Safety and Airspace Regulation Group

Report of the CAA's Post Implementation Review of the London Airspace Management Programme (LAMP) Phase 1A Module E Airspace Change Proposal – South Coast Changes

CAP 1692 E

Published by the Civil Aviation Authority, 2018
Civil Aviation Authority,
Aviation House,
Gatwick Airport South,
West Sussex,
RH6 0YR.

This report is part of a series of PIR reports for LAMP Phase 1A Airspace change proposal implemented on 4 February 2016.

Enquiries regarding the content of this publication should be addressed to:
Airspace and ATM Aerodromes, Safety and Airspace Regulation Group, CAA House,
45-59 Kingsway, London, WC2B 6TE

The latest version of this document is available in electronic format at www.caa.co.uk

Contents

Contents **3**
Executive Summary **5**
Operational Conclusion 6
Environmental Conclusion 6
Scope and Background of the PIR **8**
What is a Post Implementation Review 8
Background to our conclusions in this PIR Decision 8
Conditions attached to the CAA's decision to approve the change 9
Condition 1 outcome 11
Conditions 2, 3 and 4 compliance 11
Condition 2 outcome 12
Condition 3 outcome 13
Condition 4 outcome 13
Condition 5 outcome 14
Condition 5 outcome (the second condition 5) 14
Data collected for the purpose of the PIR 15
Sources of Information 15
Change Sponsor 15
Operators and Airlines 15
Air Navigation Service Provider 15
Groups and residents local to Farnborough, Southampton and Bournemouth Airports 16
Objectives and Anticipated Impacts **17**
The original proposal and its objectives 17
Anticipated Impacts 19
CAA Assessment **22**
Operational Assessment 22

Safety 22
Operational Feedback 22
Air Navigation Service Provision 23
Letters of Agreement 23
Utilisation and Track Keeping 23
Traffic 23

Environmental Assessment 24

Noise 24
Areas of Outstanding Natural Beauty and National Parks 24
CO_2 Emissions 25
Environmental Conclusion 26

Community Stakeholder observations 26
Ministry of Defence Operations 26
Any other impacts 26

Conclusion 28

Operational Conclusion Module A Conclusions 28
Environmental Conclusion 28
Complaints Conclusion 29
Overall conclusion 29

Note on plain language 30
Annexes 31
Annex A - LAMP Phase 1A PIR data provision Requirements - evidence provided 32
Annex B – NATMAC 80 Presentation 43
Annex C – Bournemouth, Southampton and Farnborough arrival traffic pattern and CAA analysis of the change 51
Annex D - CO2 Emissions Summary 72

Conclusion 73

Notes 73

Executive Summary

1. The CAA's airspace change process is a seven-stage mechanism that is set out in detail in CAP 725. Under this process in February 2015, National Air Traffic Services (NATS) submitted an Airspace Change Proposal (ACP) titled the London Airspace Management Programme (LAMP) Phase 1A proposal to the Civil Aviation Authority (CAA), to propose changes to airspace in the south-east of England including proposals to change a number of arrival and departure procedures at a number of aerodromes. LAMP Phase 1A was a major airspace change designed to deliver modifications to airspace arrangements affecting a broad swathe of south-east England from Stansted to the Isle of Wight in order to provide, primarily, capacity and efficiency benefits. There are five individual elements (referred to as Modules) of the LAMP Phase 1A proposal.

2. NATS proposed changes to the following:

- Changes to flight planned arrival and departure routes for Farnborough, Bournemouth and Southampton airports comprising:
  - New RNAV-1 Standard Terminal Arrival Route (STAR), SAM2D for Southampton and Bournemouth from the south-east.
  - New air traffic service (ATS) route N20 feeding the new SAM2D STAR.
  - New air traffic service (ATS) route (U)N16 primarily for re-routeing Farnborough, Southampton and Bournemouth departures to Dover for Europe above FL165.
  - Minor route re-alignments for (U)Y8 and (U)M8.
  - Revised flight plannable routes inbound to Farnborough from the south-west and south-east, and outbound to the east via Dover routeing to Europe.
  - Lowering of some Controlled Airspace (CAS) in the region of the Isle of Wight to enable the new procedures.

3. Stage 7 of this process is a Post Implementation Review (PIR) that normally begins one year after implementation of the change.

4. The sponsor provided PIR data to the CAA in June 2017; on 18 October 2017, the CAA commenced the PIR of the impact of its decision and the implemented change. The content and outcome of this review process by the CAA is discussed in detail in this report including its annexes.

5. On 2 January 2018, the CAA introduced a new process for making a decision whether or not to approve proposals to change airspace design (CAP1616). However, as this ACP was fully implemented prior to the introduction of that document, and the PIR data received by the CAA prior to its introduction, this review has been undertaken in accordance with CAP725 and the Department for Transport's Guidance to the Civil Aviation Authority on Environmental Objectives Relating to the Exercise of its Air Navigation Functions (2014).

6. During the review process, the CAA considered data provided by the sponsor NATS. As a result, the CAA has reached the following conclusions:

Operational Conclusion

7. The airspace change has achieved the aims and objectives. Traffic inbound to Southampton and Bournemouth from the southeast is now routed away from Goodwood as designed. The eastbound departure routeing via Biggin instead of Seaford has been integrated with other flows without issues. The revised Farnborough flight planned routeings for arrivals have again eased the positioning and integration of the overall 3 traffic flows in the region, and as a result complexity around Goodwood has been reduced.

Environmental Conclusion

8. The noise impacts are consistent with the impact anticipated in the airspace change proposal. On that basis, we consider that there has been no increase in the number of people significantly affected by noise as a direct result of the airspace change.

9. Impacts upon Areas of Outstanding Natural Beauty (AONBs) and National Parks are largely as anticipated. The difference between the expected traffic flow over the Isle of Wight and the actual post-implementation traffic flow is noted, but is deemed to be consistent with the anticipated impact.

10. This Module has resulted in a modest increase in annual CO_2 emissions. This impact is in line with the anticipated increase in CO_2 emissions.

11. No stakeholder observations (enquiries/complaints) were received by the change sponsor, NATS and/or the CAA specifically concerning the implementation of changes applicable to Module E (see Stakeholder Observations below for further information).

12. This report, and its annexes and attachments, provide a summary of the information the CAA has reviewed and taken into account before reaching these conclusions. However, all the information the CAA has taken into account is published on our website/interim portal.

Scope and Background of the PIR

What is a Post Implementation Review

13. The CAA's approach to decision-making in relation to proposals to approve changes to airspace is explained in its Guidance on the Application of the Airspace Change Process, CAP 725. This detailed Guidance provides that the seventh and last stage of the process is a review of the implementation of the decision, particularly from an operational perspective, known as a Post Implementation Review (PIR).

14. The Guidance states that the purpose of a PIR is to determine whether the anticipated impacts and benefits in the original proposal and published decision are as expected, and where there are differences, what steps (if any) are required to be taken.

15. If the impacts are not as predicted, the CAA will require the change sponsor to investigate why, and consider possible mitigations or modifications for impacts that vary from those which were anticipated to meet the terms of the original decision.

16. A PIR is therefore focused on the effects of a particular airspace change proposal. It is not a review of the decision on the airspace change proposal, and neither is it a re-run of the original decision process.

Background to our conclusions in this PIR Decision

17. On 13 October 2015, the CAA approved LAMP Phase 1A change proposals to change traffic patterns for Stansted and Luton SIDs, London City arrival and departure routes, route network changes for London City, Gatwick, Farnborough, Southampton and Bournemouth; these changes involved a variety of changes which included RNAV1 procedures for London City arrivals and departures and a number of new ATS routes providing connectivity to the route network in adjacent States' airspace. The changes proposed in the South Coast change proposal were proposed as Module E which is the subject of this report. In our Decision document dated 22 December 2015, we provided information and background to the change. We recommend readers of this report read that Decision in conjunction with this document.

Conditions attached to the CAA's decision to approve the change

18. The following conditions were placed on the sponsor:

1	NATS is to ensure that the safety requirement for radar monitoring of the RUDMO Hold are in place prior to the operation going live.
2	The utilisation of controlled airspace regarding climb and descent profiles following LAMP Phase 1A implementation is to be reviewed by NATS by 30 June 2016 in order to address the CAA's list of possible options for raising the lower limits of controlled airspace following implementation of LAMP Phase 1A which were discussed with NATS on 21 May 2015. NATS is to advise the CAA by 30 June 2016 regarding what revisions to the lower limits of controlled airspace are feasible and, if appropriate, advise the CAA which options are not feasible. If changes are possible, these will be co-ordinated by the CAA for implementation at the next available ICAO Southern England and Wales 1:500,000 chart update.

3	By 30 June 2016, in conjunction with the above, determine whether the lower limits of the LTMA may be raised in LTMA Sectors 3 and 8 as follows: -- LTMA Sector 3 (3500-FL195) situated south of the Southend CTA 7 and, -- the revised LTMA Sector 8 from the north coast of Kent to the boundary of the LTMA Sector 21/N859 eastern extremity taking due consideration of the new southern arrival segment of the London City arrival transition procedure. NATS is to advise the CAA by 30 June 2016 regarding what revisions to the lower limits of controlled airspace are feasible and if appropriate, advise the CAA which options are not feasible. If changes are possible, these will be co-ordinated by the CAA for implementation at the next available ICAO Southern England and Wales 1:500,000 chart update.
4	By 30 June 2016, investigate re-classification of the new Portsmouth CTAs 1 and 2 from Class A to Class C. Notwithstanding details provided to the CAA during the Case Study concerning reasons why NATS could not manage Class C operations immediately on implementation, NATS is to determine if these areas could this be Class C rather than Class A as proposed. If a reversion to Class C is possible, NATS is to provide the CAA with a proposal to revert the Portsmouth CTAs to Class C airspace for implementation in March 2017 meeting the appropriate AIRAC deadline and allowing for a CAA regulatory assessment of the proposal. The arrangements for this will be confirmed by the SARG Case Officer and handled through the Stage 7 PIR process.

5	By 1 May 2016, NATS is to engage with all General Aviation stakeholders who provided feedback to the consultation in respect of the airspace now approved as the Portsmouth CTA 1 and CTA 2. NATS is to determine which operations could be accommodated as segregated VFR activity in Class A airspace. For those activities requiring to use the airspace above FL65/75 as appropriate, such as specialist activities for example, high altitude spinning and stalling, which can be accommodated, NATS is to establish appropriate Letters of Agreements with the specific airspace users to cater for segregated VFR activity in Class A airspace. The LoA(s) is/are to contain specific notification and access arrangements, detailing the procedures to be followed. A draft LoA and exemption request is to be submitted to the CAA Case Officer for approval, prior to the agreements becoming effective. Any agreements established are to be ready for operational use by 1 June 2016.
5.	NATS to monitor the track of a number of traffic entering the RUDMO Hold and ensure aircraft do not enter Danger Area D037.

