Aviation sector. Greater detail of the individual changes is available within each of the sponsors ACP submissions/consultation documents where the operations within CAS are described and proposed size of CAS is justified.

96. Table 67, Table 68 and Table 69 show breakdown of the volume of CAS changing classifications for eth whole cluster at all level, above 7000ft and below 7000ft respectively.

97. Table 67 shows that the overall proposal would result in an increased volume of CAS (and therefore decrease in Class G) of c.700 NM^3. However, this is a ‘net’ value. Table 69 shows that c.1300 NM^3 of new CAS is required by the changes above 7000ft to provide more efficient en-route connectivity. This airspace is predominantly at high level and much of it is over the sea (the Firth or Forth in particular). It is therefore not expected to have a major impact on non-commercial air traffic operations. Table 68 shows that below 7000ft there is a reduction of c.600 NM^3. The sponsors believe that it is airspace in areas that will be most beneficial for General Aviation, a conclusion that will be tested during the consultation.

Table 67: Volume of each type and classification of CAS in the baseline and proposed, combined Glasgow Airport, Edinburgh Airport and NERL ACPs (All Levels).

Airspace Type	Baseline Volume	Option A Volume	Volume Change (nm3)
CTR	773.2	737.6	- 35.5
CTA	26,129.4	26,778.7	649.3
TMA	9,467.3	9,512.3	45.1
Total	36,369.8	37,028.7	658.8

Airspace Classification	Baseline Volume	Option A Volume	Volume Change (nm3)
Class A	6,714.0	1,417.8	- 5,296.2
Class C	0.0	3,713.2	3,713.2
Class D	17,691.7	19,307.5	1,615.8
Class E	11,964.2	12,590.1	626.0
Total	36,369.8	37,028.7	658.8

Table 68: Volume of each type and classification of CAS in the baseline and proposed, combined Glasgow Airport, Edinburgh Airport and NERL ACPs 7000ft and below only.

Airspace Type	Baseline Volume	Option A Volume	Volume Change (NM^3)
CTR	773.2	737.6	- 35.5
CTA	7,667.8	7,100.1	- 567.7
TMA	9,467.3	9,468.8	1.5
Total	17,908.2	17,306.5	- 601.7

Airspace Classification	Baseline Volume	Option A Volume	Volume Change (NM^3)
Class A	404.4	95.2	- 309.2
Class C	0.0	0.0	0.0
Class D	13,389.0	13,566.8	177.8
Class E	4,114.9	3,644.6	- 470.3
Total	17,908.2	17,306.5	- 601.7

Table 69: Volume of each type and classification of CAS in the baseline and proposed, combined Glasgow Airport, Edinburgh Airport and NERL ACPs above 7000ft.

Airspace Type	Baseline Volume	Option A Volume	Volume Change (NM^3)
CTR	0.0	0.0	0.0
CTA	18,461.6	19,678.6	1,217.0
TMA	0.0	43.5	43.5
Total	18,461.6	19,722.1	1,260.5

Airspace Classification	Baseline Volume	Option A Volume	Volume Change (NM^3)
Class A	6,309.6	1,322.6	- 4,987.0
Class C	0.0	3,713.2	3,713.2
Class D	4,302.7	5,740.7	1,438.0
Class E	7,849.3	8,945.5	1,096.2
Total	18,461.6	19,722.2	1,260.6

98. In terms of access to controlled airspace, all sponsors have confirmed appropriately equipped and operated General Aviation aircraft will be granted clearance into CAS where traffic density and capacity permits. Table 67 shows that a net reduction of over 5,000 NM^3 in Class A airspace, which a corresponding increase in Class C, Class D and E which improves opportunities for access.

99. Reclassifying Class A to Class D or E helps to support VFR access of general aviation operators as VFR are not able to enter Class A.

100. The net volume of airspace released is only part of the story. The useability of airspace that is released must also be considered, Figure 5 to Figure 27 show airspace 'cutaways' highlighting where the proposals would change the controlled airspace structure .

101. Airspace Cutaway Diagrams Cutaways are only provided at 5000ft intervals from 500ft upwards *where there is a change*. e.g. the airspace for 1000ft is the same as that at 500ft and so the next cutaway shown after 500ft is at 1500ft.

102. Figure 5 to Figure 27 are presented to show a simplified view, at a cluster wide level, of where airspace is changing from controlled (Class A, C , D or E) to uncontrolled (Class G). Note that it was found that showing both the classifications and the changes on the same cluster wide map made the maps overly complex and difficult to interpret. Further detailed information on the changes to classification are provided in the individual ACP submissions and consultation material. Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

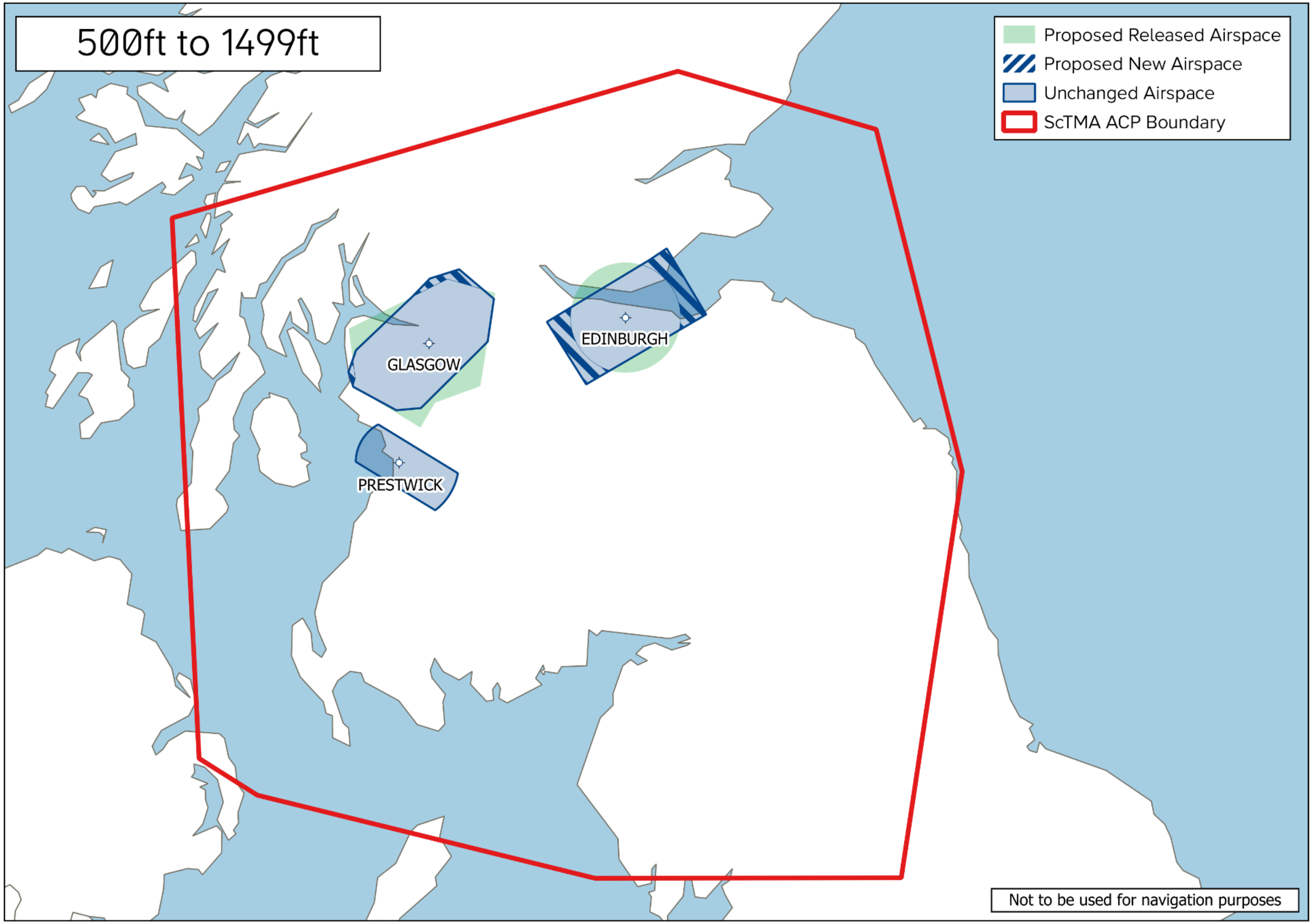
103. It is immediately apparent from these Figures that both airports have amended airspace to make it more appropriate for a single runway operation, changing the shape of the CTRs. Other changes at lower levels relate to airspace reverting to Class G as the systemised design and modern operations do not require it, resulting in significant increase in Class G airspace below 7,000ft.

104. One area of significant change and increase in CAS is to the Northeast of Edinburgh. This is to provide CAS to protect aircraft arriving and departing on Edinburgh Airport's proposed routes to and from the north, east and southeast, which have been developed to move commercial flights over the sea as much as is practical. The totality of this increase can only be seen when considering both the Edinburgh Airport and NERL changes together.

105. There is nothing else in the changes of the individual ACPs that is exacerbated when they are brought together (i.e. there are no cumulative negative effects where the impact of the proposal as a whole is worse than the sum of its parts). Indeed, the total reduction in airspace between Glasgow and Edinburgh at the lower levels is only possible because Glasgow and Edinburgh Airports have been working together to align proposals and ensure that the net effect is to improve GA access in the areas where it is most beneficial. The diagrams below, combined with the more detailed information in the relevant ACPs, aim to help other airspace users to assess any impact on the requirements of their own operations so that feedback may be provided through consultation.

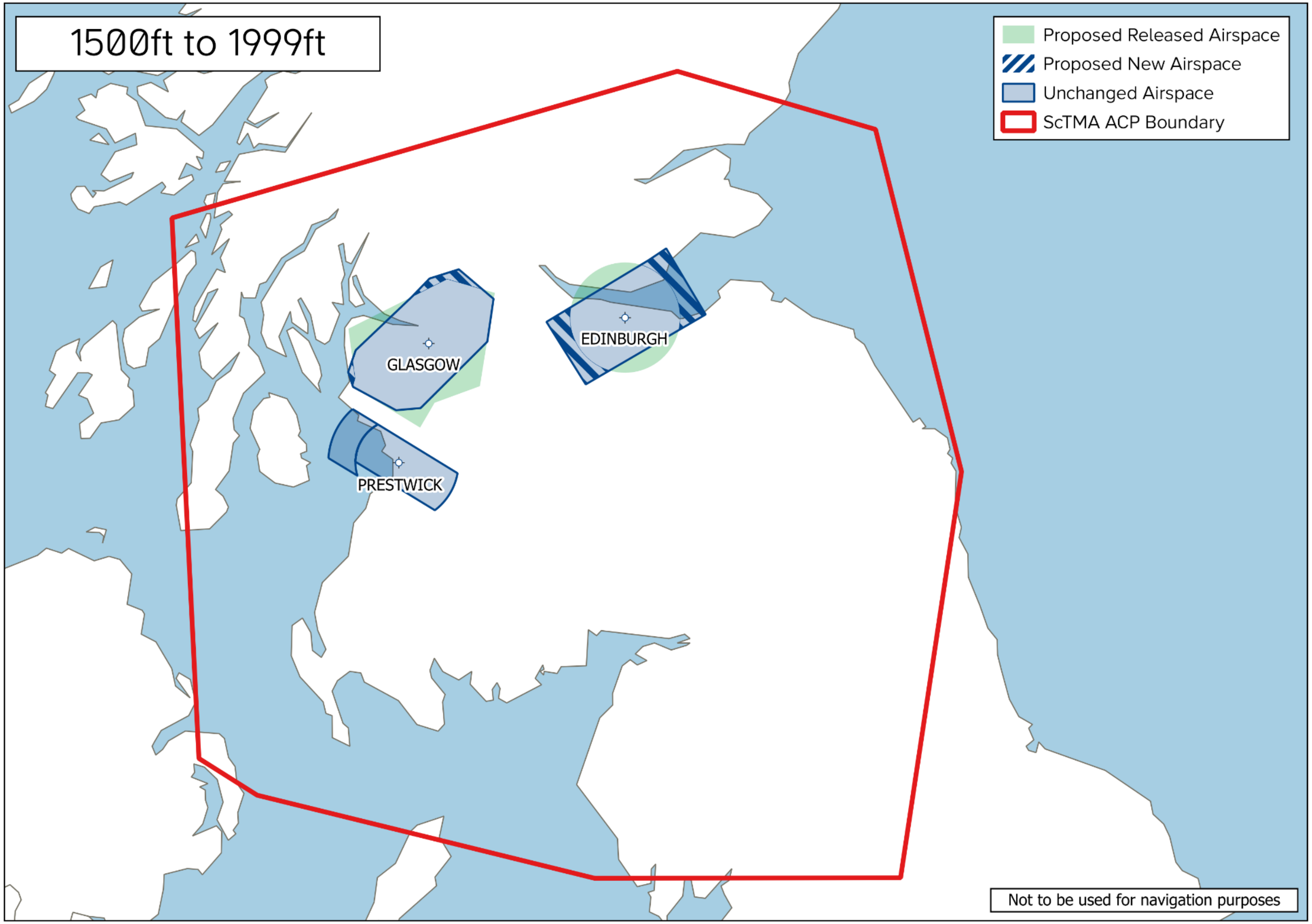
106. As part of this overall proposal NERL has also sought to revise and extend Temporary Reserved Areas (Gliding) (TRA(G) in the vicinity of the ScTMA. TRA(G)s are used for gliding between FL195 and FL245. As these changes are entirely covered in the NERL ACP, the details are not repeated in this CAF2 document. For full details see the NERL ACP submission/consultation.

