Title of Airspace Change Proposal	**LAMP Phase 1A: Module E South Coast Changes**
Change Sponsor	**NATS**
SARG Project Leader	[redacted]
Case Study commencement date	**01/05/2015**
Case Study report as at	**05/08/2015**
Report Reference	**SARG/ERCD/AG/South Coast Changes LAMP1A v 3.3**

Instructions

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

- **Yes**
- **No**
- **Partially**
- **N/A**

To aid the SARG Project Leader's efficient Project Management it may be useful that each question is also highlighted accordingly to illustrate what is resolved (Green), **not resolved** (Amber) or **not compliant** (Red) as part of the SARG Project Leader's efficient project management.

1. Introduction

This report describes the environmental considerations relevant to NATS's proposal to amend airspace along the south coast of England in order to reduce the operational interactions that exist and reduce the complexities and inefficiencies that arise from these interactions. This airspace change proposal is one of five modules proposed as part of the London Airspace Management Programme (LAMP) Phase 1A airspace redesign.

This module will affect aircraft arriving from the east into Southampton and Bournemouth airports between 2,500 and 7,000 feet. The ACP also proposed changes to the flight plannable routing of arriving traffic inbound to Farnborough from the southwest and south, and to departing aircraft above 7,000 feet out of Farnborough, Southampton and Bournemouth airports that currently route towards Goodwood and Dover. Together these changes aim to reduce the opposing-direction traffic interactions between inbound and outbound traffic streams that occur east of the Goodwood navigational beacon.

The Airspace Change Proposal (ACP) also proposes to reduce the minimum altitude in controlled airspace (CAS) from Flight Level 105 (approx 10,500 feet) to Flight Level 65 (approx 6,500 feet) in four areas of existing controlled airspace. Two of the regions are almost entirely off the south coast stretching from Littlehampton to East Wittering. The largest area, named the Isle of Wight CAS region, covers the majority of the Isle of Wight and extends north covering Lee-on-the-Solent, Gosport, Portsmouth and Portsmouth Harbour.

Finally, the ACP proposes to amend two Air Traffic Service (ATS) routes than direct traffic to the revised arrival route, and facilitate onward connectivity for the revised departure routing, and a Standard Terminal Arrival Route (STAR) for traffic arriving at Southampton and Bournemouth airports. All of these changes affect traffic at altitudes above 7,000 feet.

The ACP has been submitted by the sponsor, NATS, having been transferred from TAG Farnborough who undertook the consultation.

This assessment is based upon information presented in the proposal document entitled "LAMP Phase 1A Airspace Change Proposal - Module E, South Coast Changes – Issue 2.0, March 2015", plus associated supporting material, consultation material and subsequent information received as the result of queries raised with the sponsor following submission of the ACP.

2. Guidance to the CAA

Status

2.1	Is the proposal consistent with Government policy and/or guidance from Government to the CAA?	Yes

Guidance issued to the Civil Aviation Authority[1] sets out a framework for the environmental objectives that the CAA must consider when assessing airspace change proposals. In addition to these objectives, there may be other legitimate operational objectives, such as the overriding need to maintain an acceptable level of air safety, the desire for sustainable development or to enhance the overall efficiency of the UK airspace network, which need to be considered alongside these environmental objectives. The Government looks to the CAA to determine the most appropriate balance between these competing characteristics.

Flights over National Parks and AONBs are not prohibited by legislation[2] as a general prohibition against over-flights would be impractical. Government policy focuses on minimising the over-flight of more densely populated areas below 7,000 feet (amsl), but balances this with CO_2 emissions between 4,000 and 7,000 feet (amsl). However, where it is practical to avoid over-flight of National Parks and AONBs below 7,000 feet (amsl), the Guidance asks that the CAA encourages this.

3.	Rationale for the Proposed Change	Status
3.1	Does the rationale for the ACP include environmental reasons?	No

No. The aim of the ACP is to reduce traffic interactions and thereby reduce the consequential air traffic and operational complexities and inefficiencies that these interactions cause.