Condition 1 outcome

19. Condition 1 was met prior to implementation. No MOR's were attributed to this scenario during the first year of operations.

Conditions 2, 3 and 4 compliance

20. For a number of reasons a delay in completing the required review action required by NATS by 30 June 2016 was necessary and a revised deadline of 31 August was agreed with the CAA. The results of this review were subsequently provided to the CAA on 31 August 2018.

Condition 2 outcome

21. Regarding Condition 2, NATS complied with this condition and completed a review of the lower limits and usage by GAT in a number of areas of controlled airspace along the south coast region both over the sea and overland. A number of possibilities for controlled airspace lower limit revision were identified and discussed with the CAA. In order to seek some quick wins by raising some lower limits of controlled airspace mainly over the sea and more towards the Thames Estuary (in conjunction with Module C approval conditions), adjustments and some rationalisation of controlled airspace lower limits was circulated to NATMAC members prior to NATMAC 80 in October 2017. Some NATMAC members responded, however, when discussed at NATMAC, it was thought that more time was necessary for members to assimilate the details and impacts of the proposals (see Annex B). This was recorded in the NATMAC 80 meeting notes:

NATMAC 80 PARA 10.2

South Coast Rationalisation. The proposal for the rationalisation of controlled airspace base levels along the South Coast and in the Thames Estuary had been the subject to a very short NATMAC consultation period due to the deadline for charting submissions. Representatives were concerned, however, that too little time had been allowed to fully consider the proposals and objections had been raised over service provision, flight in icing conditions and areas where it was considered that further rationalisation could be made, but where there was insufficient time to consider them. PPL IR also raised the subject of alternative options such as changes to airspace classification to achieve the desired aim. Consequently, the **Chairman** accepted that, whilst the proposal had constituted a genuine attempt to secure a 'quick win' in terms of releasing controlled airspace, further scrutiny of the proposal was needed. The proposal would be put on hold to allow NATMAC Representatives to consider the proposal further.

22. Following NATMAC 80, no further feedback was received from NATMAC members. Therefore, the CAA has decided to re-examine this initiative once the outcome of the Farnborough ACP is determined and will notify NATMAC members in due course.

Condition 3 outcome

23. Regarding Condition 3, NATS complied with this condition and completed a review of the utilisation of this airspace. The outcome is:

    1) For LTMA Sector 3 (3500+), no change was feasible due to the altitude of Gatwick, Southend and Biggin Hill arrivals.
    2) For LTMA 8 Sector (5500+), whilst there were significant numbers of GAT flying through this airspace at 6000ft and above, NATS determined that there might be scope to raise part of this area. However, until the outcome of the Farnborough ACP has been determined, it was not possible to determine what would be feasible. Therefore, it was agreed by the CAA that CTA bases to the south of the London Terminal Control Area (LTMA) would be reviewed after any decision on the Farnborough proposed controlled airspace change is made by the CAA. Therefore, the CAA has decided to re-examine this initiative once the outcome of the Farnborough ACP is determined and will notify NATMAC members in due course.

Condition 4 outcome

24. Regarding Condition 4, NATS complied with this condition and completed a review of the requirement to consider the re-classification of the Portsmouth CTAs 1 and 2 controlled airspace from Class A to Class C. NATS determined at that time that the lower limits of these two areas of controlled airspace could not be raised, and that they would not want to make changes to airspace classification (or indeed the lower limits) whilst other airspace change projects were ongoing. This can be interpreted to mean the Farnborough change proposal and the further initiatives beyond LAMP Phase 1A (a change was submitted to the CAA in 2017 under the branding name of the Swanwick Airspace Improvements Initiative Airspace Development 1 (SAIP AD 1) which involved new routes through the controlled airspace above the Isle of Wight (IoW)). The CAA accepted this position at that time and agreed that this should be re-examined once the outcome of the Farnborough ACP is determined. NATMAC members will be advised of the outcome of this initiative in due course in due course.

Condition 5 outcome

25. An extension to the timescale proscribed in Condition 5 was agreed; the CAA advised NATS that any arrangements for segregated VFR operations in controlled airspace must be agreed and in place by 31 August 2016.

26. NATS complied with Condition 5 in that a meeting was set up with 2 stakeholders who had responded to the LAMP 1A consultation and other airspace users from Goodwood – this was held at Goodwood on 26 May 2016. One of the Stakeholders failed to attend the meeting. NATS subsequently offered an additional meeting with this particular stakeholder, but did not receive a response from the stakeholder to the invitation. The outcome was that Goodwood aerodrome and the other airspace users operating there were content that they could operate satisfactorily with the new airspace that came into operation on 4th February 2016.

27. NATS also engaged with a further operator conducting skydiving from Sandown on the IOW who were impacted by the change although they did not specifically respond to the LAMP 1A consultation. Arrangements were subsequently put in place to permit paradropping from Sandown.

28. The CAA is satisfied that NATS had taken a very positive step to facilitate access to particular GA operations potentially impacted by this change. It is therefore encouraging to see that such arrangements to facilitate paradropping in controlled airspace were established; this demonstrates that airspace sharing is possible when new controlled airspace is proposed, although the CAA does recognise that these types of airspace sharing arrangements will be entirely dependent on the nature of operations and density of traffic at the locations concerned.

Condition 5 outcome (the second condition 5)

29. This relates to the 2nd condition 5 – there was a typo in the decision document. NATS has complied with this condition. We are unaware of any issues associated with the RUDMO hold and any inadvertent penetration of Danger Area D037. NATS confirmed that no MOR's were attributed to this scenario during the first year of operations.

Data collected for the purpose of the PIR

Sources of Information

Change Sponsor

30. By letter of 20 May 2016, the CAA requested from the change sponsor the data sets/analysis attached at Annex A by 4 May 2017. Due to the volume of data required, the collation process and sponsor review of the data prior to submission to the CAA, the data was actually provided to the CAA on 2 June 2017.

31. During the review process, the CAA considered:

- Evidence provided by NATS to comply with the CAA approval conditions.
- Route utilisation data (in the NATS commentary – see below).
- Track plots of arrival 'whisker plots' illustrating the route flown by aircraft before and after the change.
- Track density plots to illustrate the dispersion of aircraft before and after the change.
- The NATS commentary on the impacts of the change.

This summary of the evidence provided is at Annex A.

32. The change sponsor provided all the data requested.

Operators and Airlines

33. No specific data was required from operators and airlines as the proposal related to a new RNAV5 STAR and ATS routes which are routinely in operation in the UK.

Air Navigation Service Provider

34. NATS is the air navigation service provider (ANSP) currently providing air traffic control services for arrivals and departures to and from Farnborough, Southampton and Bournemouth aerodromes. On 20 May 2016, the CAA confirmed with NATS the PIR data submission requirements to enable the PIR to be analysed. This request was published on the CAA's website and the response is included at Annex A and on the CAA website together with all the data provided.

Groups and residents local to Farnborough, Southampton and Bournemouth Airports

35. The CAA, change sponsor, and NATS have received no stakeholder observations (enquiries/complaints) from groups and residents local to Farnborough, Southampton and Bournemouth airports which specifically concern the implementation of changes applicable to Module E. The only evidence we have relating to complaint data was supplied from the Manager Air Traffic Services at Southampton to indicate that there have been no noticeable changes in noise complaints as a result of LAMP Phase 1A airspace changes.

Objectives and Anticipated Impacts

The original proposal and its objectives

36. NATS explained in its change proposal that:

> Flights that arrived at Southampton and Bournemouth airports from the east did so via Goodwood. Arrivals to Farnborough from the south and east also interacted with these flights, and also with Gatwick departures to the west. Departures from all three airports towards Dover also had interactions with Gatwick and Heathrow arrivals. This lead to complexity and inefficiencies in the wider route network.
>
> This proposal sought to move the arrival routes further south offshore and the departure routes further north, reducing these interactions, and enabling the ATC sectorisation which was an integral part of LAMP Phase 1A.
>
> Simultaneously this proposal would mean fewer flights overland below 7,000ft by moving some routes over the sea.
>
> The justification was the overall improvement of airspace management in the region and of the wider airspace system and represented a major step forward for the modernisation of airspace over London and the south east reducing delay, CO_2 and overall noise impacts
>
> The objective is to reduce complexity and increase efficiency of the route network by supporting the wider LAMP Phase 1A programme.
>
> As an enabler for the wider LAMP Phase 1A proposal, this Module was also justifiable indirectly on the grounds of the operational and overall noise benefits of the wider LAMP Phase 1A proposal.
>
> The proposal was not dependent on TAG Farnborough proposal which proposed making local changes close to Fanrborough at a later date, however that it would complement any such development should TAG Farnborough seek to progress it.

37. In our decision we explained that:

The CAA has decided that the proposed airspace design was safe, which satisfied the CAA's primary statutory duty. It was also the CAA's duty to consider the anticipated impact on each of the other material considerations identified in section 70(2) of the Transport Act. In accordance with section 70(3) of the Transport Act, and the CAA published policy, the CAA was required to consider whether the airspace change proposal produces any conflicts between the material considerations identified in section 70(2).

We had identified the environmental impacts of the revised procedures, the impact on AONBs and the impact on Class G airspace users.

However, we had taken also into account that we consider there are significant flight safety and efficiency benefits from this Module and environmental benefits from the overall proposals of LAMP Phase 1A (of which this is part) set out in the **CAA Decision: Part applicable to each LAMP Phase 1A Modules A – E** which this proposal enables. The overall LAMP Phase 1A package would deliver network-wide changes that have safety benefits through greater use of systemisation, removal of airspace hotspots, in this specific case in regard to Goodwood and, in part, in relation to other portions of the London Terminal Manoeuvring Area. Overall, in our view a more efficient use of airspace would be achieved as a result of capacity benefits becoming possible through the de-confliction of arrival and departure routes. This can only be achieved by the enabling changes outlined in this Module E proposal due to the nature of the interactions of the departing traffic to the east via Dover having to be re-routed via Biggin Hill.

We decided that in order to achieve the anticipated benefits consequential on the airspace change proposed in Module E, the CAA approved this change.

Our decision to approve the change was subject to a number of conditions which have been commented upon earlier in this report.