Figure 5: New and Released CAS 500ft-1499ft



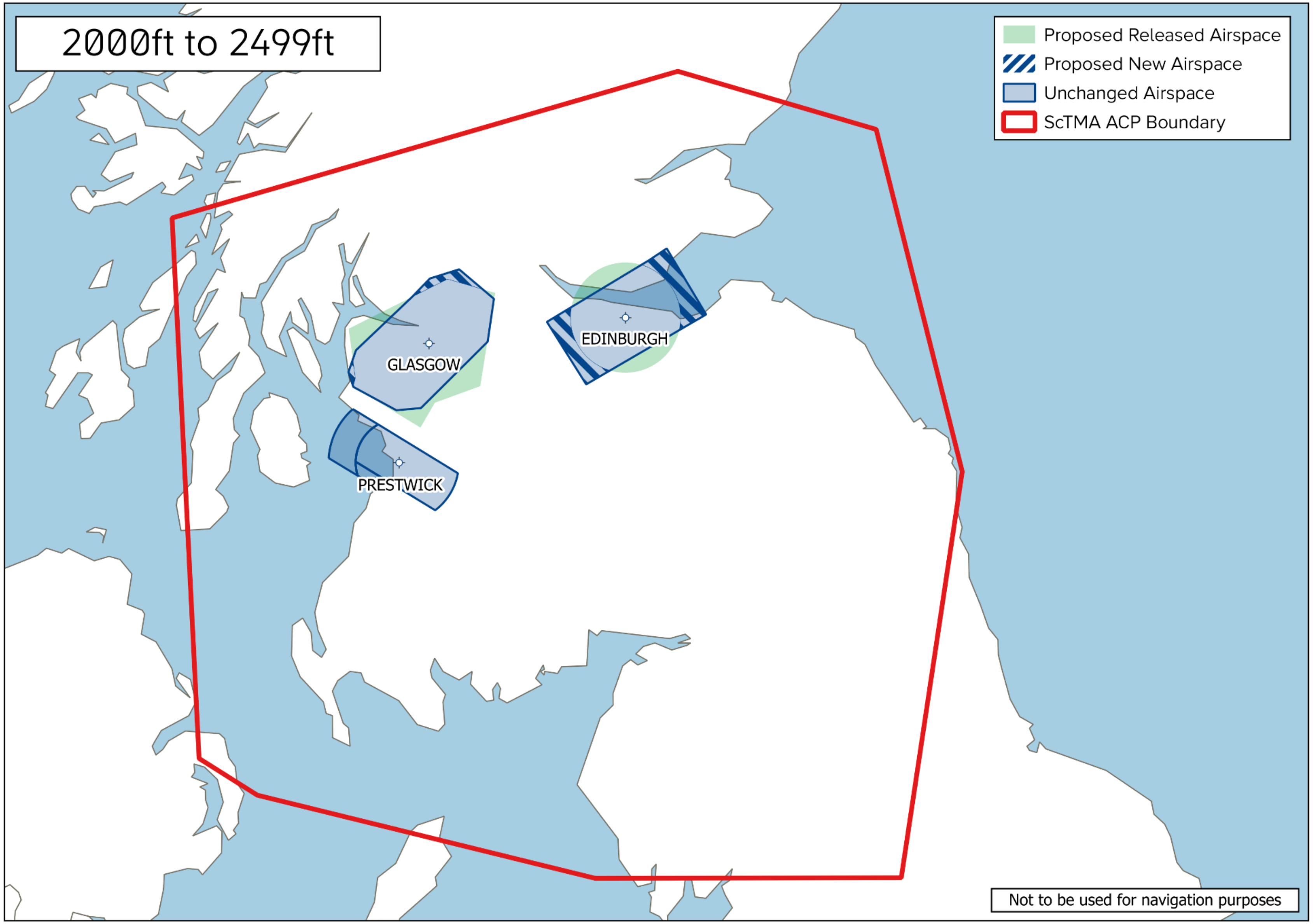
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 6: New and Released CAS 1500ft-1999ft



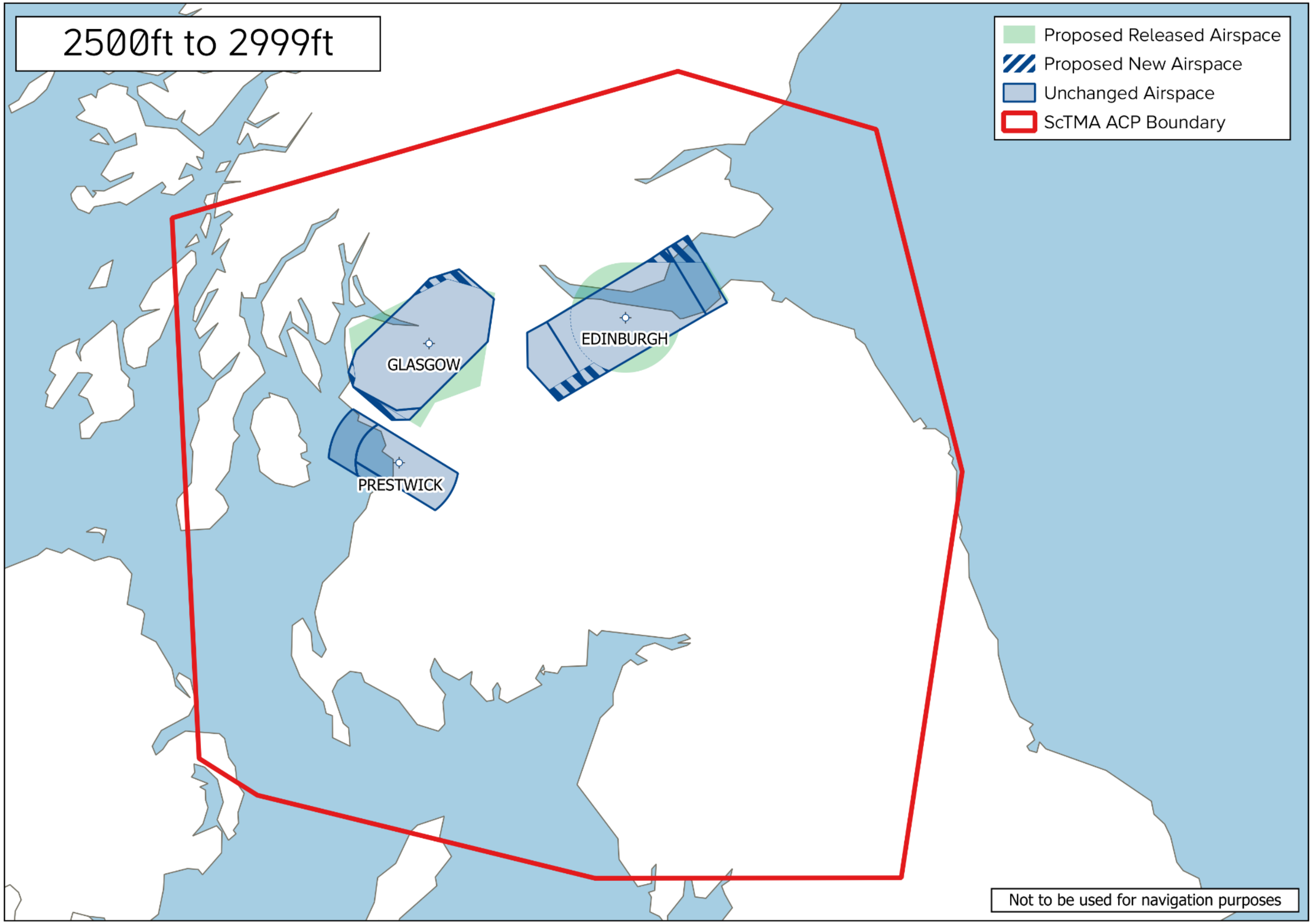
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 7: New and Released CAS 2000ft-2499ft



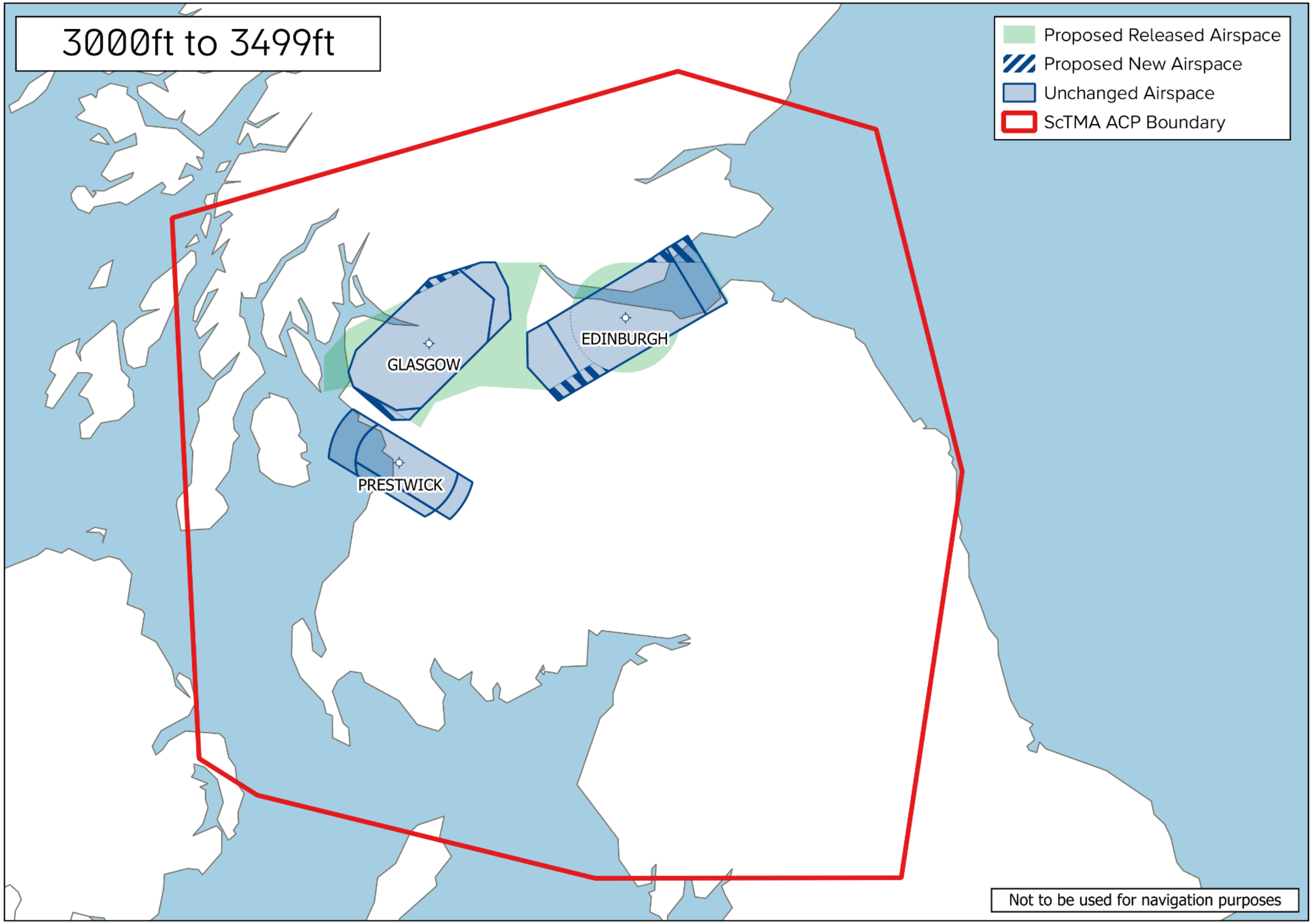
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 8: New and Released CAS 2500ft-2999ft



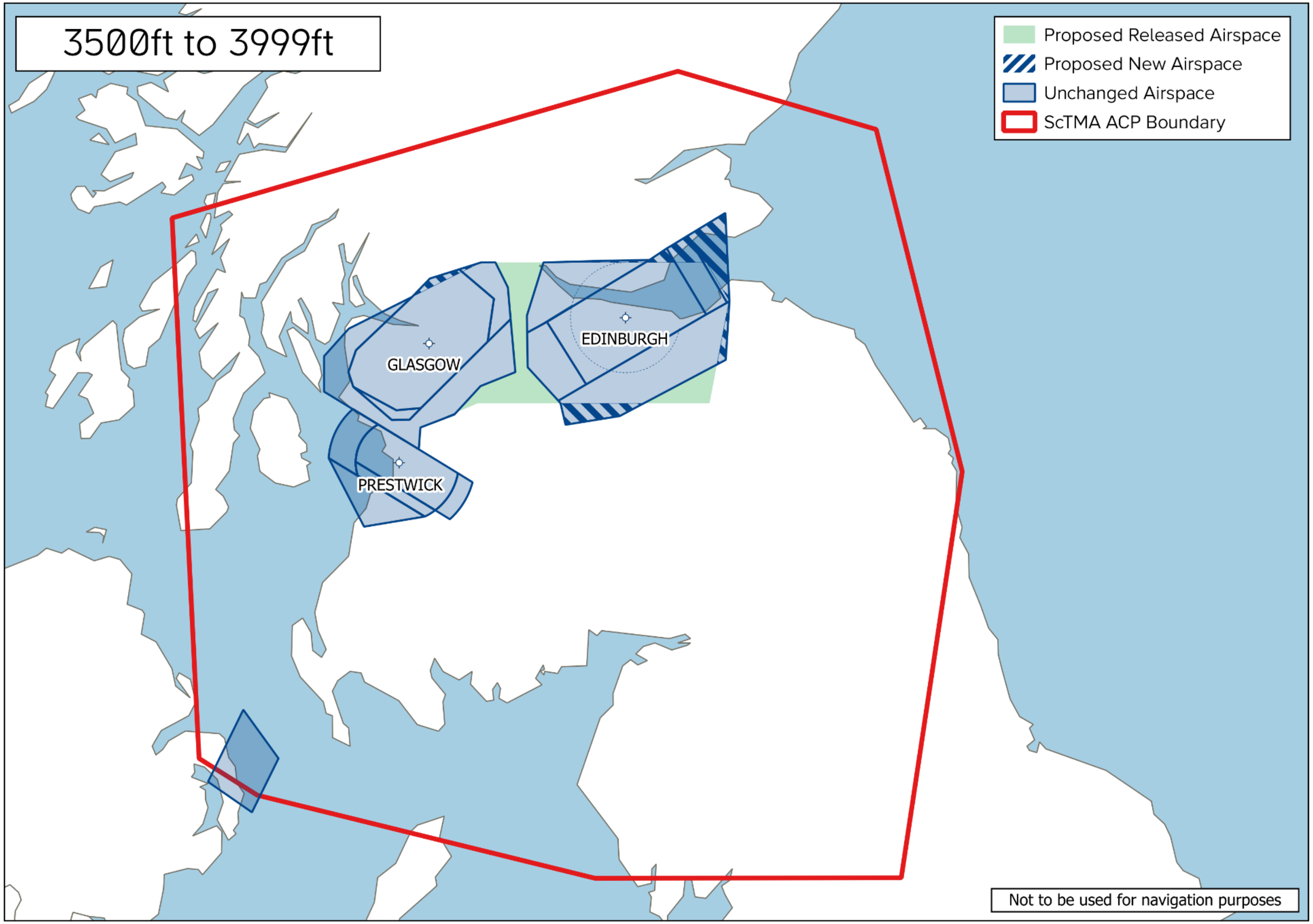
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 9: New and Released CAS 3000ft-3499ft