4.	Nature of the Proposed Change	Status
4.1	Is it clear how the proposed change will operate, and therefore what the likely environmental impacts will be?	Yes

Yes, changes to the standard arrival route are covered in Part D of the Airspace Change consultation document. This provides flight track density plots showing flights inbound and outbound of Southampton and Bournemouth airports. The consultation document goes on to show the proposed revised standard arrival route (STAR), its associated flight path swathes, and the minimum aircraft altitudes within the

[1] DfT, Guidance to the Civil Aviation Authority on Environmental Objectives Relating to the Exercise of its Air Navigation Functions, January 2014
[2] National Parks and Access to the Countryside Act 1949, National Parks (Scotland) Act 2000, and "Duties on relevant authorities to have regard to the purposes of National Parks, Areas of Outstanding Natural Beauty (AONBs) and the Norfolk and Suffolk Broads Guidance Note", Defra 2005.

swathes. The consultation document also goes on to show the numbers of aircraft and the range of individual overflight noise levels that would be experienced.

The ACP explains and illustrates the revised flight plannable arrival routes for Farnborough, departure routings for departures from Farnborough, Southampton and Bournemouth, which affect departures to the east from these airports. As the changes are all above 7,000 feet, none of these changes was consulted upon.

4.2	Have alternative options been considered, and have the environmental impact of each alternative been assessed?	Partially

With regard to arriving aircraft landing on runway 02 at Southampton airport, the sponsor consulted upon two options, one to tactically route aircraft from the east along The Solent to join the extended runway centreline around Norleywood, similar to current operations. The alternative proposed is to route aircraft over the southern portion of the Isle of Wight before joining the extended runway centreline over Freshwater.

Post consultation, the sponsor considered that the "do nothing" option could be progressed, however, the sponsor indicates this would mean that the wider benefits of the LAMP Phase 1A package would not be realised. The sponsor articulates why airspace modernisation is necessary, in order to reduce the current interactions and inefficiencies.

5.	Noise	Status
5.1	Has the noise impact been adequately assessed?	Yes

Yes, the sponsor has provided estimated peak noise levels (L_{Amax}) for the most frequent and noisiest aircraft types operating and linked these noise levels to the lowest permitted altitudes for each airspace sector.

The proposal would result in some changes to aircraft altitudes and/or routeings below 7,000 feet:

- Lowers the minimum altitude within the four CAS regions from approx 10,500 feet to 6,500 feet
- Introduces an additional initial approach path for Bournemouth 08 arrivals approaching from the south of the airport, for aircraft descending from 6,000 to 3,000 feet.
- Introduces an additional initial approach path for Southampton 02 arrivals approaching from the south over the Isle of Wight, for aircraft descending from 6,000 to 5,000 feet.

These changes are below the normal 7,000 feet threshold at which noise impacts should be considered. However, because they are for additional arrival routes, and the numbers of aircraft movements involved are small (on average less than one aircraft per day on each route) when they are taken together with the altitudes involved and the L_{Amax} noise information provided by the sponsor, we are satisfied that the estimated noise exposure levels associated with the proposed changes would be well below 57dBA Leq and thus standard Leq noise contours would not have shown any changes. On this basis the impacts of the proposal are not considered significant.

For the proposed changes above 7,000 feet, noise has not been assessed as the effects would not be considered significant.

5.2	**Has the noise impact been adequately presented in the consultation and the submitted proposal?**	Yes

Yes, the sponsor has provided maps (Consultation documents Part C & Part D) that show the areas where changes will occur, what the range of altitudes are expected to be in those areas and what the corresponding range of peak noise levels (L_{Amax}) are likely to be.

6.	**Emissions**	**Status**
6.1	**Has the impact on CO_2 emissions been adequately assessed?**	Yes

Yes, the sponsor has undertaken a fuel consumption and CO_2 emissions assessment and concluded that overall there is a small, but quantifiable increase in CO_2 emissions.

This occurs, principally as a consequence of an increase in overall distance flown, which is a consequence of moving the arrival flight paths for aircraft inbound into Southampton, Bournemouth airports further south, and also due increase in track distance flown by the revised flight plannable departure routes that affect departure above 7,000 feet out of Farnborough, Southampton and Bournemouth airports.

6.2	**Has the impact on CO_2 emissions impact been adequately presented in the consultation and the submitted proposal?**	Yes

Yes, the sponsor describes the fuel and CO_2 calculations in Part A of its consultation document, acknowledging that the proposal will increase CO_2 emissions.