Anticipated Impacts

38. In our decision, we concluded that:

Principally as a consequence of increased track mileages, there was a small but quantifiable anticipated increase in CO2 emissions that would result from the changes proposed in this Module. This was however small and fully offset by anticipated emissions reductions across the other LAMP Phase 1A Modules. Whilst the proposal demonstrated that there would be an anticipated reduction in the overflight of substantial numbers of people, the actual numbers of flights affected were estimated to be fewer than 10 per day in 2019 and thus the noise impacts associated with redistributing flights in the Solent area are likely to be minimal.

We concluded that we did not anticipate there would be a significant impact on noise emissions (within the meaning of Paragraph 9 of the Secretary of State's 2001 Directions to the CAA). The proposal to reduce the minimum altitude of some controlled airspace would result in some changes to aircraft altitudes and/or routeings below 7000ft AMSL. These changes are below the normal 7000ft AMSL threshold at which noise impacts should be considered. However, because they were for additional arrival routes, and the numbers of aircraft movements involved were small (on average fewer than one aircraft per day on each route), when they are taken together with the altitudes involved and the LAmax noise information provided by the original sponsor TAG, we were 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 noise impacts of the proposal were not considered significant.

We noted that part of this proposal was to implement a new RNAV-5 STAR. We considered that there was likely to be a noise impact of the proposal but the likely impact due to both the nature of RNAV application, i.e. it is not the RNAV-1 standard (which would be likely to create greater concentration) and the altitude and frequency of flights means that the impact is not likely to be significant.

Regarding CO2 emissions, we concluded that we anticipated that the changes within this Module would result in a small increase in CO2 emissions. In 2016, we anticipated that the increase in CO2 emissions as a result of this Module would be in the range of 332 to 665 additional tonnes of CO2. However, overall the changes proposed in this Module would facilitate the LAMP Phase 1A

package of proposals anticipated by NATS to provide an estimated 34,900 tonnes of CO2 savings in 2016. Fuel savings were predicated on a number of factors and have been calculated for a series of scenarios for 2016 and 2020 timelines. Taking a more conservative assessment, for the purpose of making this decision we concluded that we anticipated that the LAMP Phase 1A changes overall, (if all Modules are implemented and resulted in the anticipated impacts) would deliver a reduction of approximately 17,400 tonnes of CO2 in 2016 and 20,800 tonnes in 2020.

Since this proposal and the other airspace changes within LAMP Phase 1A required no changes to ground infrastructure, we anticipated that there will be no effects on biodiversity.

Since the proposed change did not alter operations below 1000ft AMSL we anticipated there would be no effect on local air quality.

We stated that many of the flight paths proposed in the Module already passed over Areas of Outstanding Natural Beauty (AONBs) and/or National Parks. The proposal would lead to changes, including overflight of new areas of AONBs and/or National Parks. In particular approximately 1% of flights inbound to Southampton and 15% inbound to Bournemouth airports (an estimated 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 7000ft AMSL. When taking this anticipated impact into account we had regard to the Secretary of State's altitude-based priorities set out in the 2014 Guidance to CAA on Environmental Objectives.

We have also taken into consideration that flights over AONBs and National Parks are not prohibited by legislation[1] as a general prohibition against overflights would be impractical.

We took into account that we considered there were significant flight safety and efficiency benefits from this Module and environmental benefits from the overall proposals of LAMP Phase 1A (of which this is part) set out in the CAA Decision: Part applicable to each LAMP Phase 1A Modules A – E which this proposal enabled. The overall LAMP Phase 1A package would deliver network-wide changes that have safety benefits through greater use of systemisation,

[1] 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.

removal of airspace hotspots, in this specific case in regard to Goodwood and, in part, in relation to other portions of the London Terminal Manoeuvring Area. Overall, in our view a more efficient use of airspace would be achieved as a result of capacity benefits becoming possible through the de-confliction of arrival and departure routes. This can only be achieved by the enabling changes outlined in this Module E proposal due to the nature of the interactions of the departing traffic to the east via Dover having to be re-routed via Biggin Hill.

CAA Assessment

Operational Assessment

39. The CAA examined the track data plots presented by the sponsor and reviewed the evidence provided by the sponsor with regard to the set of PIR reporting requirements as highlighted at Annex A. We completed a detailed analysis of all the new procedures flown and compiled a report which is at Annex C. The following is a summary of the CAA's conclusions.

Safety

40. Since implementation, the evidence provided indicated there were no safety issues associated with this Module. On the basis that we have seen that the objectives have been achieved. Traffic has been semi systemised by design by the nature of the fact that Bournemouth and Southampton arrival tracks from the east have been re-route away from Goodwood as designed and better avoid Gatwick traffic. The easterly departures routeing via Dover from all 3 aerodromes to the east, have been deconflicted from various other traffic patterns (the Heathrow and Gatwick arrivals approaching the south coast from France) by the re-routeing towards Biggin, thus the designs have been successful. The hotspot around Goodwood has seen a reduction in complexity which has therefore been a positive safety impact.

Operational Feedback

41. No operational feedback has been received from aircraft operators concerning the new arrival routes and departure re-routeing. Whilst the introduction of controlled airspace over the IoW meant that the lower limit would reduce to FL65/FL 75, we are unaware of any issues arising from the reduction of Class G airspace and the reduced lower limits of controlled airspace.

42. Whilst the sponsor forecast that some arriving traffic would use the more southerly route over the IoW inbound to Southampton and Bournemouth (see Consultation Document Figs 8 and 9 reproduced in Annex B (the CAA track analysis) this has not materialised due to the fact the CAA did not approve the full change proposal as proposed. NATS intimates that the use of the southerly route has not been taken up due to the fact that arriving traffic has been higher, and therefore, arrivals have followed a more northerly flight path over IoW than was predicted. As the number of flights from the east has been relatively low

and at levels generally above FL60, NATS believe that this difference in traffic pattern does not have any significant environmental impacts. The CAA would support this assertion.

Air Navigation Service Provision

43. There has been adequate resource to support the new operations. The proposal to de-conflict traffic in the vicinity of Goodwood did not enable an increase in movements as it was designed to improve safety in the hotspot region of Goodwood.

Letters of Agreement

44. Whilst there was no specific requirement to establish new airspace arrangements for those operators from Goodwood aerodrome to have VFR access to the new controlled airspace over the IOW, we noted that NATS established an arrangement to permit paradropping from Sandown aerodrome. This enable paradropping arrangements to continue in Class A airspace under the arrangements agreed by NATS.

Utilisation and Track Keeping

45. The CAA carried out an analysis of the traffic patterns achieved by viewing traffic samples provided by the sponsor during August 2015 and 2016. Given the traffic flows into the three aerodromes primarily featured in this Module are relatively low (see the data in Annex C), the analysis report as detailed in Annex C is more simplified compared with the track analysis in the other LAMP 1A PIR Module assessments. The traffic samples are included on the CAA website. To understand the impacts, interested parties should read the guidance in Annex C before reading the track analysis and associating the comments with the relevant diagrams.

Traffic

46. In the NATS forecast, aircraft arrival movements for the relevant aerodromes are below. The numbers in the traffic samples are taken from the NATS summary page 25 to enable a comparison of the movements before the change, the forecast and the actual movements; the forecast numbers are from the ACP.

Aerodrome	2015 arrivals before the change 10-day sample			Forecast arrivals*	2016 arrivals after the change 10 day sample		
	Total arrivals	Module E	Daily average	Daily average	Total arrivals	Module E	Daily average
Bournemouth	248	27	2.7	2.2	164	22	2.2
Southampton	568	41	4.1	4.9	683	68	6.8
Farnborough	270	134	13.4	See note	297	164	16.4

*These figures are from the consultation material which estimated implementation in 2015.
Note: A direct comparison with the forecast daily movements for Farnborough is not possible as forecasts shown in consultation were based on movements per hour. Figures from consultation were provided on an average per hour weekday and weekend. Together from the south and southwest, this equates to 1.71 + 0.49 per hour average on weekdays, and 1.06 +0.30 per hour average on weekends.

Environmental Assessment

47. The sponsor provided its analysis of the environmental impacts (see Annex A of this report for a list of information provided) for the airspace change post implementation review. The CAA has assessed that data and the details of that assessment are set out below.

Noise

48. All of the airspace design changes within Module E occur far beyond the extent of any of the airports' (Southampton, Bournemouth, Farnborough) 57 dBA L_{eq} noise contours. On this basis, we conclude that the airspace change has not resulted in an unexpected increase in people significantly affected by noise, as defined in our original decision.

Areas of Outstanding Natural Beauty and National Parks

49. It was recognised in our original decision on this Module that there would be a change in traffic pattern that would result in a new flow of Bournemouth arrivals from the east that would fly over the southern half of the Isle of Wight, and therefore over part of the Isle of Wight AONB. Based on the altitude-band swathes presented in the consultation material and as part of the proposal,

these aircraft were expected to be above 7000ft, reducing to above 6000ft at the western edge of the IoW.

50. The data presented by the sponsor for the PIR ("LAMP PIR Requirement E1, Env-E1/3/4 - Commentary on Track Plots for Portsmouth CTA1 and CTA2 Post-implementation of LAMP Phase 1A") shows that:

- The anticipated traffic pattern is over the north half of the island rather than the south, such that it crosses a different portion of the AONB than expected;
- The typical altitudes of the aircraft that are crossing the IoW are between FL68-FL70, then reducing to typically FL55-FL70 as they reach the western edge of the IoW. This is slightly lower that the anticipated altitudes presented in the proposal.

51. Whilst the difference in lateral pattern (i.e. that the arrivals are further north than expected) is not an issue in itself, the fact that the aircraft also seem to be lower than anticipated requires further consideration because our original decision had anticipated that much of the traffic crossing the AONB would be above 7000ft.

52. The data provided for the PIR shows that the frequency of aircraft arriving from the east for Bournemouth, and that cross the IoW, is low – on average it is fewer than two aircraft per day. These flights are likely to be perceptible but the infrequency of flights, and the fact that they are typically only just below 7000ft, means that they will not have any significant noise impact. On the same basis it is reasonable to conclude that they will not have any significant impact upon tranquillity.

CO_2 Emissions

53. Further detail of the PIR assessment of the change in fuel burn and CO_2 emissions can be found in Annex D of this report which summarises the impacts across all of the LAMP Phase 1A Modules.

54. In the original ACP, the fuel burn and CO_2 estimates for Module E routes did reflect the sponsor's expectations of an increase in track mileage generally for affected aircraft. The result was that additional fuel burn and a modest CO_2 increase were forecast for this Module.