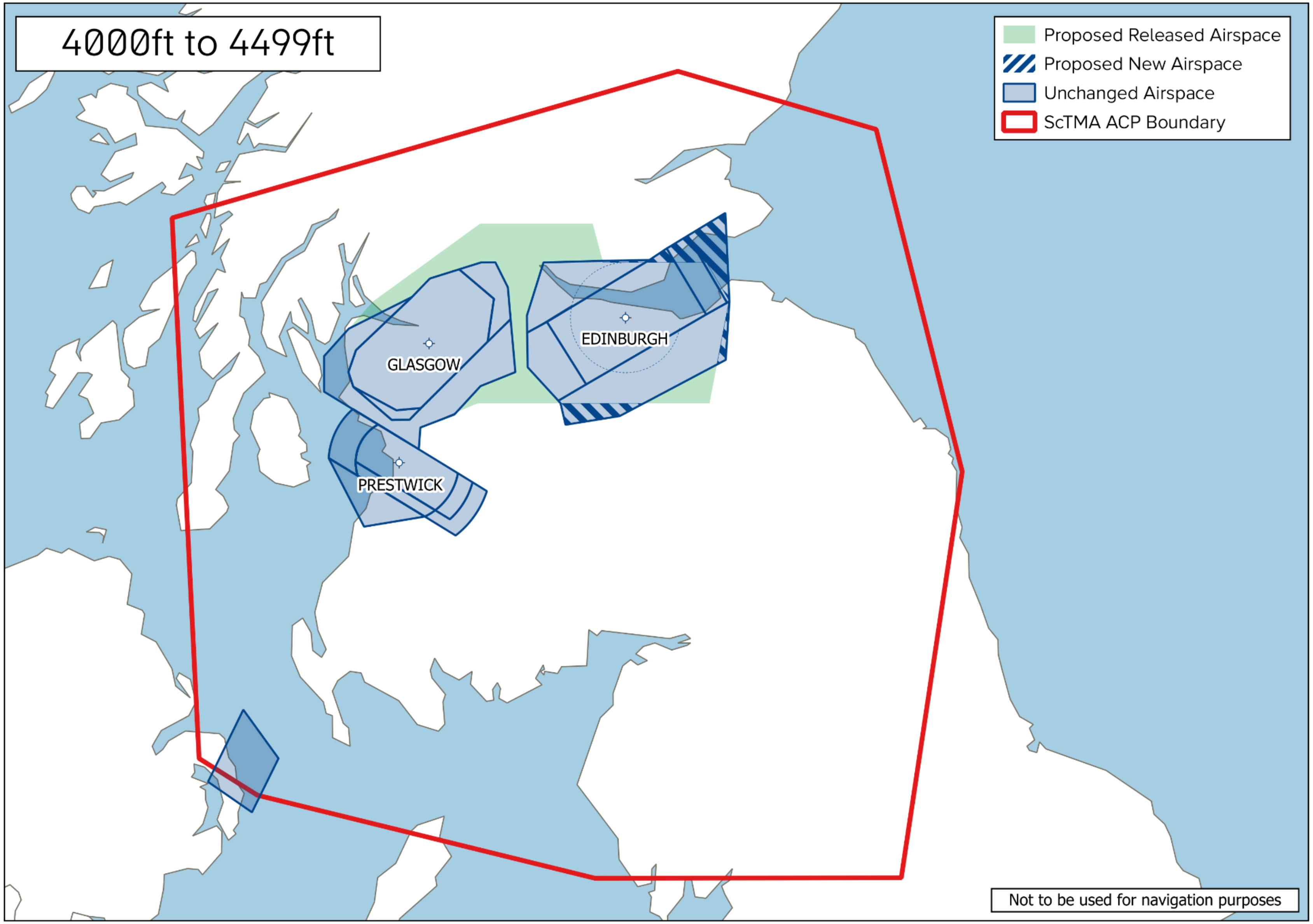
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 10: New and Released CAS 3500ft-3999ft



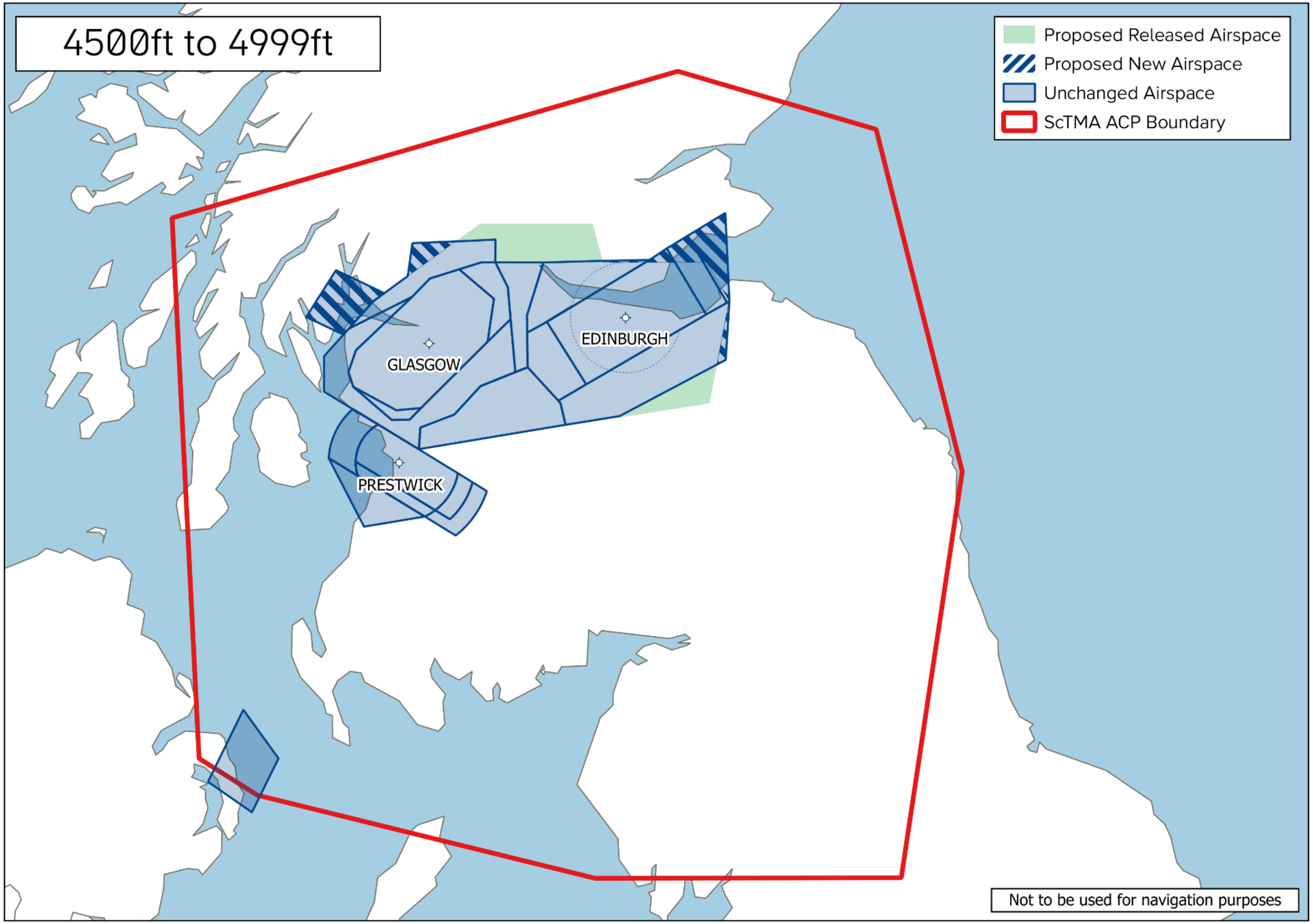
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 11: New and Released CAS 4000ft-4499ft



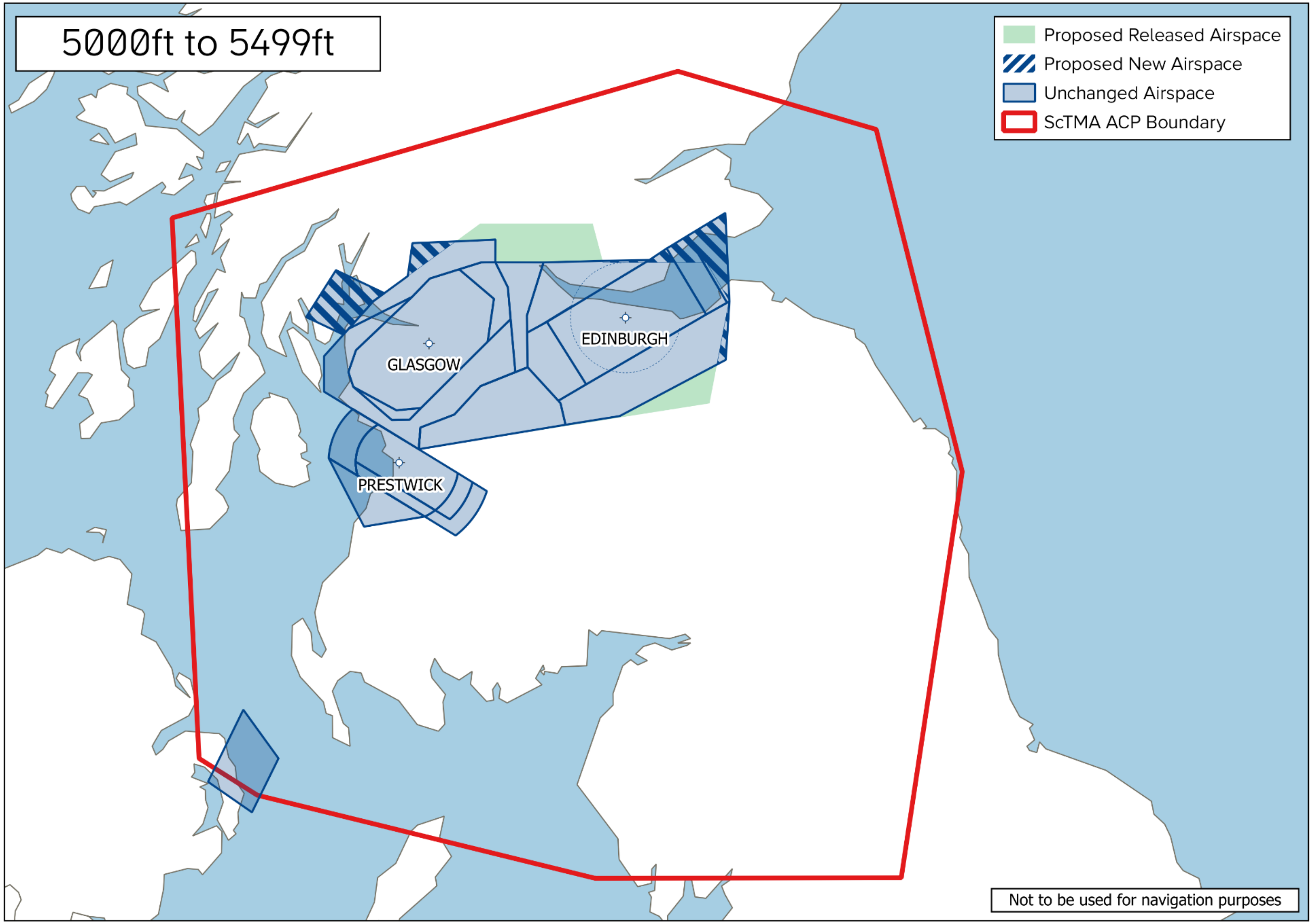
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 12: New and Released CAS 4500ft-4999ft



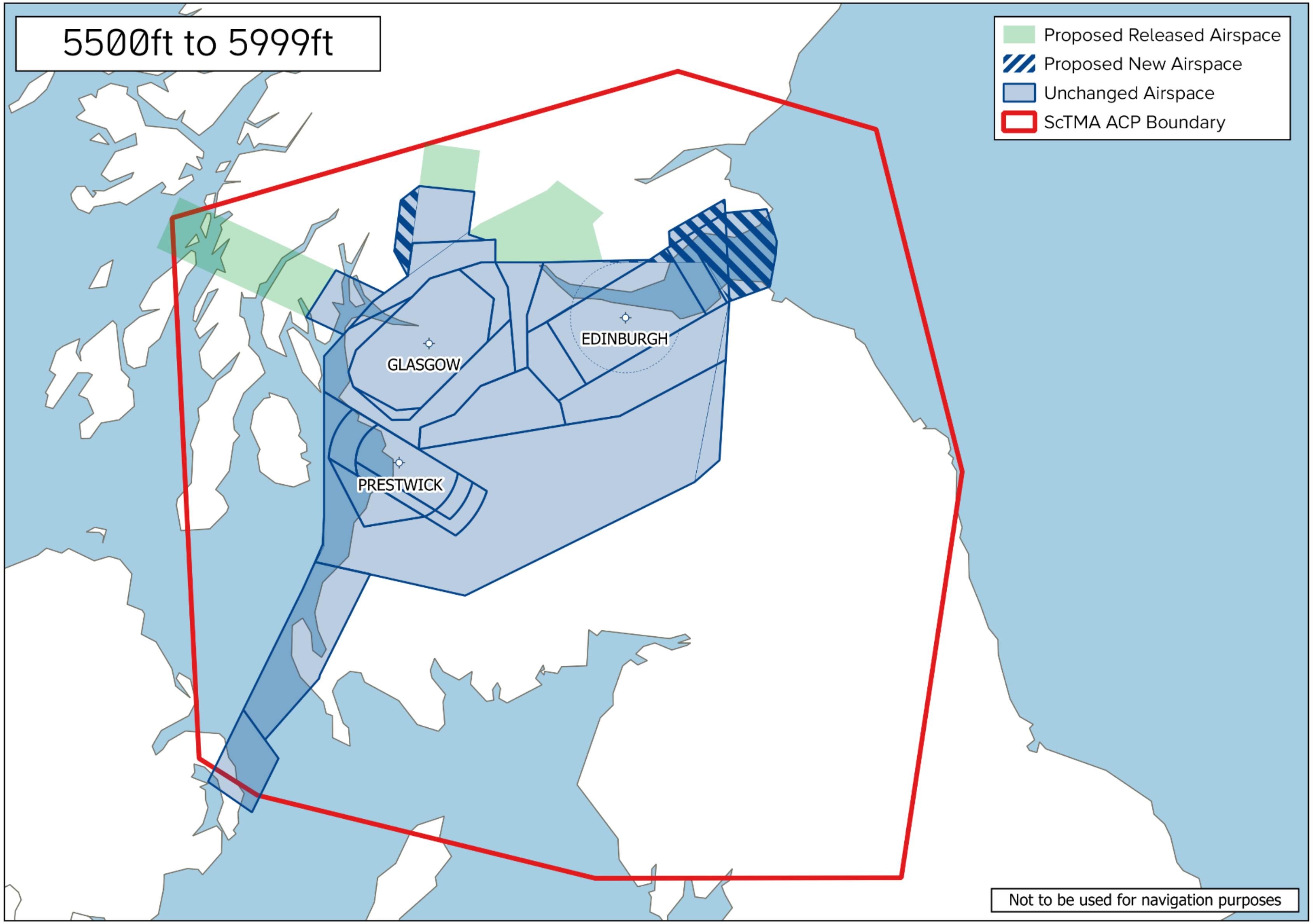
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 13: New and Released CAS 5000ft-5499ft