7.	Local Air Quality	Status
7.1	Has the impact on Local Air Quality been adequately assessed?	Yes

The sponsor sets out in proposals do not affect any flight paths below 2,500 feet and therefore will no impact on local air quality.

7.2	Has the impact on Local Air Quality been adequately presented in the consultation and the submitted proposal?	Yes

Local Air Quality was not addressed in the consultation document. However, this was the fourth most important theme raised by consultees after noise, tranquillity and CO_2 emissions.

8.	Tranquillity	Status
8.1	Has the impact on tranquillity been adequately considered?	Yes

Yes, in absence of clear objective definitions on tranquillity, the sponsor considered to what extent the proposed changes would affect overflight of Areas of Outstanding Natural Beauty (AONBs) and National Parks.

8.2	Has the impact on tranquillity been adequately presented in the consultation and the submitted proposal?	Yes

Yes, the sponsor depicted AONBs and National Parks on the maps contained in the consultation document showing the proposed changes. In addition the sponsor specifically sought views from consultees.

9.	Visual Intrusion	Status
9.1	Has the impact of visual intrusion been adequately considered?	Yes

Whilst it is not possible to objectively assess the impact on visual intrusion, the sponsor clearly identified sensitive receptions (AONBs and National Parks) where visual intrusion may be an issue and sought views from consultees.

9.2	Has the impact of visual intrusion been adequately presented in the consultation and the submitted proposal?	Yes

Yes, see 9.1.

10.	Biodiversity	Status
10.1	Has the impact upon biodiversity been adequately considered?	Yes

Yes – whilst no explicit comment is made about the possibility of any impact upon biodiversity, the proposed changes are unlikely to have any effect on biodiversity.

10.2	Has the impact upon biodiversity been adequately presented in the consultation and the submitted proposal?	Yes

Yes, see 10.1.

11.	Continuous Descent Approaches	Status
11.1	Has the implementation of, or greater use of, CDAs been considered?	No

Although not set out as an objective in the proposal, the ACP document does discuss implementation of CDAs and does suggest that reducing airspace interaction should increase the likelihood of a CDA being flown, however, it does not present any estimates or claim any benefit from this within the proposal.

12.	Impacts Upon National Parks and/or AONBs	Status
12.1	Does the proposed change have an impact upon any National Parks or Areas of Outstanding Natural Beauty (AONBs)?	No

Many of the flight paths addressed in the proposal already pass over AONBs and/or National Parks. The proposal will lead to changes, including overflight of new areas of AONBs and/or National Parks. In particular approx 1% of flights inbound to Southampton and 15% inbound to Bournemouth airports (combined total of 3.37 flights per day in 2019) would be directed to overfly the southern half of the Isle of Wight AONB, however, they would do so at altitudes above 7,000 feet.

13.	Traffic Forecasts	Status
13.1	**Have traffic forecasts been provided, are they reasonable, and have these been used to reflect the future impact of the proposal?**	Yes

Yes, forecast traffic for 2015 and 2019 were presented in the consultation document.

14.	Consultation	Status
14.1	**If undertaken, has evidence of non-aviation stakeholder consultation been provided?**	Yes

Yes, a number of non-aviation stakeholders responded to the consultation, including organisation and members of the public.

14.2	**Has account been taken of the results of the environmental factors raised by consultees or has evidence been provided to indicate why this has not been possible?**	Yes

With regard to changes between 4,000 and 7,000 feet, the overriding theme in consultation responses was a concern over increases in aircraft noise and a prevailing view that noise should not be balanced against CO_2 emissions or that airspace route efficiency should not be balanced against environmental impacts.

15.	Compliance with CAP 725	Status
15.1	**Have all environmental assessment requirements specified in CAP 725 been met, where applicable?**	Yes

Yes.

16.	Other Aspects	Status
16.1	**Are there any other aspects of the ACP, that have not already been addressed in this report, that may have a bearing on the environmental impact?**	No

No.

17.	Recommendations	Status
17.1	Are there any recommendations for the Post-Implementation Review?	No

No.