55. The PIR assessment shows that Module E has resulted in a modest CO_2 increase in line with the estimated change in emissions that was proposed and considered when the CAA made its decision to approve the airspace change.

Environmental Conclusion

56. The CAA's conclusion in this PIR is that the environmental impacts consequential on the implementation of any of the changes are largely as expected and are consistent with the impacts we took into consideration in making our original decision.

Community Stakeholder observations

57. As part of the data collection process, the change sponsor was required to accept, process and collate noise enquiries/complaints and feedback relating to the implementation of changes applicable to this module. NATS confirmed that no stakeholder observations (enquiries/complaints) were received by them specifically concerning the implementation of changes applicable to Module E

58. The Air Navigation (Civil Aviation Authority) Directions 2001 places a duty on the CAA to provide a focal point for receiving and responding to aircraft related environmental complaints from the general public This duty is fulfilled through the online Airspace Use Report (FCS 1521) form and a review of the associated database indicates that the CAA has received no direct feedback that can be positively ascribed to the implementation of changes applicable to Module E. The same conclusion was reached when reviewing all correspondence addressed directly to the CAA's Chair, Chief Executive Officer and Group Director, Safety and Airspace Regulation

Ministry of Defence Operations

59. Operations by the Ministry of Defence were not affected by the proposals in Module E.

Any other impacts

60. The impacts of the change have been as expected except that from the traffic sample provided, approximately 50% of the arrivals inbound to Southampton Runway 20 from the east are slightly further north than expected, overland rather than over the sea; this may either be due to the fact that arrivals are not

using the more southerly route over the IoW inbound to Bournemouth, or it is possible that a more expeditious routeing is being provided by ATC when traffic conditions permit. However, the impacts of this are unlikely to significantly differ from those anticipated. The number of arriving aircraft that are taking this more northerly route averages fewer than four flights per day, and they are typically at levels between FL60 and FL70. Whilst these aircraft are likely to be audible, they are neither frequent enough nor low enough to result in significant noise levels.

61. Traffic inbound to Bournemouth from the east is now using a more southerly route which takes aircraft over the IoW as predicted. However, the anticipated route over the IoW was across the southern half of the island whereas the actual traffic pattern shows that the route is across the northern half of the island. The sponsor states that this is primarily due to the higher base of controller airspace (Portsmouth CTA 2 at FL 75) instead of FL 65 as proposed by NATS. However, the impacts of this are unlikely to significantly different from those anticipated. The number of arriving aircraft that are taking this more northly route across IoW averages fewer than two flights per day, and they are typically at levels between FL60 and FL70. Whilst these aircraft are likely to be audible, they are neither frequent enough nor low enough to result in significant noise levels.

Conclusion

Operational Conclusion Module A Conclusions

62. The change has achieved the aims and objectives. Traffic inbound to Southampton and Bournemouth from the southeast is now routed away from Goodwood as designed. The eastbound departure routeing via Biggin instead of Seaford has been integrated with other flows without issues. The revised Farnborough flight planned routeings for arrivals have again eased the positioning and integration of the overall 3 traffic flows in the region, and as a result complexity around Goodwood has been reduced.

63. Whilst opportunities for shared airspace arrangements were extended to Goodwood operators, we note that one operator did not engage with NATS to discuss such opportunities, and that other operations from Goodwood have continued without requiring access to the new controlled airspace.

64. We have also noted the additional airspace sharing for parachuting activity from Sandown over the Isle of Wight.

Environmental Conclusion

65. The noise impacts are consistent with the impact anticipated in the airspace change proposal. On that basis, we consider that there has been no increase in the number of people significantly affected by noise as a direct result of the airspace change.

66. Impacts upon Areas of Outstanding Natural Beauty (AONBs) and National Parks are largely as anticipated. The difference between the expected traffic flow over the Isle of Wight and the actual post-implementation traffic flow is noted, but is deemed to be consistent with the anticipated impact.

67. This Module has resulted in a modest increase in annual CO_2 emissions. This impact is in line with the anticipated increase in CO_2 emissions.

Complaints Conclusion

68. This review has confirmed that no stakeholder observations (enquiries/complaints) were received by the change sponsor, NATS and/or the CAA specifically concerning the implementation of changes applicable to Module E.

Overall conclusion

69. In respect of Module E of LAMP Phase 1A, the CAA confirms that the operational aims and objectives have been achieved. This change is now confirmed. Therefore, the CAA's airspace change process in respect of NATS' South Coast airspace change request dated 16 February 2015 has now concluded.

Note on plain language

70. The CAA has attempted to write this report as clearly as possible. Our approach has been to include all the relevant technical material but also to provide a summary and of the conclusions the CAA has reached in reliance on it in as understandable a way as possible. Nevertheless, when summarising a technical subject there is always a risk that explaining it in more accessible terms can alter the meaning. For that reason, the definitive version of our assessment and conclusions are in the attached technical reports.

Annexes

Annex A. LAMP Phase 1A PIR data provision Requirements - evidence provided.

Annex B. NATMAC 80 Presentation.

Annex C. Bournemouth, Southampton and Farnborough arrival traffic pattern and CAA analysis of the change.

Annex D. CO_2 Emissions Summary

Annex A - LAMP Phase 1A PIR data provision Requirements - evidence provided

LAMP PHASE 1A PIR DATA PROVISION REQUIREMENTS ANNEX A TO LAMP PHASE1A PIR REVIEW REQUIREMENTS DATED 20 MAY 2016

Data for the PIR review is to be submitted to the CAA by [agreed date in 2017] unless stated otherwise in the remarks column where specific actions are required to be completed in accordance with the CAA Decision Documents dated 22 December 2015 as amended.

The following Notes relate to data provision regarding the format of submission material and responsibilities of the appropriate LAMP sponsors.

In the Table below, the last column indicates responsibility for the appropriate LAMP sponsor to provide data as appropriate; in some circumstances, this responsibility is to be shared as agreed between sponsors.

Note 1: NATS, London City Airport Ltd and London Stansted Airport Ltd are to collaborate to produce a joint PIR to match the collaborative ACP. References to 'LAMP Sponsors' in the remarks column refer to the collective.

Note 2: MOR analysis: A number of the remarks below relate to MOR analysis. NATS is to monitor MORs generated within the region and highlight any significant issues that require further investigations to the case officer as they arise. A complete MOR summary for the year post implementation is to be provided with the PIR in May 2017. It is noted that overloads are reported as a subset of MORs.

Note 3: Density and track plot maps: NATS is to aim to produce directly comparable maps across the whole LAMP 1A region. However, given that NATS is upgrading their track processing technology, it is understood that this may mean data presentation tools change from those used in the consultation. The CAA recognises that this in turn may make it impossible to produce new maps that are directly comparable to the consultation diagrams. If this occurs NATS is to produce fresh maps using the new technology with the new data and the historic consultation data; this is to allow comparison of:

- The difference the between the old and new tools (i.e. compare consultation material with same data in new tool).
- The difference between the old and new data (i.e. comparing the consultation data and new data using the new tool).

If any of the sponsors find they are unable to produce directly comparable maps, they must advise the CAA at the earliest opportunity with a view to agreeing the best alternative presentation of data in advance of the PIR target deliverable date in May 2017.

Whilst airports have additional data that is not compatible with the NATS system, for example track plots distinguishing between RNAV and non RNAV arrivals, these should also be provided where relevant.

Where consultation and ACP material showed plots highlighting flights over AONBs, this is to be repeated for the PIR plots.

The Lmax data provided with consultation plots is to be reviewed and any difference highlighted.

Note 4: Sponsors are to review the assumptions of the CO2 analyses and update the analyses accordingly.

Note 5: Sponsors are to review all the ACP claims and report on whether the statements can be supported by observation post implementation.

Source Material	Data Required	Remarks	Responsibility	Evidence
Decision Documents				
CAP 1366 (Decision Document)	Not specified here; see Individual Modules, and ENV requirement under bridging Module			
General ENV Requirement for track dispersion plot diagrams	The general requirement for all Modules is that any diagrams provided as part of the PIR must be directly comparable with equivalent diagrams provided as part of the consultation and/or the proposal. There should be no changes to style, format, scale, colour-coding etc.	See note 3	NATS and airports	
Bridging Module 1	Updated CO_2 analysis using the same principles as the assessment undertaken as part of the Bridging Module. Assumptions to be updated based upon actual post-implementation data (e.g. the proportion of traffic that is tactically vectored, runway usage, flight numbers etc). Analysis to be broken down by Module, to reflect individually all five Modules submitted.	See note 4	NATS	See NATS reports: Bridge-Anticipated Impacts and Benefits Summary Bridge-Fuel-CO2-Analysis Bridge-Population-Overview-Analysis For MORs regarding overloads, see Bridge-Safety-Confidential-MORs