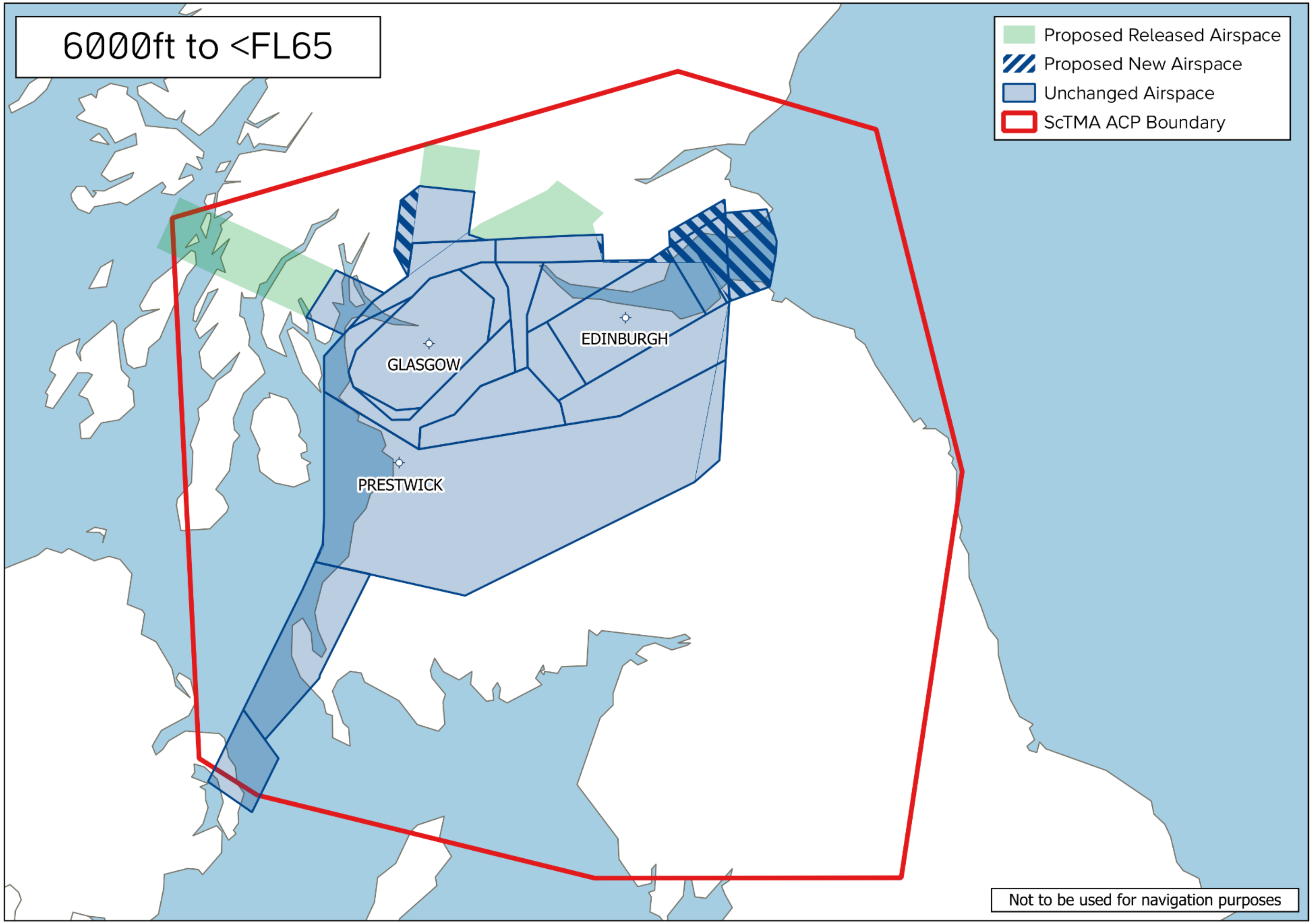
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 14: New and Released CAS 5500ft-5999ft



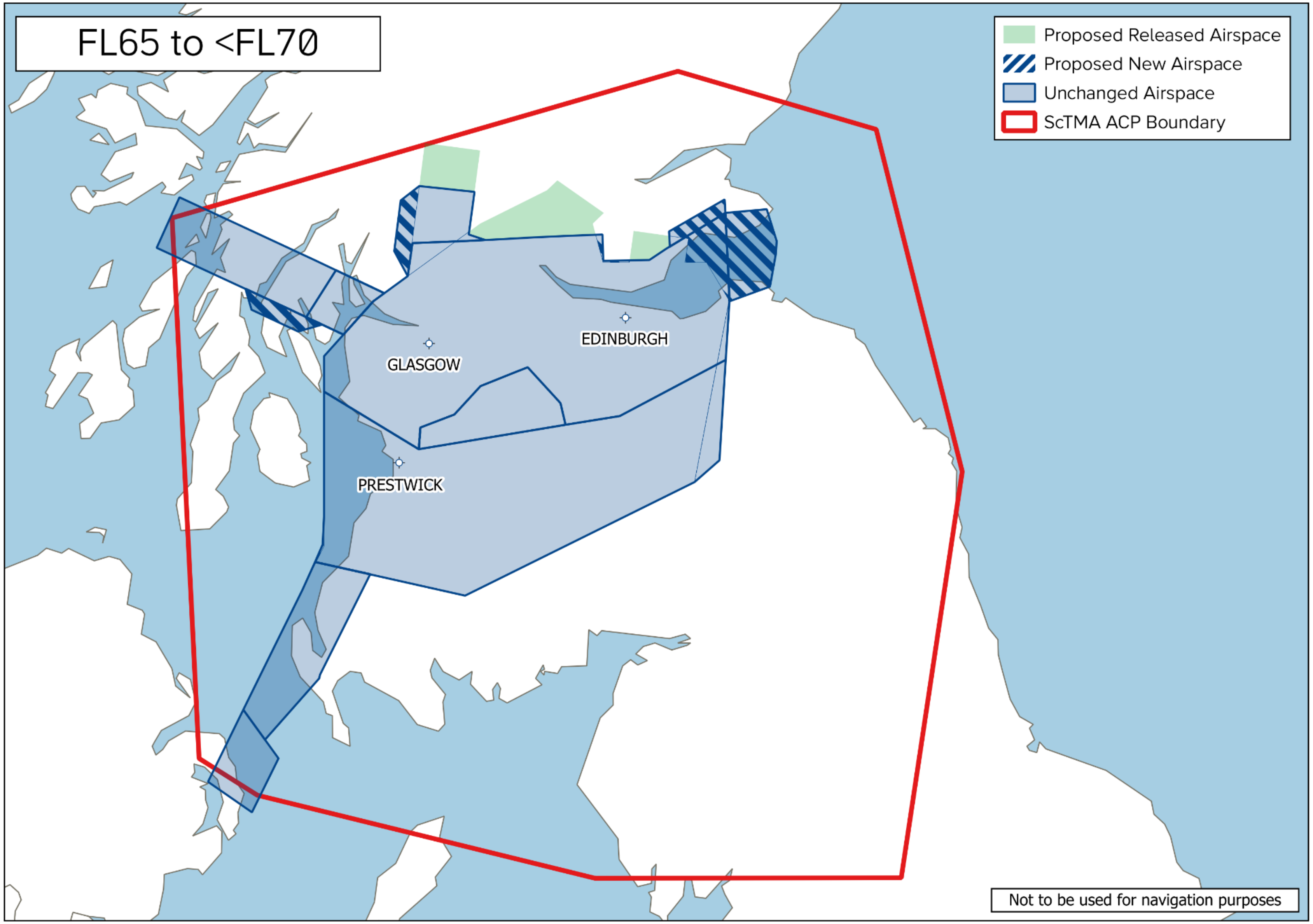
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 15: New and Released CAS 6000ft to <FL65



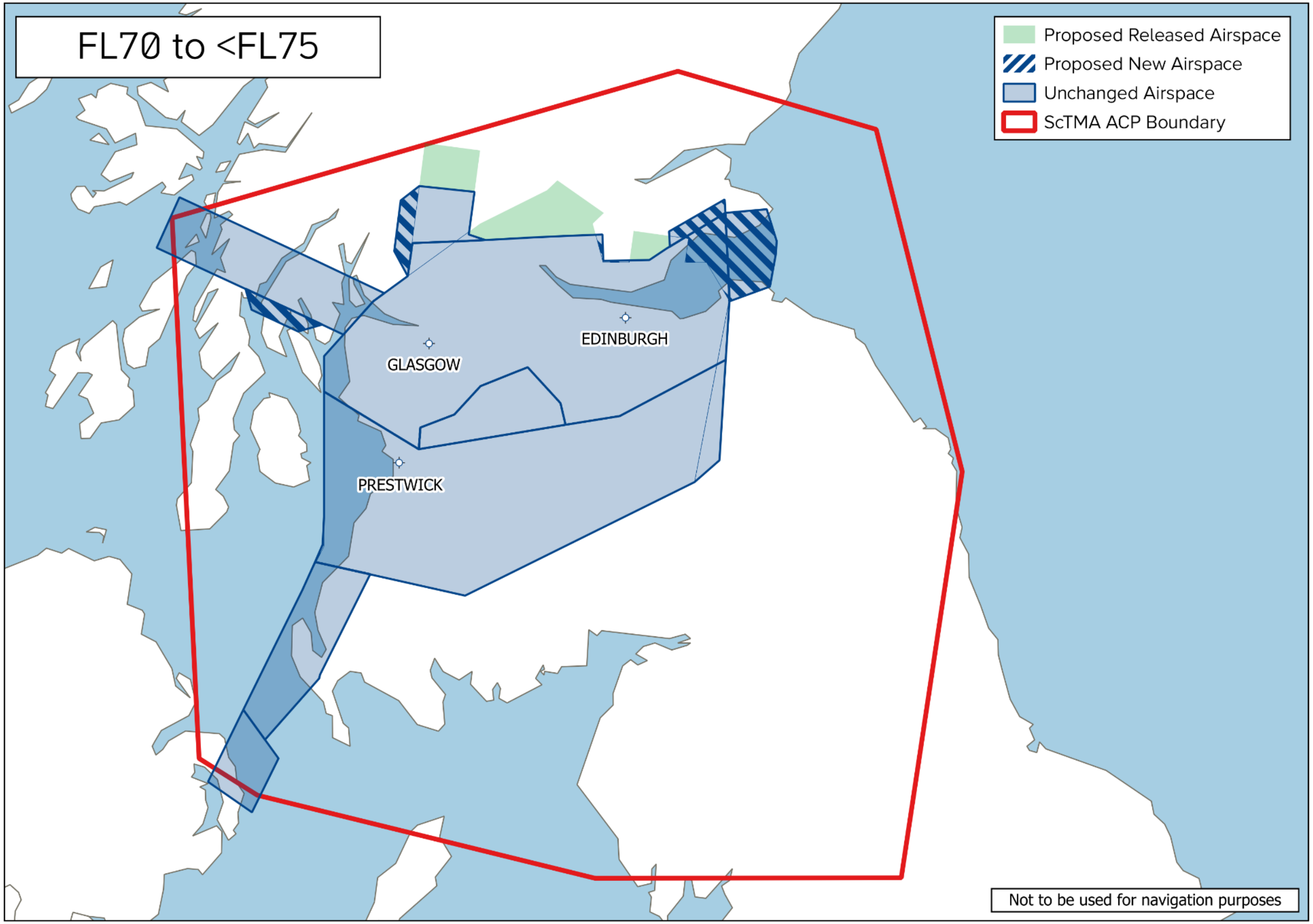
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 16: New and Released CAS FL65 to <FL70