18.	Government Approval	Status
18.1	Is the approval of the Secretary of State for Transport required in respect of the environmental impact of the airspace change proposal?	No

No.

19.	Conclusions	
19.1	Can an overall environmental benefit be demonstrated (or justified/supported)?	No

Environment is not the primary objective of this proposal. The sponsor fully acknowledges that the proposal will lead to longer track miles flown and a net increase in CO_2 emission. The increase is, however, very small in aviation terms and fully offset by emissions reductions across the other LAMP Phase 1A modules. Whilst the proposal demonstrates that it will reduce overflight of substantial numbers of people, the numbers of flights are estimated to be less than 10 per day in 2019 and thus the benefits or dis-benefits associated with redistributing flights in the Solent area are likely to be minimal.

Outstanding Issues		
Serial	Issue	Action Required

Additional Compliance Requirements (to be satisfied by Change Sponsor)

Serial	Requirement

Environmental Assessment Sign-off/Approvals			
	Name	Signature	Date
Environmental Assessment completed by (ERCD representative)	[redacted]	[redacted]	5 August 2015
Environmental Assessment approved by (Head of ERCD)	[redacted]	[redacted]	5 August 2015

Appendix 1 – Fuel & CO_2 Assessment for LAMP Phase 1 A

Explanatory notes on CO_2 assessment methodology

All figures in the following tables represent the change when compared with a "do nothing" scenario, with all other things being equal. They do not represent an absolute reduction.

The figures represent a fuel saving unless they are expressed as a negative (which represents a fuel increase).

The assessment method used for the LAMP Phase 1A CO_2 estimates calculated both an "enabled" fuel burn figure (which reflected the impact based solely of the theoretical flight-planned routes) and an "adjusted" fuel burn figure which sought to make an adjustment to reflect the fact that many aircraft fly routes that are shorter than their flight-planned routes because they are tactically vectored by Air Traffic Control.

Consultation for the various LAMP Phase 1A elements was undertaken by different sponsors depending upon the nature of the change (NATS, Stansted Airport, Gatwick Airport and London City Airport). However, not all elements that were consulted upon were progressed to become a formal Airspace Change Proposal. In particular, the majority of changes consulted upon in relation to aircraft operating at Gatwick Airport were not progressed and did not feature in the CO_2 assessment that was submitted to the CAA, other than some high-level changes for arrivals (the TIMBA STARs).

In addition to considering NATS' assumptions and methodology for its CO_2 analysis, in terms of assessing the adequacy of the resulting estimates, the impacts attributable to the Stansted Airport elements (Module A) were checked for reasonableness by the CAA. This determined that the sponsor's estimates were reasonable and was therefore used as an indicator that the estimates for the other Modules were also likely to be reasonable.

Key points from the Bridging ACP document:

The following points help to explain the methodology adopted by NATS to estimate the system-wide impacts on CO_2 emissions.

- The CO_2 emissions report is a full system analysis covering all of the LAMP Phase 1A modules. It was completed in January 2015 and is based on real time simulation modelling, taking into account the final proposed design both in terms of routes and procedural flight levels. It therefore represents the most up to date and complete analysis of the expected fuel and CO_2 impact of the Airspace Change Proposal (ACP) and supersedes analyses undertaken by the sponsors during the design process.
- The report estimates that in 2016 the change would result in enabled fuel savings of 15,600 tonnes, rising to 18,200 tonnes by 2020. This is an 'enabled' fuel benefit, which is a measure of the difference that the proposal will make to the "trip fuel" that airlines will plan for.
- In the current operation aircraft are tactically vectored by Air Traffic Control for reasons of safety and efficiency. This occurs in today's airspace and would also occur in the future.