Source Material	Data Required	Remarks	Responsibility	Evidence
Module A Decision Document STANSTED SID SWITCH	Provide any details of occurrences of traffic using (U)M84 resulting in inadvertent penetration of D138A, together with action taken to prevent any further occurrence. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
Module A Operational A1	Provide details of any sector overload associated with the Stansted DET SID switch resulting in an MOR.	See note 2	NATS	No MORs were attributed to this scenario
A2	Provide details of any release difficulties to adjacent ACCs with traffic routing through KONAN.	See note 2	NATS	See Bridging Module filename: Bridge-Safety-CONFIDENTIAL-MORs-LAMP-Related Specifically, report numbers 112535 & 113762
A3	Provide details of the number of flights using Stansted Rwy 22 and Rwy 04 CLN and DET SIDs for the period 4 Feb 15 – 3 Feb 16 and post change for period of 4 Feb 16 - 3 Feb 17. The number of flights post change should illustrate those flights specifically routeing eastbound after CLN on the original SID routing, and those routeing via (U)M84 to KONAN.	To be provided from STAL records of departures	STAL for runway records	STAL has supplied their reports, see zip file A3-A4-A5-EnvA1_STAL-Reports KONAN data was supplied to STAL by NATS CPW and was also incorporated into evidence filename: A-Env2-Env4 Commentary
A4	Provide details of number of flights using the DET SID at night from 2300L-0600L for the periods in No 3 above.	To be provided from STAL records of departures	STAL for runway records NATS for flight plan data	STAL has supplied their reports, see zip file A3-A4-A5-EnvA1_STAL-Reports
A5	The sponsor should keep local reaction to the airspace change below 7000ft under review, and complete an annual summary of issues arising. Sponsors are requested to advise the CAA Airspace Regulation Consultation Regulator with an initial summary of any feedback by 30 June 2016.	STAL is to provide a summary of stakeholder reaction.	STAL	STAL has supplied their reports, see zip file A3-A4-A5-EnvA1_STAL-Reports NATS evidence supplied under Bridge-Comms-Complaints
Module A ENV A1	Sponsor to provide sufficient data to confirm that there have been no changes to Leq noise contours as a result of the airspace change, or alternatively to illustrate any changes to the contours. The sponsor may provide post-implementation contours for direct compassion with pre-implementation contours, or provide sufficient evidence that support any rationale that Leq contours are unchanged and do not need to be produced. Such evidence is likely to include a comparison of lateral and vertical aircraft tracks (both pre- and post-implementation).	If a rationale for not producing Leq contours cannot be provided and accepted by the CAA, then the comparison can be based on 2016 Leq contours – subject to other factors not related to the ACP being taken into account (e.g. traffic growth).	STAL	STAL has supplied their reports, see zip file A3-A4-A5-EnvA1_STAL-Reports
ENV A2	In addition to the requested operational track diagrams, the sponsor is to re-perform any noise assessment that was reflected in the consultation or proposal documents, to reflect post-implementation data. This includes any swathes, altitude bands, anticipated noise levels and frequency of flights that were used to portray the expected noise impact.	See Note 3.	NATS and airports are to review diagrams and assess/ provide what is required	Track plots complete, matching those in the main consultation doc (including consultation areas and AONB) See evidence folder A-Env2-Plots And filename A-Env2-Env4 Commentary
ENV A3	Sponsor to provide an assessment of the impact upon CO_2 emissions as a result of the airspace change, using the same methodology as the consultation and proposals, but updated as required using actual post-implementation data (e.g. to replace or update any assumptions used, to use actual track profiles and actual track mileages. The emissions assessment must be consistent with the pattern of traffic reflected in any associated track diagrams provided for the PIR.	See note 4.	NATS & Airport	See Bridging Module files: Bridge-Fuel-CO2-Analysis Bridge-Population-Overview-Analysis
ENV A4	Sponsor to provide sufficient data/rationale to support any claimed environmental impacts (positive, negative or neutral) made in consultation or proposal documents (e.g. Local Air Quality, tranquillity, visual intrusion etc.)	See note 5.	NATS and the airport are to review and assess what is required	Track plots from A-Env2 will be that evidence See filename A-Env2-Env4 Commentary

Source Material	Data Required	Remarks	Responsibility	Evidence
Module B Decision Document LONDON CITY SID Replic Arr Trans Replic	1. Requirement N/A here - detailed in Module C			
	2. Provide any details of occurrences when RNAV 1 traffic deviates from the RNAV1 flight path of the London City traffic downwind / base leg for Rwy 09 using the ODLEG arrival transition procedure resulting in an MOR to such an extent that controller intervention is required to maintain separation with the Heathrow Detling SIDs. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
	3. Provide any details of occurrences when RNAV1 traffic deviates from the RNAV1 flight path of the London City Rwy 27 RNAV SIDs resulting in an MOR to such an extent that controller intervention is required to maintain separation with the Heathrow Rwy 09 BPK SIDs. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
	4. Provide any details of occurrences when RNAV1 traffic deviates from the RNAV1 flightpath of the London City Rwy 27 RNAV SIDs resulting in an MOR to such an extent that controller intervention is required to maintain separation with the Heathrow Rwy 09 BUZAD SIDs. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
Module B Operational B1	Provide any details of any issues with flyability of all SIDs and Arrival Transitions. (Provide dates of any occurrences and appropriate details and how issues have been resolved).	See note 2	NATS	None noted. See track plot packages B10 and B14 for examples of the impact of strong SW wind (Storm Imogen, 7-8 Feb 2016).
B2	Provide any details of EKNIV SIDs not being able to reach Min Stack Level by SODVU resulting in an MOR.	See note 2	NATS	No MORs were attributed to this scenario
B3	Provide details of any issues where the IFP naming and/or coding had an impact on the flyability of all SIDs.	See note 2	NATS	None noted
B4	Provide any details of issues associated with vectoring of non-RNAV 1 departures resulting in an MOR.	See note 2	NATS	No MORs were attributed to this scenario
B5	Provide any details of issues associated with vectoring of Rwy 09 non-RNAV 1 arrivals when turning aircraft onto base leg / final approach at TODBI resulting in an MOR.	See note 2	NATS	No MORs were attributed to this scenario
B6	Provide details of any issues with aircraft not being able to establish on the Rwy 09 ILS following the turn at ODLEG resulting in an MOR.	See note 2	NATS	No MORs were attributed to this scenario
B7	Provide any details of any inadvertent penetration of the London Heathrow CTR by traffic using the ODLEG arrival transition which fail to take the turn at TODBI resulting in an MOR and what subsequent action was taken.	See note 2	NATS	No MORs were attributed to this scenario
B8	Advise of RNAV 1 usage: 4 Feb 16, 4 May 16, 4 Aug 16, 4 Nov 16, 4 Feb 17	LAMP Sponsors are to provide quarterly updates as in Col 2.	LCAL	See evidence filename: B8 B9 B10 Data, Commentary
B9	The % of RNAV 1 / non-RNAV1 using each SID.	This is to be provided by analysing airport records of SID allocation.	LCAL	See evidence filename: B8 B9 B10 Data, Commentary
B10	The % of RNAV1 aircraft using the RNAV arrival transitions.	Flight plan data is to be analysed to identify flights filing on the transitions. NB: Track dispersion plots will need to show non-RNAV flights as well as RNAV	NATS for flight plan data	See evidence filenames: B8 B9 B10 Data, Commentary B10 B14 Commentary See folder of track plots: B10 Arrival transitions
B11	Any issues of RNAV1 traffic using the BPK/CPT SIDs not making the turn at LCN05 resulting in an MOR.	See note 2	NATS	No MORs were attributed to this scenario
B12	Details of any database coding issues and action taken to resolve.	See note 2	NATS	Coding issues arose on implementation that were not discovered during the live checks completed as per the CAA requirement to be carried out during the 10 days before the change. One Airline operating Q400s discovered that the LAMP RNAV transitions had been linked to the STARs, but that their FMS could not cope with a “STAR followed by STAR”. The operator worked with the Coding Houses to rectify this and the problem was resolved in the first few weeks – the issue was raised immediately with the IFP team at CAA. The subject was raised through the LOCP (Lead Operator and Carrier Panel) meetings and its technical sub-group (attended by LAMP Case Officer) to highlight the required lessons learned for all parties. There was an instance of a coding house deciding to impose its own naming code for RNAV transitions to Biggin Hill, renaming the LAVNO and ODLEG transitions as JACKO and GODLU. This was flagged up in the live checking and coding houses advised accordingly to correct their charts. Again, the IFP team at CAA were advised of this. Following resolution of these issues during the first few weeks of implementation, there has been no recurrence of any associated problems.

Source Material	Data Required	Remarks	Responsibility	Evidence
B13	Any issues of inadvertent penetration of Southend CAS by traffic arriving into EGLC or departing from EGLC resulting in an MOR.	See note 2	NATS	No MORs were attributed to this scenario
B14	Monthly track dispersion plots of all London City conventional SIDs before the change are required for each SID, together with the new RNAV SIDs showing altitudes in 1000ft level bands on both conventional and RNAV track dispersion diagrams post change to illustrate monthly analysis carried out by London City Airport to determine whether the impacts on traffic patterns arising from the change have been as predicted as shown in consultation, both from an operational and environmental perspective. In particular, track keeping around the first turns should be monitored on a monthly basis to determine if the impacts are as portrayed in consultation. The track dispersion plots must be comparable with the diagrams shown in the consultation document to enable a direct like-for-like comparison. There must be explanation to illustrate when/where radar vectoring has occurred to enable stakeholders to understand any deviation away from the nominal track of the SID design that may be a result of radar vectoring as and where this occurs. Track dispersion diagrams must illustrate the Rwy in use, SID designator and the number of aircraft in the relevant traffic sample to enable a like-for-like comparison between the conventional SIDs and RNAV SIDs. Details of the above monthly stats must be submitted to the CAA in the PIR data after 1 year of implementation. However, an initial first month snapshot is requested to provide an early indication of flight paths flown. Any changes in radar vectoring practices should be explained. Track dispersion data plots should be provided on separate diagrams to illustrate pre- airspace change track dispersion, and post airspace change track dispersion to illustrate both RNAV1 and non-RNAV1 traffic. (This is to enable explanation of differences between traffic patterns after the change).	When providing RNAV track dispersion diagrams to illustrate RNAV impacts, please add suitable comments on diagrams to explain differentiation between the impacts of RNAV track dispersion and radar vectoring. Any track plots showing deviations away from the nominal track need to be explained, whether it is a result of 'direct to' instructions by ATC or tactical vectoring. Also, any unusual deviations away from the expected track arising from the effects of high winds, or otherwise, also need to be explained. If there are unusually high wind days, it is helpful from a flyability point of view to be able to show separately, impacts on these days. Action: LCAL		See evidence filename: B10 B14 Commentary See folder of track plots: B14 SIDs
B15	The sponsor should keep local reaction to the airspace change below 7000ft under review, and complete an annual summary of issues arising. Sponsors are requested to advise the CAA Airspace Regulation Consultation regulator with an initial summary of any feedback by 30 June 2016.	LAMP sponsors are to provide a summary of stakeholder reaction.	LCAL and NATS as appropriate	See LCAL-supplied evidence items, filenames: B15 LAMP Localised Complaints B15 Final Complaints Submission NATS evidence supplied under Bridge-Comms-Complaints
B16	Provide details of any level busts associated with the RNAV SID replications.	See note 2	NATS MM	No MORs were attributed to this scenario
Module B ENV B1	Sponsor to provide sufficient data to confirm that there have been no changes to Leq noise contours as a result of the airspace change, or alternatively to illustrate any changes to the contours. The sponsor may provide post-implementation contours for direct compassion with pre-impleme-ntation contours, or provide sufficient evidence that support any rationale that Leq contours are unchanged and do not need to be produced. Such evidence is likely to include a comparison of lateral and vertical aircraft tracks (both pre- and post-implementation).	If not producing Leqs state why.	LCAL to provide Leq contours or appropriate rationale if otherwise	See evidence filename: B-Env1-Leq Argument is that flights do not change path noticeably within the extent of the contour, therefore there would be no change to the contour itself due to the implementation of the RNAV1 flight procedures.
ENV B2	In addition to the requested operational track diagrams, the sponsor to re-perform any noise assessment that was reflected in the consultation or proposal documents, to reflect post-implementation data. This includes any swathes, altitude bands, anticipated noise levels and frequency of flights that were used to portray the expected noise impact.	See note 3.	NATS and airport	Track plot data supplied for B10 & B14 will be that evidence. See evidence filenames: B10 B14 Commentary
ENV B3	Sponsor to provide an assessment of the impact upon CO_2 emissions as a result of the airspace change, using the same methodology as the consultation and proposals, but updated as required using actual post-implementation data (e.g. to replace or update any assumptions used, to use actual track profiles and actual track mileages. The emissions assessment must be consistent with the pattern of traffic reflected in any associated track diagrams provided for the PIR.	See note 4.	NATS and airport	See Bridging Module files: Bridge-Fuel-CO2-Analysis Bridge-Population-Overview-Analysis
ENV B4	Sponsor to provide sufficient data/rationale to support any claimed environmental impacts (positive, negative or neutral) made in consultation or proposal documents (e.g. Local Air Quality, tranquillity, visual intrusion etc.)	See note 5.	NATS and airport	Track plot data supplied for B10 and B14 will be that evidence. See evidence filenames: B10 B14 Commentary