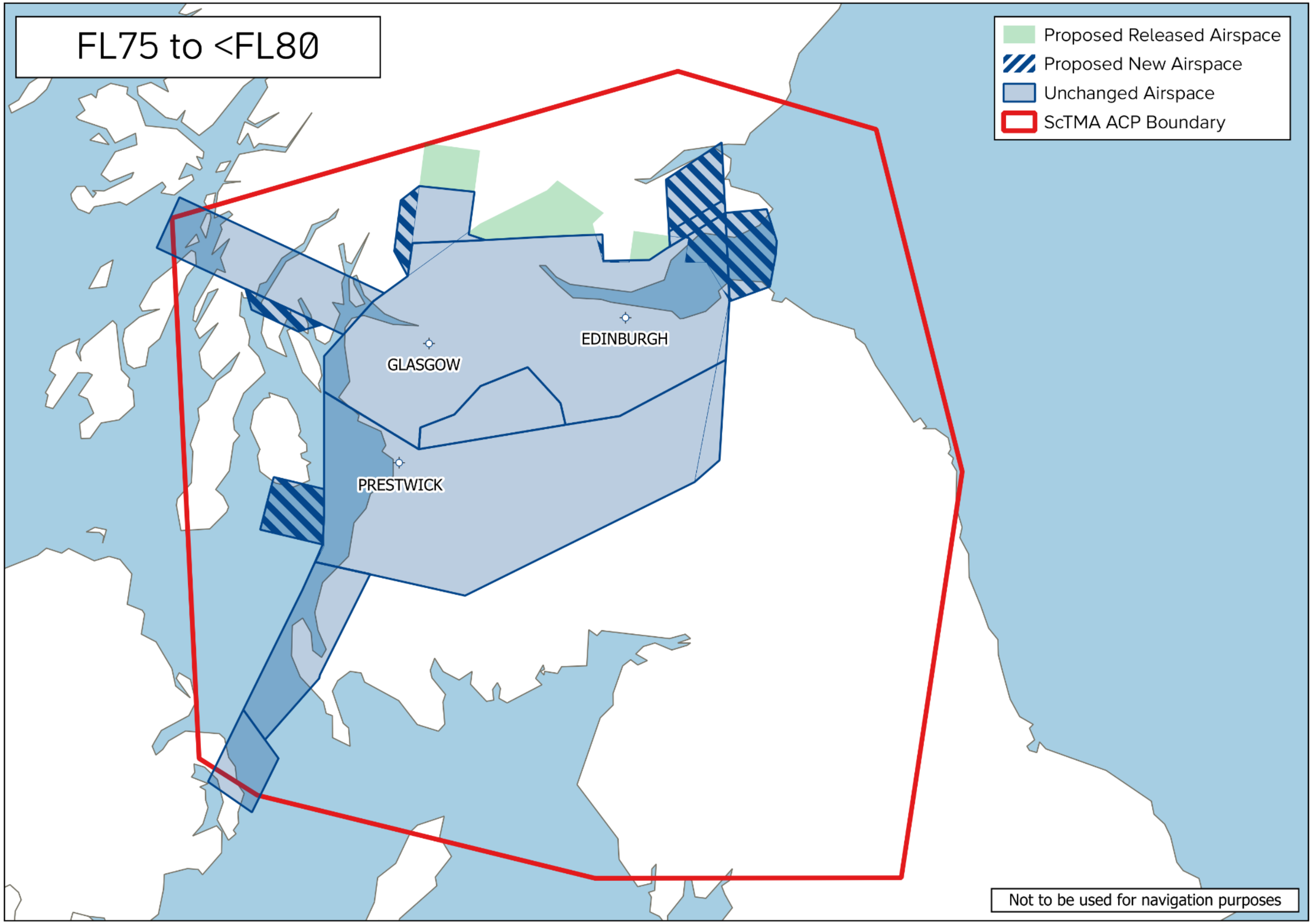
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 17: New and Released CAS FL70 to <FL75



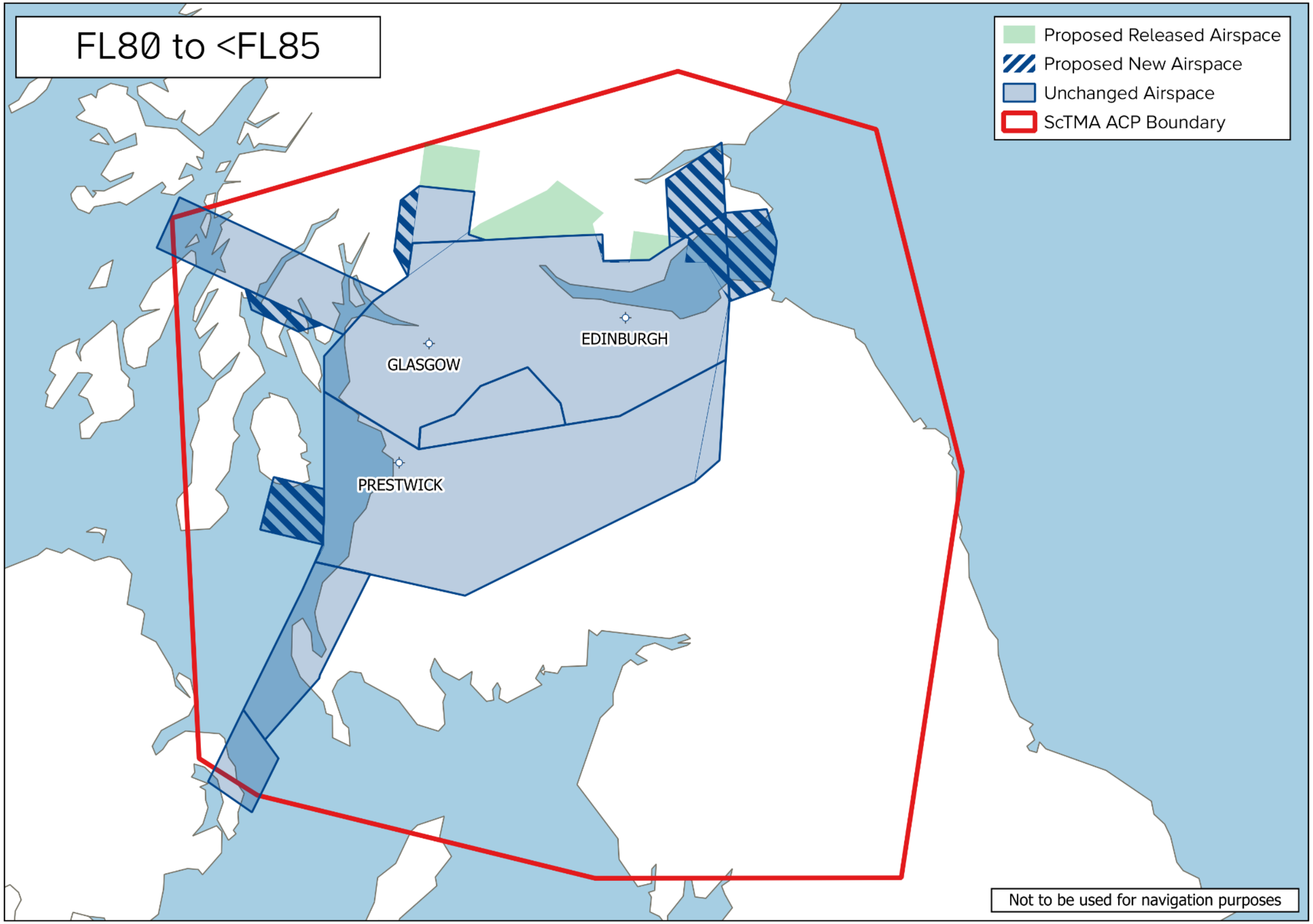
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 18: New and Released CAS FL75 to <FL80



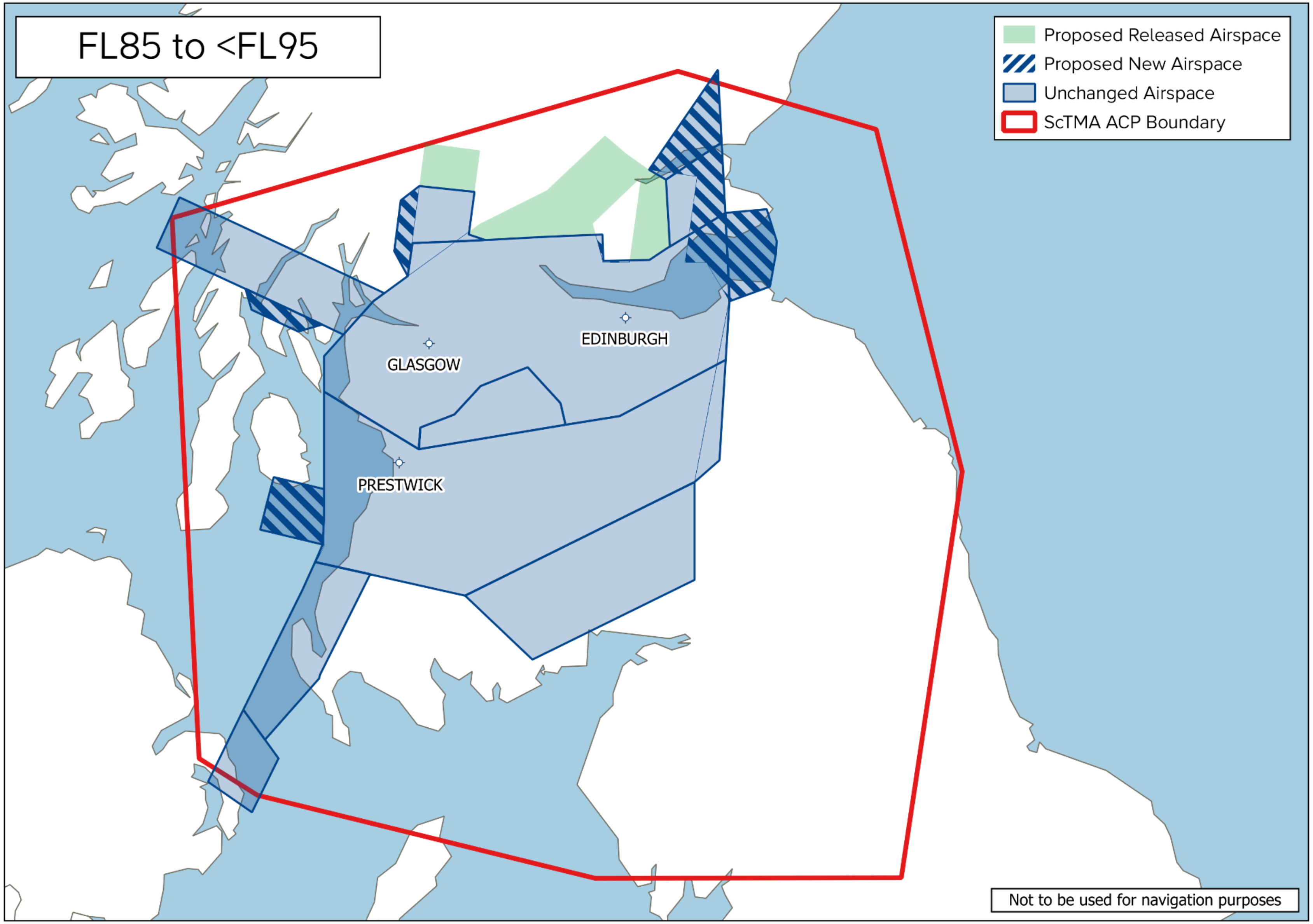
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 19: New and Released CAS FL80 to <FL85



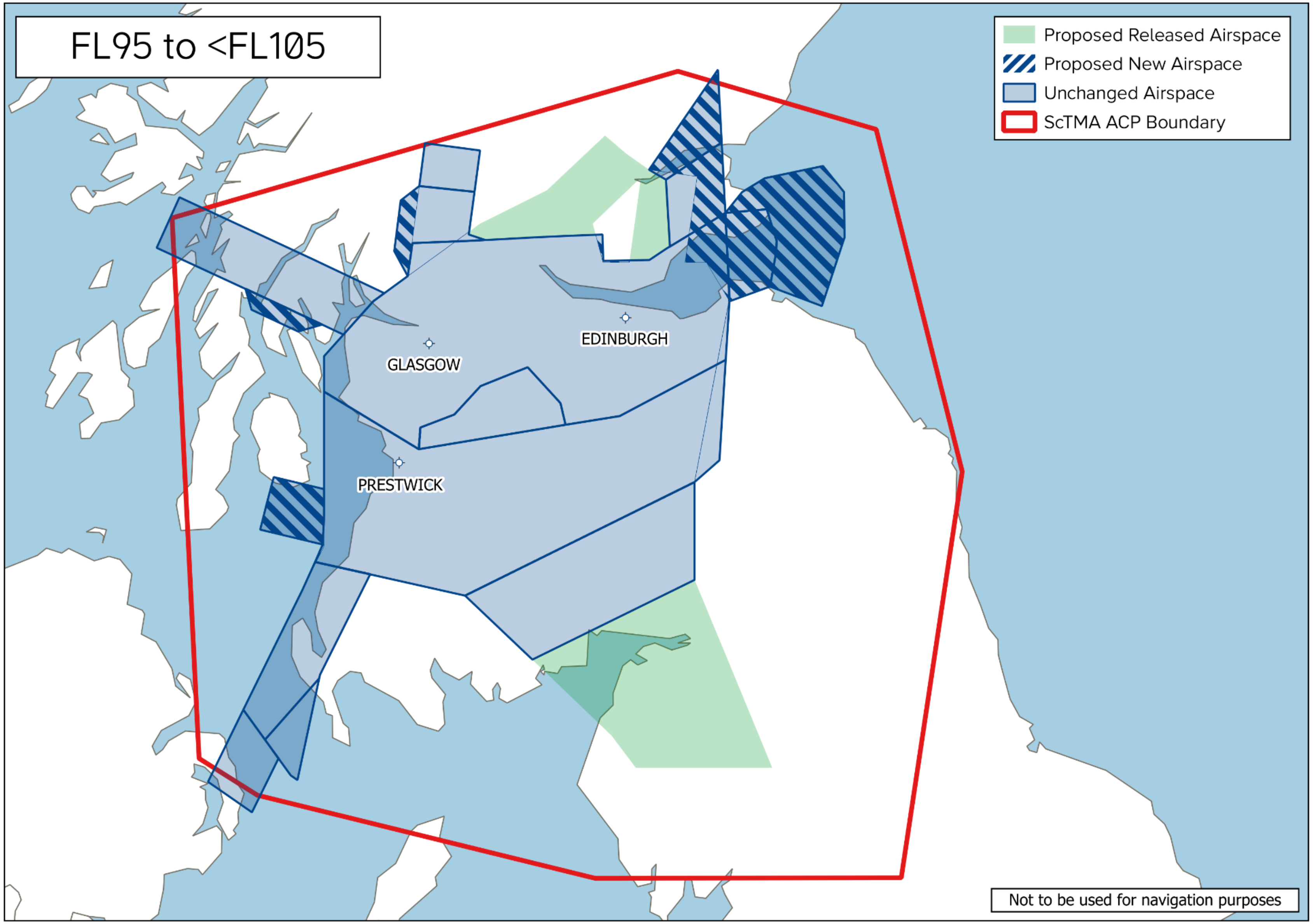
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 20: New and Released CAS FL85 to <FL95