- Tactical vectoring means that not all trip fuel that airlines load onto a flight is used, because the distance actually flown is usually less than that planned for. As CO_2 is only generated from fuel which is burnt, this can mean that the enabled fuel benefit is likely to overestimate the CO_2 benefit if a straight conversion from the enabled fuel is undertaken. Therefore the report describes and applies a method for adjusting the results to avoid, as far as is practicable, overestimating actual fuel burn and therefore CO_2.
- NATS, as the sponsor, recognises that there are elements of the fuel and CO_2 assessment methodologies that remain subject to assumptions, in particular when translating enabled fuel reduction into actual CO_2 reduction. It took account of these factors as far as possible, and therefore reduced the CO_2 benefits on the basis of a comparison of modelled and actual fuel for today's traffic. This comparison indicated that a reduction of 21% to reflect the difference between enabled fuel and actual fuel was reasonable.
- The adjusted CO_2 estimate was a 39,400 tonne saving in 2016; rising to 46,000 by 2020 (this is adjusted down by 21% from the equivalent 'enabled' benefit).
- However, the dynamic nature of the air traffic environment both in terms of day-to-day operation and the long term effects of increasing traffic and technological advancement, mean that a degree of uncertainty remains and to account for this uncertainty NATS applied a range to the reported results in the ACP.
- The lower end of the range was not scientifically derived; it is simply 50% of the calculated value. However, it was NATS' view based upon its own operational and analytical experts that, as the calculated value represents "as close an approximation to the required adjustment as can be achieved, and then the lower end of the range more than covers the remaining uncertainty, and presents a sufficient benefit contributing to the overall justification for change."
- When applying this lower limit of 50%, the range of CO_2 reductions estimated by NATS for the entirety of LAMP Phase 1A are:
    - For 2016 = 19,000 to 40,000 tonnes
    - For 2020 = 23,000 to 46,000 tonnes
- It was noted that within the overall result there were some specific routes for which there will be a negative fuel/CO_2 impact, i.e. an increase. However, because these are the less-frequently-used routes, the net negative CO_2 impact is negligible when taken in the context of the overall estimated system benefit that is derived from the combined impacts of the LAMP Phase 1A modules.

Predicted Annual Saving on Fuel (2016) – tonnes

		Consultation	Module ACP	Bridging ACP (Table 52 – "Enabled" Fuel)	Bridging ACP (revised for runway split – Table 52 – "Enabled" Fuel)[1]	Further adjustment by CAA ("Enabled" Fuel)
Module A - Stansted	Base case	2,000-4,000	2,000-4,000	5,131	4,271	4,298
Module B – London City Replications	Base case	0	0	0[2]	0[2]	0[2]
Module C – London City Network (plus Gatwick & Southend)	Base case	Part E = 2,500-5,000 for LCY Additional 5% for Biggin Hill = 125-250 (same figures quoted in Part F and Part G) No CO_2 assessment for Southend, therefore no benefit claimed in consultation but negligible impact expected.	No figures stated – but cross-reference to the figures in the Bridging ACP	LCY = 4,632 Gatwick (TIMBA STARs) & Southend = 4,229 **Total = 8,861[2]** (no separate figures for Biggin Hill)	LCY = 4,136 Gatwick (TIMBA STARs) & Southend = 3,980 **Total = 8,116[2]** (no separate figures for Biggin Hill)	LCY = 4,082 Gatwick (TIMBA STARs) & Southend = 3,959 **Total = 8,041[2]** (no separate figures for Biggin Hill)
Module D – Luton & Northolt	Base case	No consultation undertaken	No figures stated – but cross-reference to the figures in the Bridging ACP	1,854	1,836	1,815
Module E – South Coast (Farnborough, Southampton, Bournemouth)	Base case	Figures for 2015: Farnborough = -1,400 Southampton = -102 Bournemouth = -9	-248	-248	-252	-265
Total	**Base case**	**3,114-7,739**	**7,835-9,835**	**15,598**	**13,971**	**13,889**

[1] The original assessment presented in the Bridging ACP had assumed a simple runway usage of 50/50. This was subsequently revised during the CAA's consideration of the LAMP Phase 1A proposals to a more realistic 70 westerly/30 easterly runway usage, and the CO_2 assessment was modified by the sponsor to reflect this.

[2] The CO_2 impacts from London City that are reported in the Bridging ACP do not distinguish between those from the Replications (Module B) or the Network (Module C) and so the entire figure for London City is reflected in this table as being Module C.