Source Material	Data Required	Remarks	Responsibility	Evidence
Module C Decision Document LONDON CITY PM	1. Provide any details of occurrences of traffic using the GEGMU and GODLU STARs resulting in inadvertent penetration of D037 resulting in an MOR, together with action taken to prevent any further occurrence. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
	2. See note 2. Provide any details of occurrences of traffic using the GODLU Hold resulting in inadvertent penetration of the Paris FIR, together with action taken to prevent any further occurrence resulting in an MOR. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
	3. See note 2. Provide any details of occurrences of traffic using the ROPMU Hold leaving controlled airspace resulting in an MOR, together with action taken to prevent any further occurrence. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
	4. See note 2. Provide any details of occurrences of traffic in the ATPEV hold inadvertently entering the Shoeburyness Danger Areas resulting in an MOR, together with action taken to prevent any further occurrence. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
	5. See note 2. Provide any details of occurrences of traffic using the OKVAP Hold resulting in inadvertent penetration of the Paris FIR resulting in an MOR, together with action taken to prevent any further occurrence. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
	6. See note 2. Provide details of any flyability issues with aircraft using the arrival transition procedures between: JACKO-NONVA NONVA-BABKU ERKEK-OKVAP And the STAR between NEVIL-OSPOL.	See note 2	NATS	None known (see also B12)
	7. Review the climb and descent profiles of traffic utilisation in the lower limits of controlled airspace in the areas of controlled airspace identified in Module C Regulatory Requirement Serial 7 as discussed with NATS on 21 May 2015. NATS is to determine which areas of controlled airspace could be raised as a result of non usage by GAT, and provide appropriate draft AIP changes for the areas concerned. NATS is also to advise the CAA of any the options identified for potential raising of controlled airspace which are not feasible and provide the appropriate rationale.	**Action by 31 August 2016.** This date is required to enable the CAA to review and approve any proposals in order to meet the ICAO Southern England 1:500,000 chart due for publication on 2 March 2017. Note: the AIS deadline for chart amendments is 31 October 2016.	NATS	Closed in August 2016
	8. In conjunction with No 7 above, NATS is to determine whether the lower limits of the LTMA may be raised in LTMA Sectors 3 and 8 as follows: -- LTMA Sector 3 (3500-FL195) situated south of the Southend CTA 7 and, -- The revised LTMA Sector 8 from the north coast of Kent to the boundary of the LTMA Sector 21/N859 eastern extremity taking due consideration of the new southern arrival segment of the London City arrival transition procedure.	**Action by 31 August 2016** This date is required to enable the CAA to review and approve any proposals in order to meet the ICAO Southern England 1:500,000 chart due for publication on 2 March 2017. Notes: 1. The AIS deadline for chart amendments is 31 October 2016.	NATS	Closed in August 2016

Source Material	Data Required	Remarks	Responsibility	Evidence
		2. In conjunction with Module E		
Module C Operational C1	Provide any details of EKNIV SIDs not being able to reach MSL by SODVU.	See note 2	NATS	None noted. No MORs were attributed to this scenario
C2	Listed in Mod B.	Env Req		See Mod B
C3	Listed in Mod B.	See note 2	NATS	See Mod B
C4	Listed in Mod B.	See note 2	NATS	See Mod B
C5	Listed in Mod B.	See note 2	NATS	See Mod B
C6	Provide a summary of any unauthorised incursions into the new controlled airspace resulting in an MOR.	See note 2	NATS	None noted - No MORs were attributed to this scenario
C7	Provide details of any unusual holding patterns flown at the TIMBA RNAV hold. From an airline operational perspective, is the TIMBA RNAV hold being flown manually or via the FMS coding? Provide details of any issues which have impacted the FMS selection and/or flyability of the hold resulting in an MOR.	See note 2	NATS	None noted - No MORs were attributed to this scenario
C8	Provide details on any issues with the revised delegated ATS between LTC and Paris ACC in La Manche East Low.	See note 2	NATS	None noted - No MORs were attributed to this scenario
C9	Provide details of any issues with use of (U)L10 and the interface with Reims ACC.	See note 2	NATS	None noted - No MORs were attributed to this scenario
C10	Provide any details of excessive workload in vectoring non-RNAV 1 arrivals from either JACKO or GODLU inbound London City and Biggin Hill resulting in an MOR. (Nil returns required).	See note 2	NATS	None noted - No MORs were attributed to this scenario
C11	Provide track dispersion plot data of traffic in 1000ft level bands routing from JACKO and GODLU to the LAVNO for Rwy 27 and ODLEG for Rwy 09 to illustrate the lowest levels flown.	See Note 3.	NATS and airports	See evidence filename: C11 Env-C1 Env-C2-Env-C4 Commentary See track plots folder: C11-PointMerge
C12	Provide details of any inadvertent entry into the Shoeburyness Danger Areas by traffic using the arrival transitions resulting in an MOR together with any subsequent action taken.	See note 2	NATS MM	No MORs were attributed to this scenario
C13	Provide details of the number of PAT alerts.	Determine with NATS how event data is gathered and processed, then confirm.	NATS to investigate available data	No PAT alerts resulted in safety incidents. See evidence filename: C13 PAT Alerts
C14	Details of any database coding issues that impacted ATC clearance delivery and/or operator selection of IFP and action taken to resolve.	See note 2	NATS MM	See item B12
C15	Are the Clearance Limit Points being monitored by ATC? Report any issues of where adherence of the clearance limit points on the STARs has not occurred resulting in an MOR.	See note 2	NATS MM	Clearance limit points are monitored by ATC. No MORs were attributed to this scenario
C16	The sponsor should keep local reaction to the airspace change below 7000ft under review, and complete an annual summary of issues arising. Sponsors are requested to advise the CAA Airspace Regulation Consultation Regulator with an initial summary of any feedback by 30 June 2016.	Early snapshot to consultation regulator by 30 April 2016.	NATS	NATS evidence supplied under Bridge-Comms-Complaints
C17	Provide any details of occurrences of traffic failing to make the OSPOL waypoint when using the GODLU 1F and GEGMU 1G STARs due to the previous segment length resulting in an MOR. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
C18	Provide any details of occurrences of traffic failing to make the AVANT waypoint when using the GEGMU 1N STAR due to the previous segment length resulting in an MOR. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
C19	Provide any details of occurrences of traffic failing to make the OKVAP waypoint when using the GEGMU 1F STAR due to the previous segment length resulting in an MOR. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
C20	Provide any details of occurrences of traffic failing to make the ABTUM waypoint when using the TIMBA 1J/1K STARs due to the previous segment length resulting in an MOR. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario

Source Material	Data Required	Remarks	Responsibility	Evidence
C21	Provide any details of occurrences of traffic failing to make the OSPOL waypoint when using the TIMBA 2G STAR due to the previous segment length resulting in an MOR. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
C22	Provide any details of occurrences of traffic failing to make the EVEXU waypoint when using the SAM 2D STAR due to the previous segment length resulting in an MOR. NIL returns required.	See note 2	NATS	No MORs were attributed to this scenario
Module C ENV C1	In addition to the requested operational track diagrams, the sponsor to re-perform any noise assessment that was reflected in the consultation or proposal documents, to reflect post-implementation data. This includes any swathes, altitude bands, anticipated noise levels and frequency of flights that were used to portray the expected noise impact.	See note 3.	NATS & Airports	See evidence filename: C11 Env-C1 Env-C2-Env-C4 Commentary
ENV C2	Data regarding post-implementation traffic patterns over AONBs and National Parks to be provided, in order to support anticipated impacts set out in the consultation or proposal. Notably the following AONBs - Dedham Vale, Suffolk Coast & Heath, Kent Downs and High Weald.	See note 3.	NATS	See evidence filename: C-Env2-LC-AONB-Comparison-ArrsDeps
ENV C3	Sponsor to provide an assessment of the impact upon CO_2 emissions as a result of the airspace change, using the same methodology as the consultation and proposals, but updated as required using actual post-implementation data (e.g. to replace or update any assumptions used, to use actual track profiles and actual track mileages. The emissions assessment must be consistent with the pattern of traffic reflected in any associated track diagrams provided for the PIR.	See note 4.	NATS	See Bridging Module
ENV C4	Sponsor to provide sufficient data/rationale to support any claimed environmental impacts (positive, negative or neutral) made in consultation or proposal documents (e.g. Local Air Quality, tranquillity, visual intrusion etc.)	See note 5.	NATS	See evidence filename: C11 Env-C1 Env-C2-Env-C4 Commentary