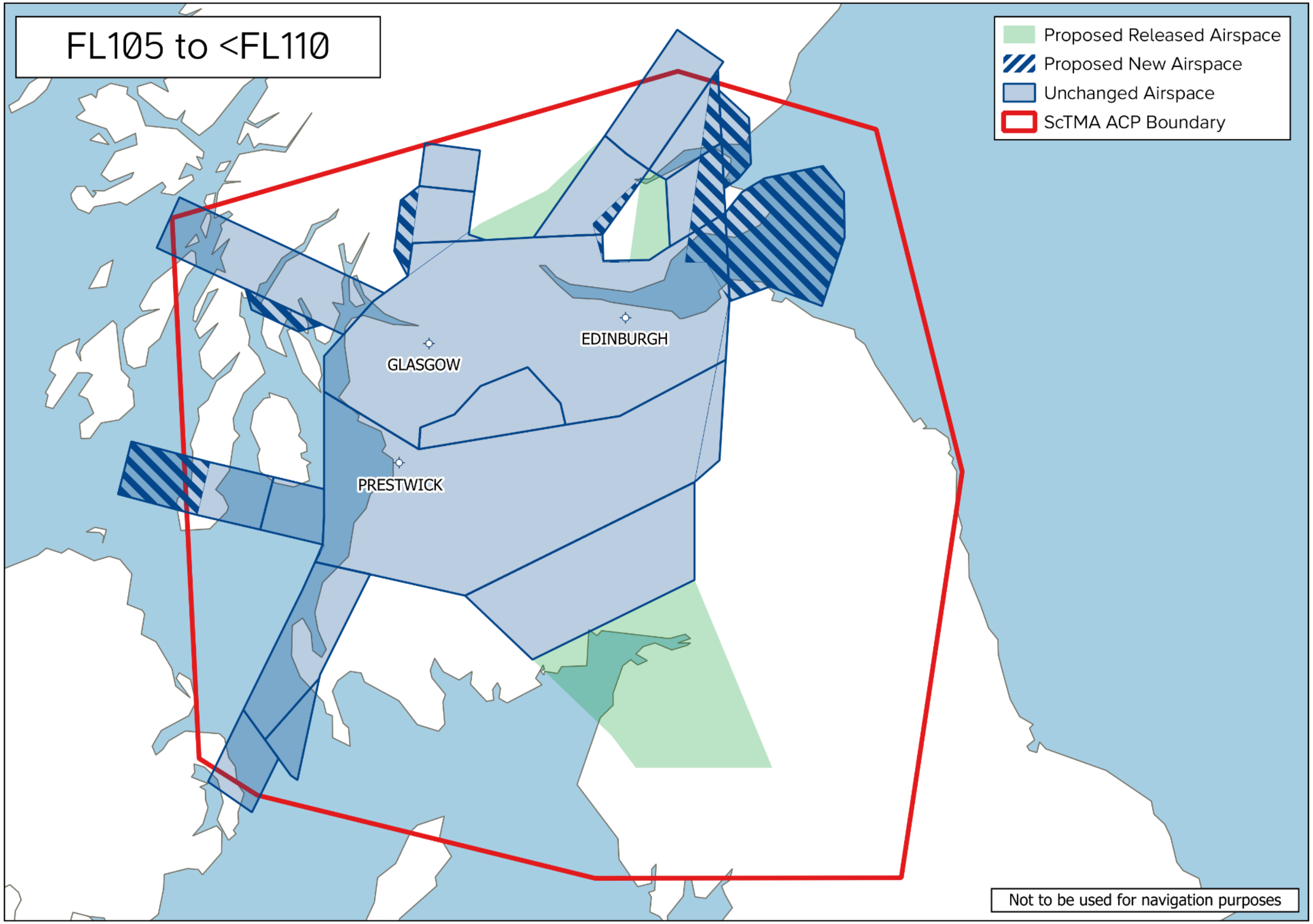
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 21: New and Released CAS FL95 to <FL105



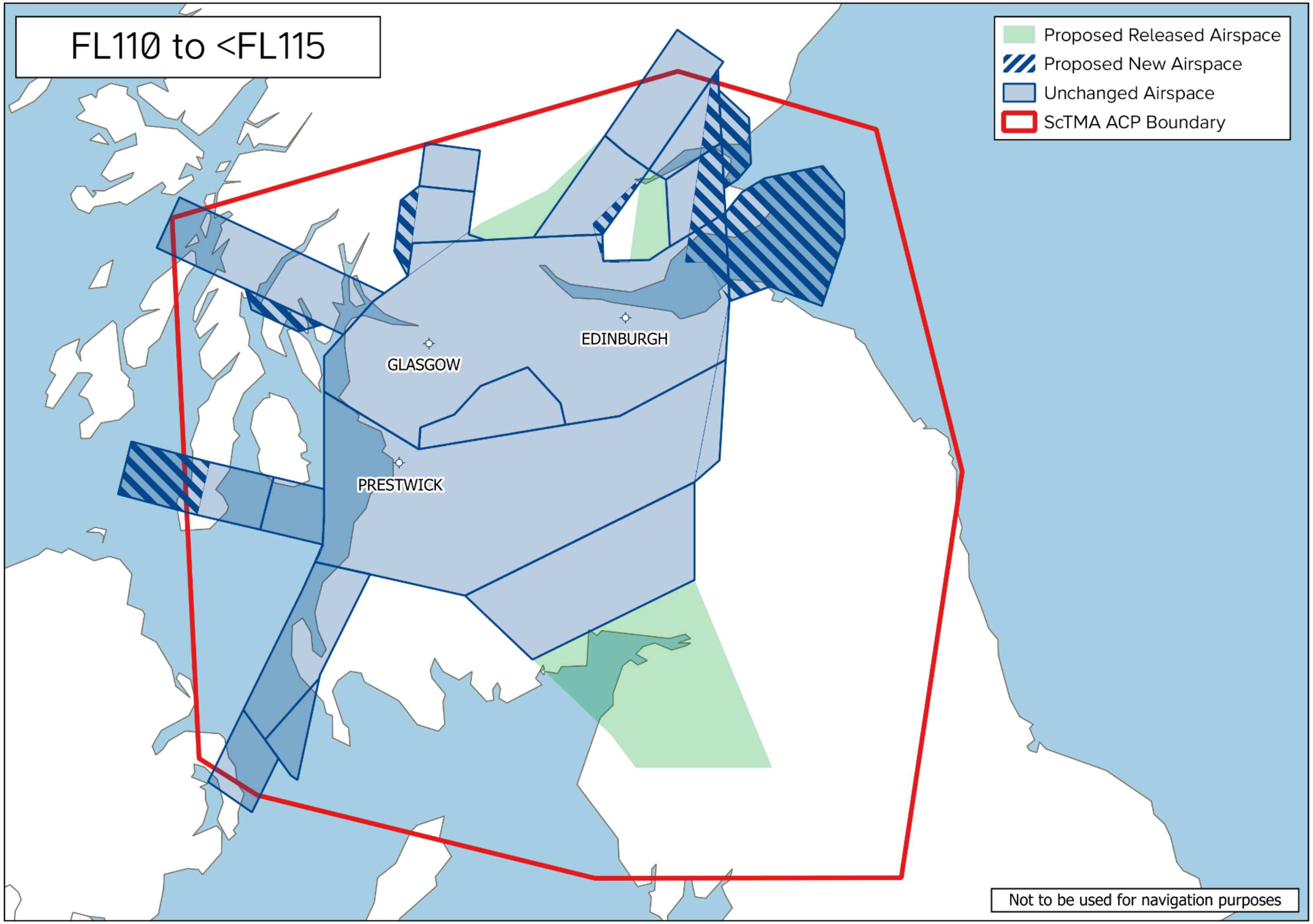
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 22: New and Released CAS FL105 to <FL110



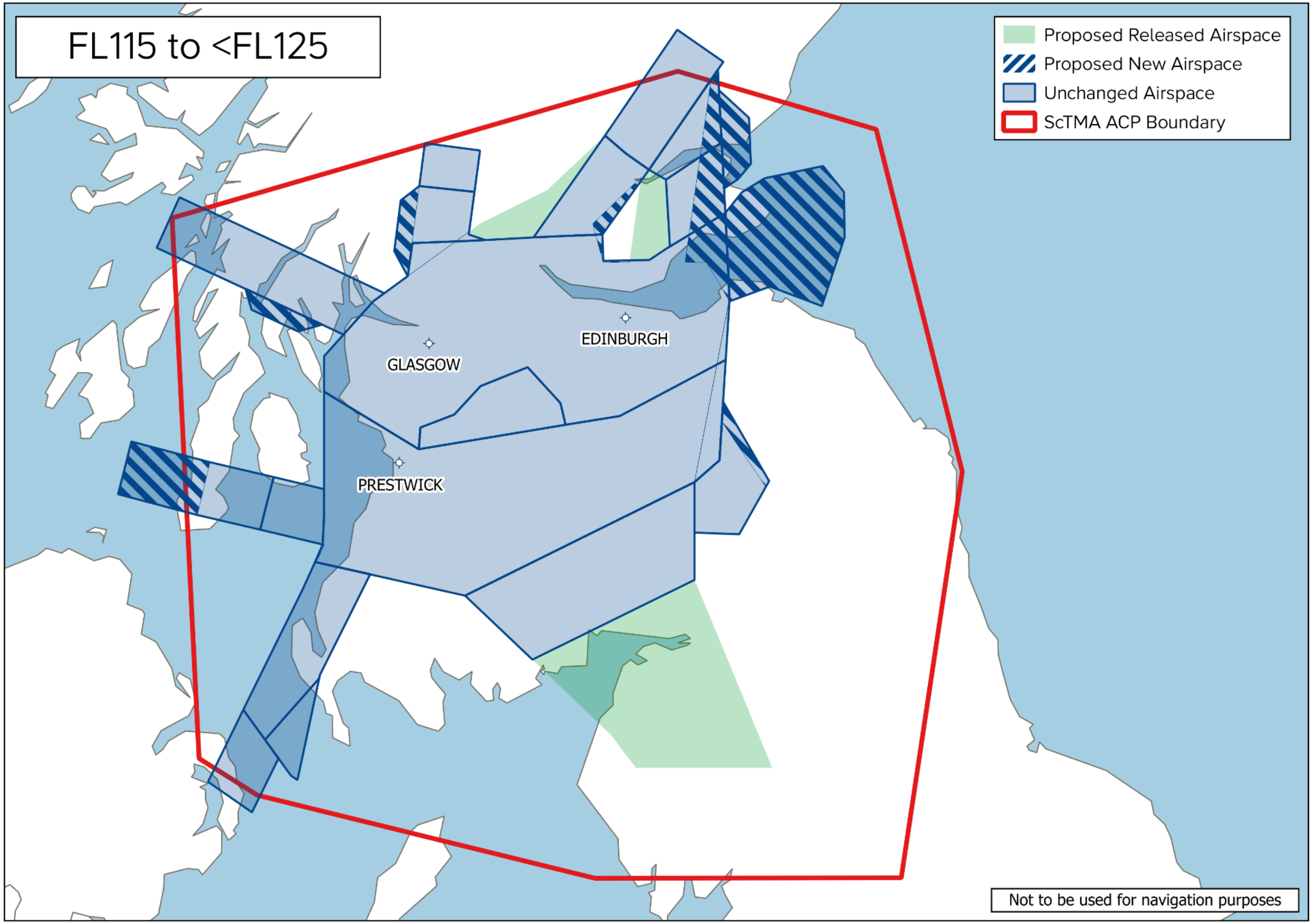
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 23: New and Released CAS FL110 to <FL115



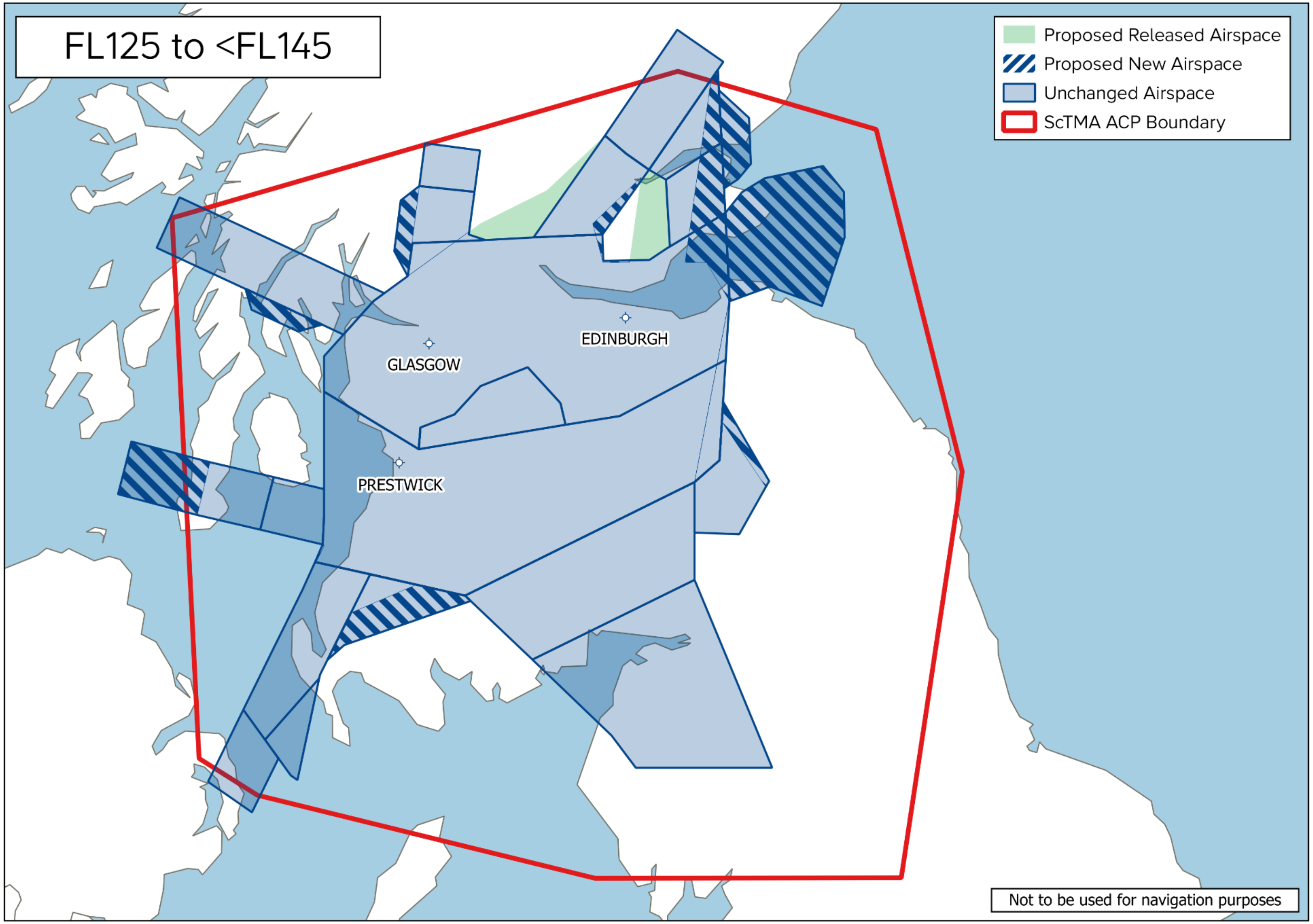
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 24: New and Released CAS FL115 to <FL125