Predicted Annual Saving on Fuel (2020) – tonnes

		Consultation	Module ACP	Bridging ACP (Table 52 – "Enabled" Fuel))	Bridging ACP (revised for runway split – Table 52 – "Enabled" Fuel)[1]	Further adjustment by CAA ("Enabled" Fuel)
Module A - Stansted	Base case	2,300-4,700	2,300-4,700	5,941	4,970	4,932
Module B – London City Replications	Base case	0	0	0[2]	0[2]	0[2]
Module C – London City Network (plus Gatwick & Southend)	Base case	Part E = 3,000-5,900 for LCY Additional 5% for Biggin Hill = 150-295 (same figures quoted in Part F) Part G= 2,900-5,800 for LCY No CO_2 assessment for Southend, therefore no benefit claimed in consultation but negligible impact expected.	No figures stated – but cross-reference to the figures in the Bridging ACP	LCY = 6,255 Gatwick (TIMBA STARs) & Southend = 4,252 **Total = 10,507[2]** (no separate figures for Biggin Hill)	LCY = 5,648 Gatwick (TIMBA STARs) & Southend = 4,381 **Total = 10,029[2]** (no separate figures for Biggin Hill)	LCY = 5,514 Gatwick (TIMBA STARs) & Southend = 4,356 **Total = 9,870[2]** (no separate figures for Biggin Hill)
Module D – Luton & Northolt	Base case	No consultation undertaken	No figures stated – but cross-reference to the figures in the Bridging ACP	2,177	2,156	2,170
Module E – South Coast (Farnborough, Southampton, Bournemouth)	Base case	Figures for 2019: Farnborough = -1,700 Southampton = -113 Bournemouth = -10	-400	-399	-402	-418
Total	**Base case**	**3,627-9,072**	**8,329-10,729**	**18,226**	**16,753**	**16,554**

[1] The original assessment presented in the Bridging ACP had assumed a simple runway usage of 50/50. This was subsequently revised during the CAA's consideration of the LAMP Phase 1A proposals to a more realistic 70 westerly/30 easterly runway usage, and the CO_2 assessment was modified by the sponsor to reflect this.

[2] The CO_2 impacts from London City that are reported in the Bridging ACP do not distinguish between those from the Replications (Module B) or the Network (Module C) and so the entire figure for London City is reflected in this table as being Module C.

Bridging ACP – Total Estimated CO_2 Reduction (tonnes)

These CO_2 figures are taken or derived from the Bridging ACP submitted to the CAA as part of LAMP Phase 1A Airspace Change proposal.

The "revised" figures represent the revision made by the sponsor to switch from a 50/50 runway usage assumption to a 70/30 usage assumption.

The "CAA adjusted" figures represents small adjustments made for roundings and other small inconsistencies in calculation.

A conversion figure of 3.18 has been used to convert fuel into CO_2 .

			2016	2020
Based on Estimated Enabled Fuel Saving	Base case	original proposal	49,600	57,962
		revised proposal	44,428	53,278
		CAA adjusted total	44,167	52,642
	High case	original proposal	55,314	62,566
		revised proposal	49,662	57,488
		CAA adjusted total	-	-
Based on Estimated Actual Fuel Saving (i.e. adjusted for a 21% reduction from Enabled)	Base case	original proposal	39,368	46,006
		revised proposal	35,263	42,287
		CAA adjusted total	**34,892**	**41,587**
	High case	original proposal	43,903	49,659
		revised proposal	39,418	45,629
		CAA adjusted total	-	-

Based on the above results, we would conclude that the approximate annual benefit (i.e. reduction when compared with a "Do Nothing" scenario) in CO_2 emissions as a result of the combined LAMP Phase 1A changes would be approximately **34,900 tonnes of CO_2 in 2016 and 41,600 tonnes in 2020**.

In acknowledging the fact that these estimates incorporate a number of assumptions derived from operational experience, NATS proposed a range of CO_2 impacts which set the lower limit at 50% of the derived estimate. (See the methodology notes at the start of this Appendix.) Applying the same 50% reduction to the figures in the table above in order to obtain a range, the result is:

- For 2016 = 17,450 to 34,900 tonnes of CO_2 saved
- For 2020 = 20,800 to 41,600 tonnes of CO_2 saved

If this lower limit was used as a pessimistic assumption for the estimated CO_2 saving, then the combined LAMP Phase 1A changes would be approximately **17,450 tonnes of CO_2 in 2016 and 20,800 tonnes in 2020**.