Module D **Decision Document** **Luton/Northolt**	1. As per Module A 1.			
Module D Operational D1	Provide details of any sector overload associated with the Luton & Northolt DET SID switch resulting in an MOR.	See note 2	NATS	No issues noted – no MORs were specifically attributed to Luton/Northolt, for overload info see evidence filename Bridge-Safety-CONFIDENTIAL-MORs-LAMP-Related
D2	Provide the number of occasions when D138 is active above 13,000ft necessitating a re-route from M85 onto (U)M84 from 4 Feb 16-3 Feb 17.	NATS is to provide details of D138 activation but it is recognised that NATS may not be able to identify re-routes as a consequence; – NATS to investigate what is possible and provide detail as appropriate.	NATS	See evidence filename: D2-data-D138-use
D3	Provide number of flights regarding continued use of the DET SID for positioning flights or for traffic routing via L10 to RINTI.	NATS is to produce a flight plan analysis.	NATS	See evidence filename: D3-data-D-Env2-D-Env3-commentary
Module D ENV D1	In addition to the requested operational track diagrams, the sponsor to re-perform any noise assessment that was reflected in the proposal documents, to reflect post-implementation data. This includes any swathes, altitude bands, anticipated noise levels and frequency of flights that were used to portray the expected noise impact.	See note 3.	NATS	Change occurred well along the track of the SIDs, generally FL100+, therefore no change to noise impacts below 7,000ft. This applies to both pre- and post-implementation.
ENV D2	Provide illustrations of vertical and lateral profiles that demonstrate traffic patterns between BPK and DET for departures from both Luton and Northolt. These should portray traffic patterns for comparative and representative periods, and should show a comparison between pre-implementation and post-implementation. Average tracks should be derived for both lateral and vertical profiles and then used to model the fuel burn and CO_2 emissions, and then extrapolated to estimate an annual figure for the respective fleets at each airport.	See note 3 and 4.	NATS	See evidence filename: D3-data-D-Env2-D-Env3-commentary See Bridging Module files: Bridge-Fuel-CO2-Analysis
ENV D3	Provide data as evidence of the proportion of flights that benefit from the new routing, i.e. the proportion of flights that achieve a profile that crosses above the Heathrow arrivals, both pre-implementation and post-implementation.	See note 3 and 4, this is to be achieved through the track plots analysis	NATS	Approx 32% of Luton DVR-bound deps moved from “below FL100” to “above FL150” which is above the majority of the Heathrow arrival flow in that area. See evidence filename: D3-data-D-Env2-D-Env3-commentary
ENV D4	Sponsor to provide an assessment of the impact upon CO_2 emissions as a result of the airspace change, using the same methodology as the proposals, but updated as required using actual post-implementation data (e.g. to replace or update any assumptions used, to use actual track profiles and actual track mileages. The emissions assessment must be consistent with the pattern of traffic reflected in any associated track diagrams provided for the PIR.	See note 4.	NATS	See Bridging Module files: Bridge-Fuel-CO2-Analysis
ENV D5	Sponsor to provide sufficient data/rationale to support any claimed environmental impacts (positive, negative or neutral) made in consultation or proposal documents (e.g. Local Air Quality, tranquillity, visual intrusion etc.)	See note 5.	NATS	None claimed

Module E Decision Document **Portsmouth CTAs, Southampton/ Bournemouth/ Farnborough arrivals.**	1. Provide any details of occurrences of traffic using the RUDMO Hold resulting in inadvertent penetration of D037 resulting in an MOR, together with action taken to prevent any further occurrence. NIL returns required.	See note 2	NATS	No issues noted – no MORs were attributed to this scenario
	As per Module C. 2. Review the climb and descent profiles of traffic utilisation in the lower limits of controlled airspace in the areas of controlled airspace identified in Module C Regulatory Requirement Serial 7 as discussed with NATS on 21 May 2015. NATS is to determine which areas of controlled airspace could be raised as a result of non usage by GAT, and provide appropriate draft AIP changes for the areas concerned. NATS is also to advise the CAA of any the options identified for potential raising of controlled airspace which are not feasible and provide the appropriate rationale.	**Action by 31 August 2016** This date is required to enable the CAA to review and approve any proposals in order to meet the ICAO Southern England 1:500,000 chart due for publication on 2 March 2017. Note: the AIS deadline for chart amendments is 31 October 2016.	NATS	Closed in August 2016
	As per Module C. 3. In conjunction with No 7 above, NATS is to determine whether the lower limits of the LTMA may be raised in LTMA Sectors 3 and 8 as follows: -- LTMA Sector 3 (3500-FL195) situated south of the Southend CTA 7 and, -- The revised LTMA Sector 8 from the north coast of Kent to the boundary of the LTMA Sector 21/N859 eastern extremity taking due consideration of the new southern arrival segment of the London City arrival transition procedure.	**Action by 31 August 2016** This date is required to enable the CAA to review and approve any proposals in order to meet the ICAO Southern England 1:500,000 chart due for publication on 2 March 2017. Notes: 1. The AIS deadline for chart amendments is 31 October 2016. 2. In conjunction with Module E	NATS	Closed in August 2016
	4. NATS is to investigate re-classification of the new Portsmouth CTAs 1 and 2 from Class A to Class C. Notwithstanding details provided to the CAA during the Case Study concerning reasons why NATS could not manage Class C operations immediately on implementation, NATS is to determine if these areas could be Class C rather than Class A as proposed. If a reversion to Class C is possible, NATS is to provide the CAA with a proposal to revert the Portsmouth CTAs to Class C airspace for implementation on 2 March 2017 meeting the appropriate AIRAC deadline for the AIP and ICAO 1:500,000 chart cycle (31 October 2017).	**Action by 31 August 2016** This date is required to enable the CAA to review and approve any proposals in order to meet the ICAO Southern England 1:500,000 chart due for publication on 2 March 2017. Note: the AIS deadline for chart amendments is 31 October 2016.	NATS	Closed in August 2016
	5. Provide a record of any instances where segregated VFR operations have been agreed in accordance with the Module E Regulatory Requirement No 5 together with any issues arising and what action was taken to resolve the issue.		NATS	None recorded

Module E Operational E1	Provide track dispersion plot data of traffic in 1000ft level bands routing through the Portsmouth CTA 1 & 2 to illustrate the lowest levels flown for traffic inbound to Farnborough, and inbound to Bournemouth and Southampton as far as the IAF for the runway in use. Track dispersion plots for flights before the change and flights after the change should demonstrate the new flight paths flown to enable comparison with diagrams shown in consultation. Compare with Consultation Document Fig D 5 and D 6 (both pre change) and Figs D8 and D 9 (both post change) Data must be provided to illustrate a direct like-for-like traffic density for the changes below 7000ft before and after the change.	See note 3.	NATS	See evidence folder of track plots: E1-TrackPlots See evidence filename: E1-EnvE1-3-4-Track-Plot-Commentary
E2	Details of any database coding issues and action taken to resolve.	See note 2	NATS	None noted. No MORs were attributed to this scenario.
Module E ENV E1	In addition to the requested operational track diagrams, the sponsor to re-perform any noise assessment that was reflected in the consultation or proposal documents, to reflect post-implementation data. This includes any swathes, altitude bands, anticipated noise levels and frequency of flights that were used to portray the expected noise impact.	See note 3.	NATS	See evidence filename: E1-EnvE1-3-4-Track-Plot-Commentary
ENV E2	Sponsor to provide an assessment of the impact upon CO_2 emissions as a result of the airspace change, using the same methodology as the consultation and proposals, but updated as required using actual post-implementation data (e.g. to replace or update any assumptions used, to use actual track profiles and actual track mileages. The emissions assessment must be consistent with the pattern of traffic reflected in any associated track diagrams provided for the PIR.	See note 4.	NATS	See Bridging Module files: Bridge-Fuel-CO2-Analysis
ENV E3	Sponsor to provide sufficient data/rationale to support any claimed environmental impacts (positive, negative or neutral) made in consultation or proposal documents (e.g. Local Air Quality, tranquillity, visual intrusion etc.)	See note 5.	NATS	See evidence filename: E1-EnvE1-3-4-Track-Plot-Commentary
ENV E4	Data regarding post-implementation traffic patterns over AONBs and National Parks to be provided, in order to support anticipated impacts set out in the consultation or proposal, notably the Isle of Wight AONB.	See note 3.	NATS	See evidence filename: E1-EnvE1-3-4-Track-Plot-Commentary

Annex B – NATMAC 80 Presentation

Civil Aviation Authority

LAMP PHASE 1A INITIAL PIR – LOWER LIMITS OF CAS REVIEW

NATMAC 80

Civil Aviation Authority

27 October 2016

LAMP PHASE 1A – INITIAL PIR – LOWER LIMITS OF CAS REVIEW

- Outcome of CAA review of NATS analysis 31 Aug 16:
- Some lower limits could be raised
- Very small window of opportunity for implementation on 2 Mar 17
  - Needs decision by 1 Nov 16 otherwise 1 year delay.
- Objectives:
  - Raise CAS if not required
  - Simplify airspace structures where possible
  - Reduce chart / label clutter
  - Reduce risk of infringements
  - Opportunity to smooth out a few lateral boundaries

LAMP PHASE 1A – INITIAL PIR – LOWER LIMITS OF CAS REVIEW – NATMAC FEEDBACK AS AT COP 26 OCT 16

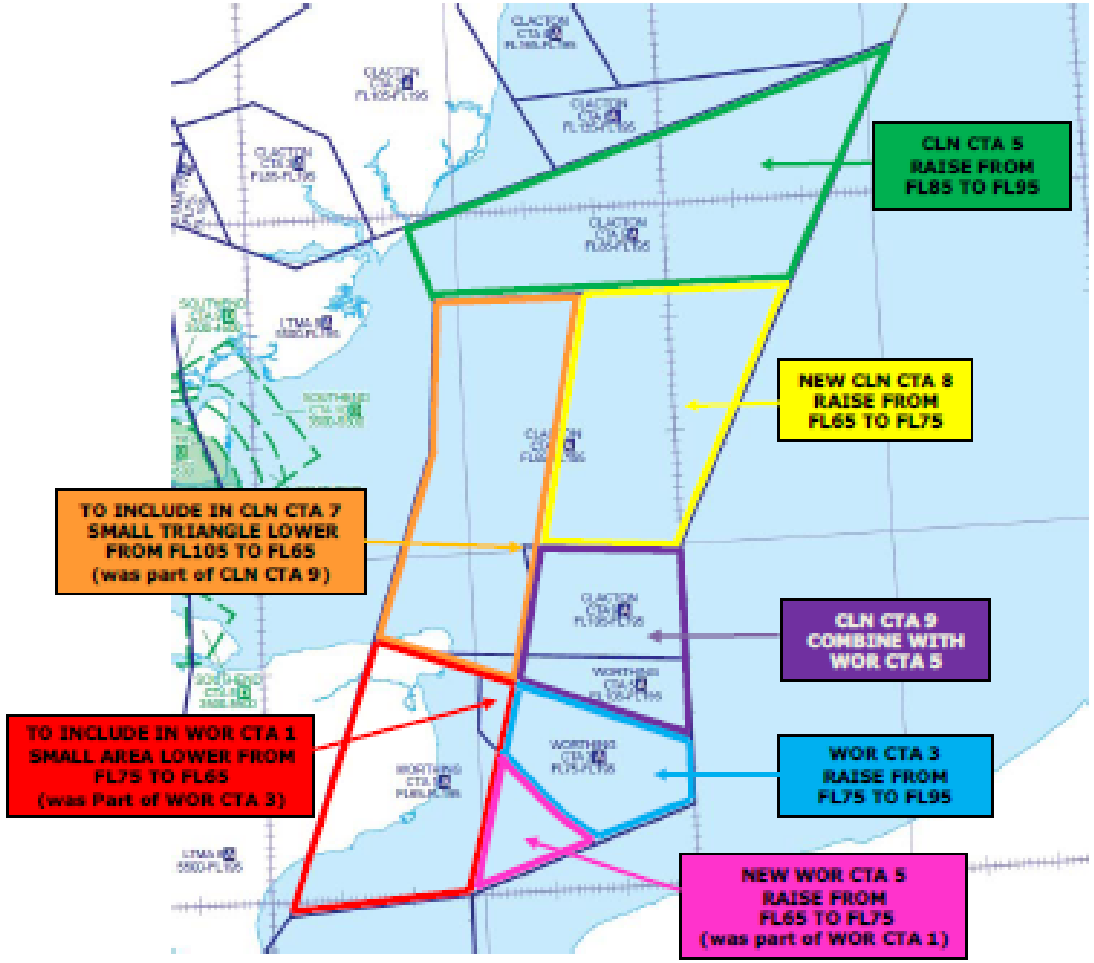
- 7 responses to date:
- 5 responses supported proposals but with some caveats:
  - Consider raising LTMA 14 to 5500ft – CAA comment - not possible
  - Pressurisation & icing issues; due time constraints, consider only raising up to FL 80 in short term until further analysis conducted – this allows for non-pressurised operations and caters for potential icing – CAA comment – see following slide for possible option
- One query raised - formal response pending
- NATS supplied a further option (3a) for south coast - still being considered by NATS:
  - Would raise only the southern part of WOR CTA 2 up to FL85 and
  - Would raise WOR CTA 6 up to FL85