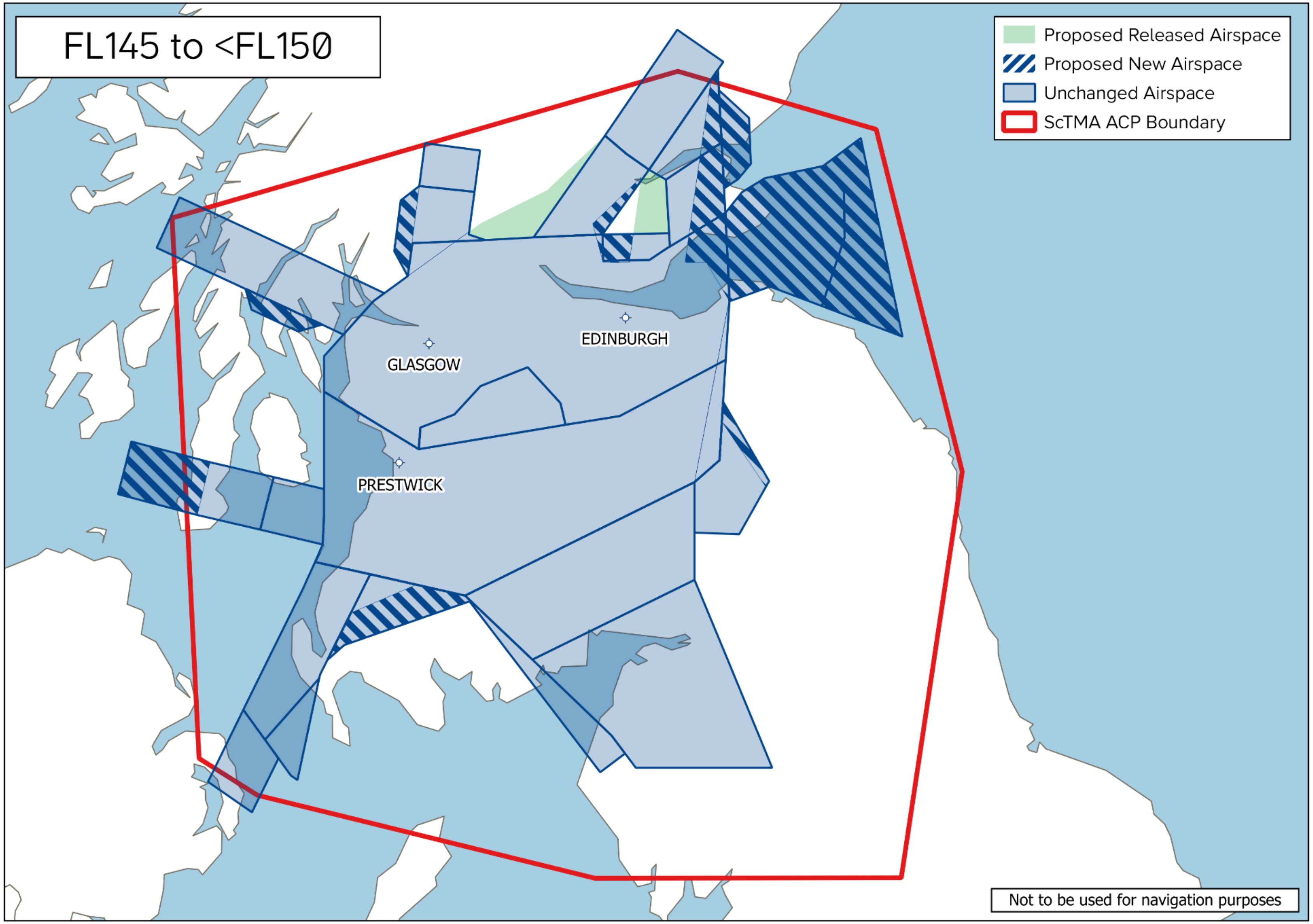
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 25: New and Released CAS FL125 to <FL145



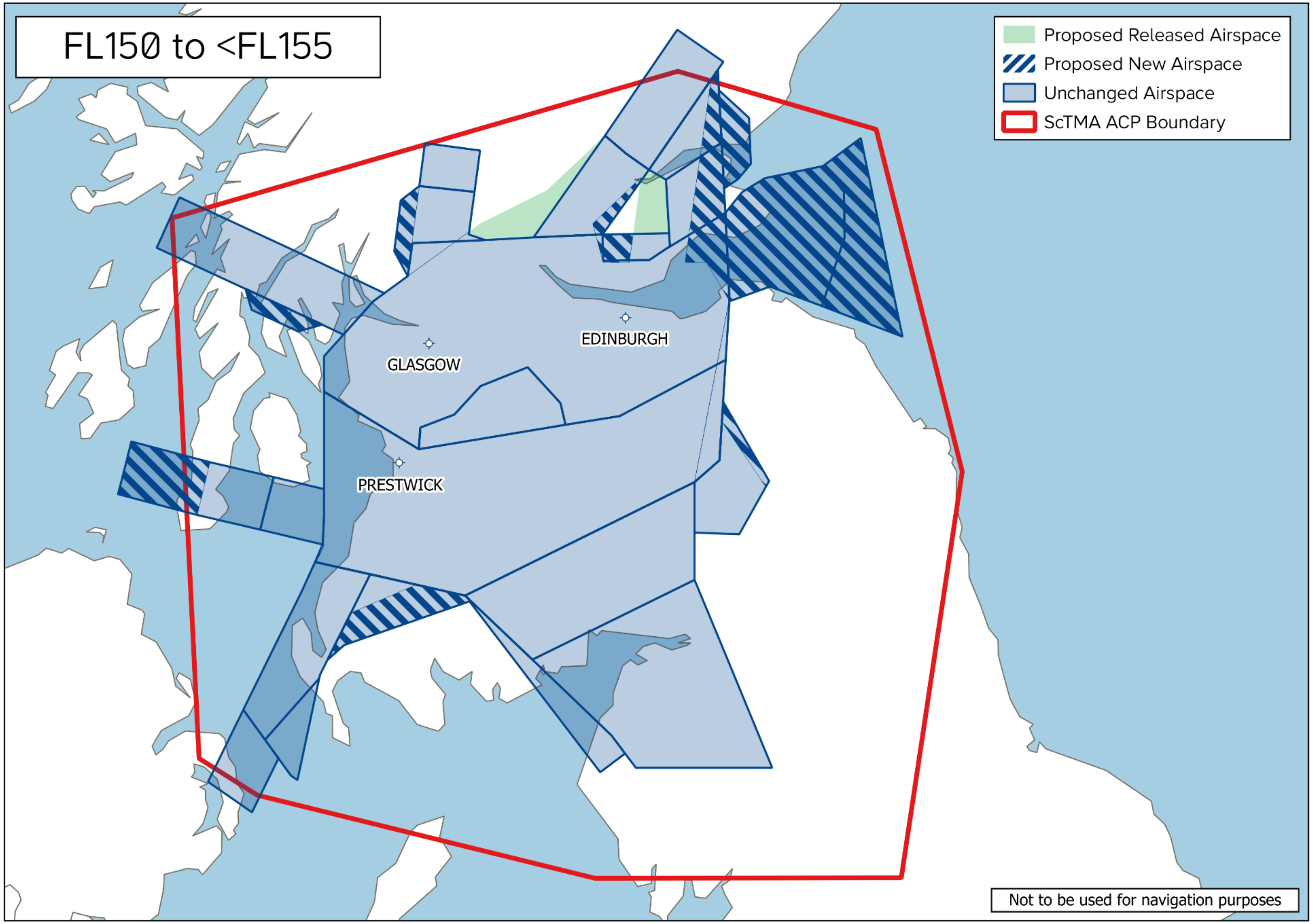
Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 26: New and Released CAS FL145 to <FL150



Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Figure 27: New and Released CAS FL150 to <FL155



Note that only airspace structures wholly contained within the red ScTMA cluster ACP boundary are shown. This means other airspace structures, e.g. Newcastle CTA, are not shown – these are outside the scope of this change and remain as today as do any other areas on, or over, the red line boundary.

Economic Impact from Increased Effective Capacity for Cluster-Wide "With Airspace Change" Proposal – General Aviation/Commercial Airlines

107. The delay benefit figures from Table 66 have been monetised by the sponsors, this monetisation is captured in the Cost Benefit Section 8.

Fuel Burn for Cluster-Wide "With Airspace Change" Proposal – General Aviation/Commercial Airlines

108. Fuel burn is directly proportional to CO_2e and so is calculated by the same method/assumptions as described in Annex A. The fuel burn comparison is shown below. This has been monetised for the cost benefit analysis in Section 8[13].

Table 70: Fuel Burn for Cluster-Wide "With Airspace Change" Proposal vs "Without Airspace Change" Baseline 2027-2036 & Total

Year	Without Airspace Change			With Airspace Change			Difference		
	Annual Fuel Burn (Kt)	Annual Fuel Burn Cost (£) 2024 prices	Average Fuel Burn per Flight (kg)	Annual Fuel Burn (Kt)	Annual Fuel Burn Cost (£) 2024 prices	Average Fuel Burn per Flight (kg)	Annual Fuel Burn (Kt)	Annual Fuel Burn Cost (£) 2024 prices	Average Fuel Burn per Flight (kg)
2027	493.4	£ 338,489,871	1,908.2	487.5	£ 334,425,382	1,885.2	- 5.9	-£ 4,064,489	- 22.9
2028	500.4	£ 343,265,898	1,911.0	494.3	£ 339,051,136	1,887.6	- 6.1	-£ 4,214,762	- 23.5
2029	507.4	£ 348,041,924	1,913.8	501.0	£ 343,676,889	1,889.8	- 6.4	-£ 4,365,035	- 24.0
2030	514.3	£ 352,817,951	1,916.6	507.7	£ 348,302,642	1,892.0	- 6.6	-£ 4,515,309	- 24.5
2031	521.3	£ 357,593,977	1,919.2	514.5	£ 352,928,395	1,894.2	- 6.8	-£ 4,665,582	- 25.0
2032	528.2	£362,370,004	1,921.9	521.2	£ 357,554,149	1,896.3	- 7.0	-£ 4,815,855	- 25.5
2033	535.2	£ 367,146,030	1,924.4	528.0	£ 362,179,902	1,898.4	- 7.2	-£ 4,966,129	- 26.0
2034	542.2	£ 371,922,057	1,926.9	534.7	£ 366,805,655	1,900.4	- 7.5	-£ 5,116,402	- 26.5
2035	549.1	£ 376,698,083	1,929.3	541.5	£ 371,431,408	1,902.3	- 7.7	-£ 5,266,675	- 27.0
2036	556.1	£ 381,474,110	1,931.7	548.2	£ 376,057,162	1,904.3	- 7.9	-£ 5,416,948	- 27.4

[13] Please refer to the greenhouse gas emissions methodology section provided in Annex B for contextual information on how the use of planned flight data in the NERL modelling may affect this result

Training Costs for Cluster-Wide "With Airspace Change" Proposal – Commercial Airlines

109. Flight procedures worldwide are updated with each aeronautical information regulation and control (AIRAC) cycle and airlines update their procedures accordingly, training as required. None of the Cluster-Wide options are not anticipated to require additional training costs for airlines.

Other Costs for Cluster-Wide "With Airspace Change" Proposal – Commercial Airlines

110. There are no additional associated costs for airlines anticipated with any of the Cluster-Wide options.

Infrastructure Costs for Cluster-Wide "With Airspace Change" Proposal – Airport / ANSP

111. None of the Cluster-Wide options are expected to change Airport or ANSP infrastructure, beyond the initial deployment phase which will require some systems engineering amendments.

112. Edinburgh have identified a future saving as a the implementation of Performance Based Navigation (PBN) procedures removes their dependencies on the Non-Directional Beacon (NDB) which are currently the contingency for the Instrument landing System (ILS). This will remove a cost of c.£300k (2024 prices) in c.2030. This is captured in the Cost Benefit Tables in Section 8.

Operational Costs for Cluster-Wide "With Airspace Change" Proposal – Airport / ANSP

113. Glasgow and Edinburgh Airport have quantified some minor increases to operating costs relevant to their consultation option. NERL have not quantified any costs in this category. The airport operating costs changes are captured in the Cost Benefit Tables in Section 8.

Deployment Costs for Cluster-Wide "With Airspace Change" Proposal – Airport / ANSP

114. There are costs associated with training operational staff prior to an airspace change. These costs are described qualitatively in each ACP where relevant.

Other Costs for Cluster-Wide "With Airspace Change" Proposal – Airport / ANSP

115. None of the Cluster-Wide options are expected to change other costs at the Airport or ANSP.

8 Cost Benefits Analysis

116. The table below shows the overall monetised benefits for the 10 year analysis period for the cluster-wide “with airspace change” Proposal compared to the equivalent ‘without airspace change’ baseline. The overall monetised benefit for the period has been calculated as c. £130m comprising of benefits from a relative reduction in noise impact, CO2e and fuel costs for airlines. There are also some relatively minor costs and benefits to airport infrastructure and operation.

Notes for Cost Benefit Analysis:

117. The NPV tables on the following pages contain an analysis of all relevant monetised cost and monetised benefits associated with each option. NPVs are based on the following assumptions:

- All ‘nominal’ costs and benefits have been adjusted into 2024 ‘real’ costs and benefits (using published Web TAG Databook GDP deflators) and converted into GBP when necessary, using spot rates as at 22nd March 2024.
- All ‘real’ figures have been discounted using the Social Time Preference Rate (STPR) set by the UK Government and contained in the WebTAG Databooks. The standard STPR of 3.5% has been used for all costs and benefits discounting, apart from ‘Noise’ costs and benefits, which have been discounted using the Health STPR figure of 1.5%.
- 2024 is used as the base year for NPV discounting.
- Noise and CO_2e costs and benefits are calculated directly using WebTAG workbooks. Please refer to the methodology section for greenhouse gas emissions for contextual information on how the use of planned flight data in the NERL modelling may affect the CO_2e costs result.
- Delay covers both airborne delay calculated by NERL and ground delay calculated by Glasgow Airport. As these are different measures, they have had different methods and assumptions for their calculation. Edinburgh Airport did not present a quantified delay benefit. See the individual ACPs for details.
- For fuel burn, the jet fuel price used in the NPV calculations is based on the Average Cost per Tonne of USD $861.39 (sourced from: IATA Fuel Monitor for week ending 22nd March 2024). To convert into GBP, the USD to GBP spot exchange rate from March 24, 2024 of £0.796373298, which converts the price to GBP £685.99. Fuel prices and exchange rates are volatile, and will have changed since the analysis was undertaken. However, it is important to note that there is a forecast fuel reduction per flight for all options and so there would always be an NPV benefit, regardless of the price and conversion rates applied.

This Full Options Appraisal was undertaken on the most up to date sources of data at the time, and as part of CAF3 (undertaken on the Final Options Appraisals in CAP1616 Stage 4), the fuel prices and exchange rates will be updated.

- It is not possible to assess CO_2e and fuel for changes below 7,000ft in isolation from those above 7,000ft. This means that airports have provided CO_2e and fuel assessments from their flights including segments above 7,000ft, and NERL have provided a fuel and CO_2e assessments for the whole proposal including segments below 7,000ft – this leads to some inevitable double counting in the individual ACP results. The presentation of cluster-wide results below does not require a distinction above and below 7,000ft and therefore the results below are the best estimates for the overall cluster-wide effect. As this is without double counting the CO2e and fuel results presented here for the cluster are less than the sum of the results in the individual ACPs. See Annex A for further detail on the methodology used to estimate the CO_2e and fuel benefits.

Table 71: Cost Benefit Table for Cluster-Wide "With Airspace Change" Proposal

Year	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	10 year total benefit
Net Community Benefit (Noise)	£ 3,322,963	£ 3,284,957	£ 3,247,348	£ 3,210,133	£ 3,173,309	£ 3,136,873	£ 3,100,820	£ 3,065,148	£ 3,029,852	£ 2,994,931	£ 31,566,333
Net Wider Society Benefit (Untraded CO_2e)	£ 1,628,801	£ 1,881,331	£ 2,130,610	£ 2,376,535	£ 2,619,014	£ 2,857,960	£ 3,093,292	£ 3,324,939	£ 3,552,834	£ 3,776,917	£ 27,242,234
Net Airspace Users Benefit (Traded CO_2e)	£ 3,082,465	£ 2,990,068	£ 3,032,375	£ 2,967,476	£ 2,785,420	£ 2,609,613	£ 2,440,014	£ 2,318,053	£ 2,128,915	£ 1,976,873	£ 26,331,271
Net Airspace Users Benefit (Airborne Fuel Costs)	£ 3,665,762	£ 3,672,744	£ 3,674,923	£ 3,673,204	£ 3,666,681	£ 3,657,160	£ 3,643,648	£ 3,627,017	£ 3,607,146	£ 3,584,395	£ 36,472,681
Net Airspace Users Benefit (Delay Cost Without Airborne Fuel)	£ 755,171	£ 766,287	£ 775,673	£ 783,442	£ 789,694	£ 794,537	£ 798,039	£ 800,310	£ 801,418	£ 801,439	£ 7,866,010
Infrastructure Costs	£ -	£ -	£ -	£ 244,050	£ -	£ -	£ -	£ -	£ -	£ -	£ 244,050
Operational Costs	£ -	£ -	£ -	£ -	-£ 15,622	£ -	£ -	£ -	£ -	-£ 12,973	-£ 28,594
Total Net Present value	£ 12,455,163	£ 12,595,386	£ 12,860,928	£ 13,254,840	£ 13,018,496	£ 13,056,143	£ 13,075,814	£ 13,135,467	£ 13,120,164	£ 13,121,582	£ 129,693,984

9 List of figures and data tables

List of Figures

Figure 1: 'Without Airspace Change' Standard Instrument Departures, Holds and Standard Arrivals Routes for Edinburgh and Glasgow Airports 13
Figure 2: Current Day Glasgow and Edinburgh Airport Flight Paths Below 7000ft for Easterly and Westerly Operations.. 14
Figure 3: Cluster-Wide "With Airspace Change" Proposal Standard Instrument Departures (SIDs), Approach Transitions (IAPs), Standard Arrival Routes (STARs)and Holds for Edinburgh and Glasgow Airports 36
Figure 4: Illustrative example of CAS structures 54
Figure 5: New and Released CAS 500ft-1499ft 59
Figure 6: New and Released CAS 1500ft-1999ft 60
Figure 7: New and Released CAS 2000ft-2499ft 61
Figure 8: New and Released CAS 2500ft-2999ft 62
Figure 9: New and Released CAS 3000ft-3499ft 63
Figure 10: New and Released CAS 3500ft-3999ft 64
Figure 11: New and Released CAS 4000ft-4499ft 65
Figure 12: New and Released CAS 4500ft-4999ft 66
Figure 13: New and Released CAS 5000ft-5499ft 67
Figure 14: New and Released CAS 5500ft-5999ft 68
Figure 15: New and Released CAS 6000ft to <FL65 69
Figure 16: New and Released CAS FL65 to <FL70 70
Figure 17: New and Released CAS FL70 to <FL75 71
Figure 18: New and Released CAS FL75 to <FL80 72
Figure 19: New and Released CAS FL80 to <FL85 73
Figure 20: New and Released CAS FL85 to <FL95 74
Figure 21: New and Released CAS FL95 to <FL105 75
Figure 22: New and Released CAS FL105 to <FL110 76
Figure 23: New and Released CAS FL110 to <FL115 77
Figure 24: New and Released CAS FL115 to <FL125 78

Figure 25: New and Released CAS FL125 to <FL145 79
Figure 26: New and Released CAS FL145 to <FL150 80
Figure 27: New and Released CAS FL150 to <FL155 81

List of Tables

Table 1: Cost benefit Analysis Summary for 2027-2036 5
Table 2: CAF2 Summary Results for 2027-2036 5
Table 3: CAF Stages as Summarised in ScTMA Masterplan Iteration 3 8
Table 4: ACP Consultation Options 10
Table 5: $L_{Aeq,\,16\,Hr}$, Daytime Cluster-Wide “Without Airspace Change” Baseline, Current Day 16
Table 6: $L_{Aeq,\,16\,Hr}$, Daytime Cluster-Wide “Without Airspace Change” Baseline, 2027 16
Table 7: $L_{Aeq,\,16\,Hr}$, Daytime Cluster-Wide “Without Airspace Change” Baseline, 2036 17
Table 8: $L_{Aeq,\,8\,Hr}$, Night-Time Cluster-Wide “Without Airspace Change” Baseline, Current Day 17
Table 9: $L_{Aeq,\,8\,Hr}$, Night-Time Cluster-Wide “Without Airspace Change” Baseline, 2027 18
Table 10: $L_{Aeq,\,8\,Hr}$, Night-Time Cluster-Wide “Without Airspace Change” Baseline, 2036 18
Table 11: N65 Daytime Cluster-Wide “Without Airspace Change” Baseline, Current Day 20
Table 12: N65 Daytime Cluster-Wide “Without Airspace Change” Baseline, 2027 20
Table 13: N65 Daytime Cluster-Wide “Without Airspace Change” Baseline, 2036 20
Table 14: N60 Night-Time Cluster-Wide “Without Airspace Change” Baseline, Current Day 21
Table 15: N60 Night-Time Cluster-Wide “Without Airspace Change” Baseline, 2027 21
Table 16: N60 Night-Time Cluster-Wide “Without Airspace Change” Baseline, 2036 21
Table 17: Overflight Daytime Cluster-Wide “Without Airspace Change” Baseline, Current Day 23
Table 18: Overflight Daytime Cluster-Wide “Without Airspace Change” Baseline, 2027 23
Table 19: Overflight Daytime Cluster-Wide “Without Airspace Change” Baseline, 2036 23
Table 20: Overflight Night-Time Cluster-Wide “Without Airspace Change” Baseline, Current Day 24
Table 21: Overflight Night-Time Cluster-Wide “Without Airspace Change” Baseline, 2027 24
Table 22: Overflight Night-Time Cluster-Wide “Without Airspace Change” Baseline, 2036 24
Table 23: CO_2e “Without Airspace Change” Baseline, Current Day (2023) and 2027-2036 25
Table 24: Tranquillity Sites in Relation to $L_{Aeq,\,16\,Hr}$, Daytime Cluster-Wide “Without Airspace Change” Baseline, Current Day 26
Table 25: Tranquillity Sites in Relation to $L_{Aeq,\,16\,Hr}$, Daytime Cluster-Wide “Without Airspace Change” Baseline, 2027 27
Table 26: Tranquillity Sites in Relation to $L_{Aeq,\,16\,Hr}$, Daytime Cluster-Wide “Without Airspace Change” Baseline, 2036 27
Table 27: Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide “Without Airspace Change” Baseline, Current Day 28
Table 28: Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide “Without Airspace Change” Baseline, 2027 28
Table 29: Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide “Without Airspace Change” Baseline, 2036 28

Table 30: Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide “Without Airspace Change” Baseline, Current Day 29
Table 31: Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide “Without Airspace Change” Baseline, 2027 30
Table 32: Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide “Without Airspace Change” Baseline, 2036 30
Table 33: Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide “Without Airspace Change” Baseline, Current Day 31
Table 34: Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide “Without Airspace Change” Baseline, 2027 31
Table 35: Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide “Without Airspace Change” Baseline, 2036 31
Table 36: Pre-departure Ground Dealy and Network Delay for “Without Airspace Change” Baseline, 2027 & 2036 32
Table 37: Fuel Burn for “Without Airspace Change” Baseline, Current Day (2023) and 2027-2036 & Total 33
Table 38: Cluster-Wide “With Airspace Change” Proposal TAG Noise Assessment Results 37
Table 39: Comparison Table for $L_{Aeq, 16 Hr}$, ,Daytime Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2027 38
Table 40: Comparison Table for $L_{Aeq, 16 Hr}$, ,Daytime Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2036 38
Table 41: Comparison Table for $L_{Aeq, 8 Hr}$, ,Night-Time Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2027 39
Table 42: Comparison Table for $L_{Aeq, 8 Hr}$, Night-Time Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2036 39
Table 43: $L_{Aeq, 16 Hr}$, ,Daytime Cluster-Wide “With Airspace Change” Proposal, 2027 40
Table 44: $L_{Aeq, 16 Hr}$, ,Daytime Cluster-Wide “With Airspace Change” Proposal, 2036 40
Table 45: $L_{Aeq, 8 Hr}$, ,Night-Time Cluster-Wide “With Airspace Change” Proposal, 2027 41
Table 46: $L_{Aeq, 8 Hr}$, ,Night-Time Cluster-Wide “With Airspace Change” Proposal 2036 41
Table 47: Comparison Table for N65,Daytime Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2027 42
Table 48: Comparison Table for N65 ,Daytime Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2036 42
Table 49: Comparison Table for N60 ,Night-Time Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2027 43
Table 50: Comparison Table for N60 , Night-Time Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2036 43
Table 51: Comparison Table for Overflight, Daytime Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2027 44
Table 52: Comparison Table for Overflight, Daytime Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2036 44
Table 53: Comparison Table for Overflight, Night-Time Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2027 45
Table 54: Comparison Table for Overflight, Night-Time Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2036 45
Table 55: Comparison Table for CO_2e, Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2027-2036 & Total 46
Table 56: Comparison Table for Tranquillity Sites in Relation to $L_{Aeq, 16 Hr}$, Daytime, Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2027 ... 48
Table 57: Comparison Table for Tranquillity Sites in Relation to $L_{Aeq, 16 Hr}$, Daytime, Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2036 ... 48
Table 58: Table for Tranquillity Sites in Relation to $L_{Aeq, 16 Hr}$, Daytime, Cluster-Wide “With Airspace Change” Proposal, 2027 49
Table 59: Table for Tranquillity Sites in Relation to $L_{Aeq, 16 Hr}$, Daytime, Cluster-Wide “With Airspace Change” Proposal, 2036 49
Table 60: Comparison Table for Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide “With Airspace Change” Proposal vs Baseline, 2027 . 50

Table 61: Comparison Table for Tranquillity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036 . 50
Table 62: Comparison Table for Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027. 51
Table 63: Comparison Table for Biodiversity Sites in Relation to Overflight Daytime Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036. 51
Table 64: Comparison Table for Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027 52
Table 65: Comparison Table for Biodiversity Sites in Relation to Overflight Night-Time Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2036 52
Table 66: Comparison Table for Delay, Cluster-Wide "With Airspace Change" Proposal vs Baseline, 2027-2036 & Total 53
Table 67: Volume of each type and classification of CAS in the baseline and proposed, combined Glasgow Airport, Edinburgh Airport and NERL ACPs (All Levels). 55
Table 68: Volume of each type and classification of CAS in the baseline and proposed, combined Glasgow Airport, Edinburgh Airport and NERL ACPs 7000ft and below only. 56
Table 69: Volume of each type and classification of CAS in the baseline and proposed, combined Glasgow Airport, Edinburgh Airport and NERL ACPs above 7000ft. 57
Table 70: Fuel Burn for Cluster-Wide "With Airspace Change" Proposal vs "Without Airspace Change" Baseline 2027-2036 & Total........ 82
Table 71: Cost Benefit Table for Cluster-Wide "With Airspace Change" Proposal........ 86