  – CAA comments – would now initially discount both options given pressurisation and icing issues – hence leave at FL75. Could just consider the minor adjustment to the WOR CTA 7 & 4 common boundary (over the sea)

ATTACHMENT A TO NATMAC LETTER DATED 13 OCTOBER 2016

Civil Aviation Authority

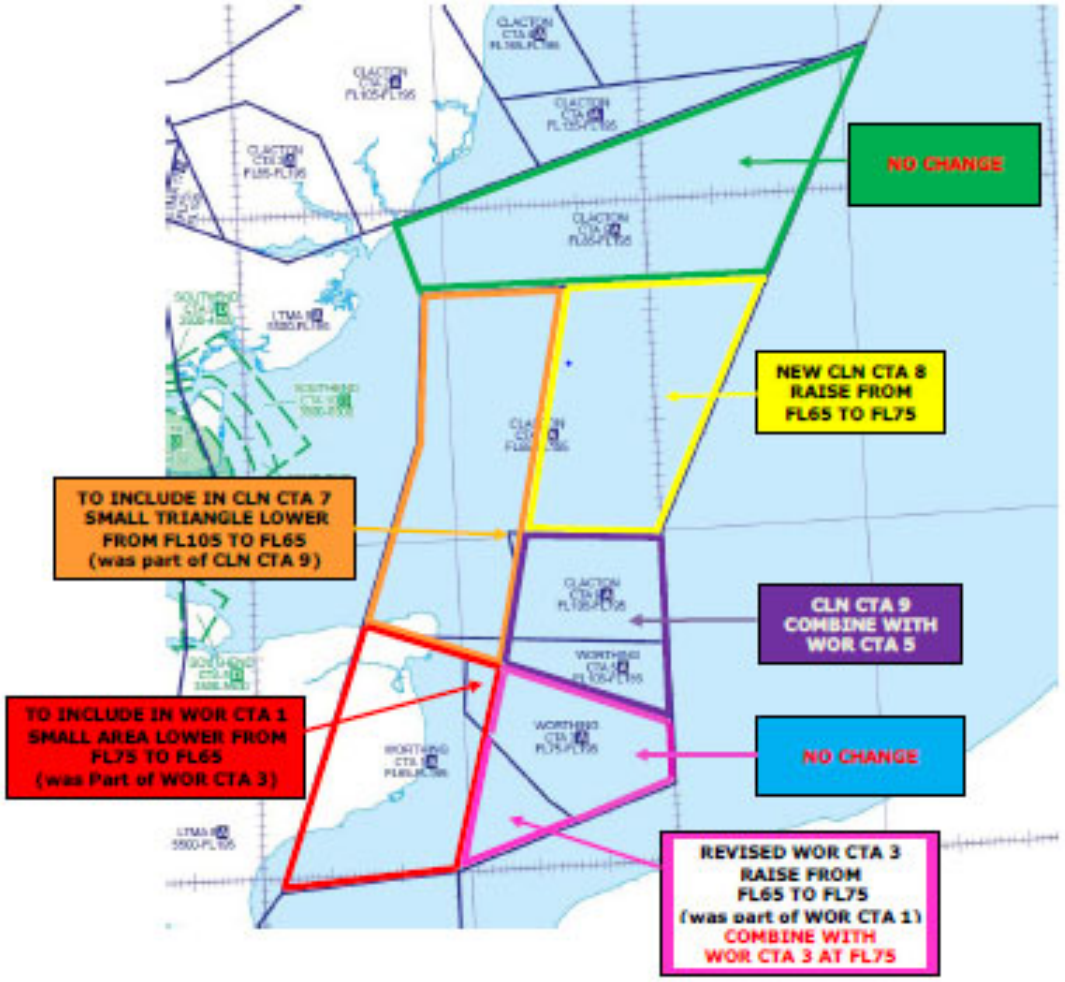
Clacton CTA & Worthing CTA (East) Proposed Base Changes



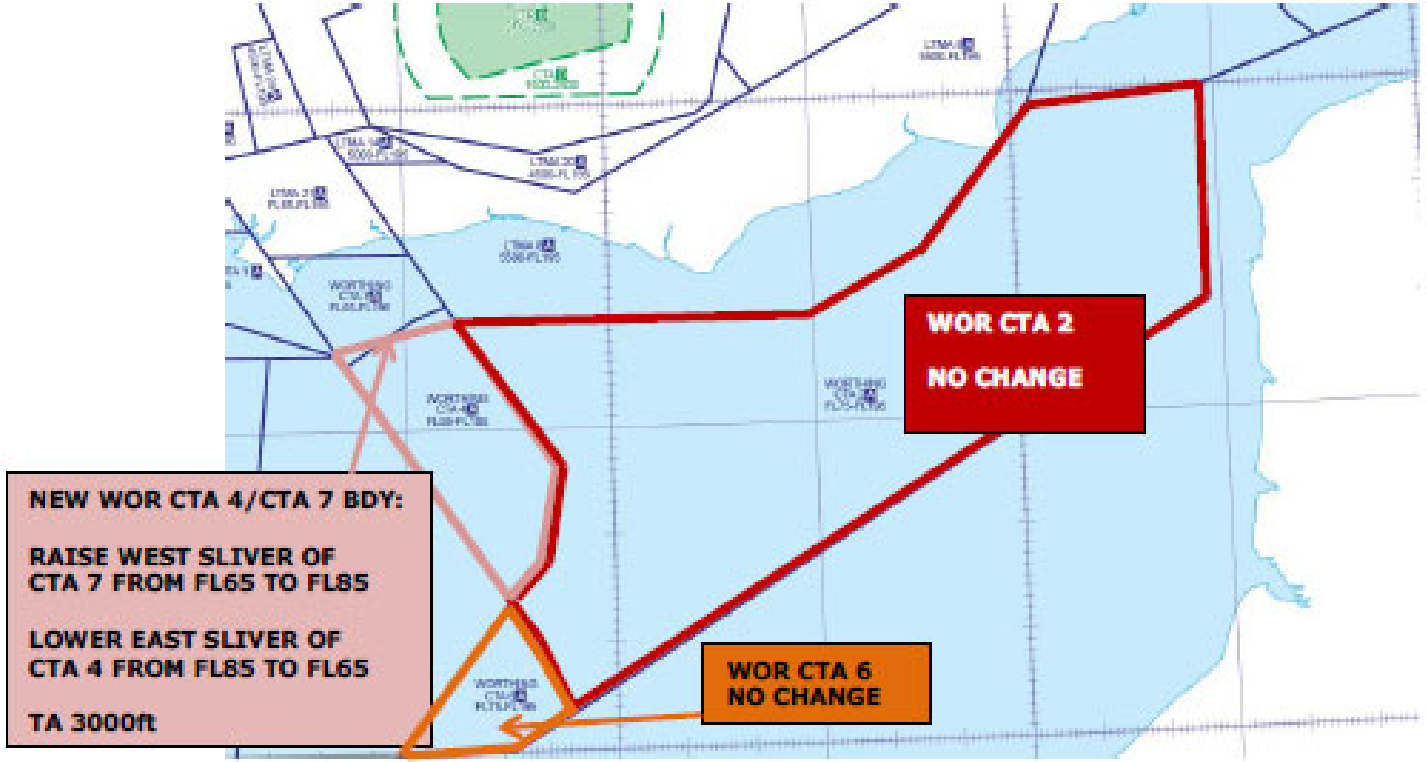
Civil Aviation Authority

Clacton CTA & Worthing CTA (East) Proposed Base Changes

Possible Revision to NATMAC Proposal as at 27 Oct 16



Worthing CTA (South) Option 2
Possible Revision to NATMAC Proposal



LAMP PHASE 1A – INITIAL PIR – LOWER LIMITS OF CAS REVIEW

- CAA action arising from outcome of NATMAC feedback:
- Confirm any outstanding NATMAC feedback due in today
- Any further queries, objection, or support?
  - Seek Group Director SARG approval, then ratify with NATS
  - Confirm AIP amendments can be processed in time
  - Prepare AIC
  - Seek ICAO agreement
- If any show stoppers, then proposals delayed 1 year or withdrawn

Annex C – Bournemouth, Southampton and Farnborough arrival traffic pattern and CAA analysis of the change

Annex C - Bournemouth, Southampton and Farnborough arrival traffic pattern and CAA analysis of the change

INTRODUCTION

This annex is a simplified analysis of arrival traffic patterns before and after the change.

Due to the fact that departure profiles to the east through Goodwood would not change other than radar vectored Farnborough departures which would vary in Class G uncontrolled airspace, and that traffic would be 7000ft and above after passing Goodwood on the revised routeing to Dover via Biggin, departure profiles have not been analysed; however, in this analysis, we have extracted the relevant departure diagrams from the Airspace Change Proposal (ACP) for reference purposes only.

This analysis explains the impacts of the changes to Bournemouth, Southampton and Farnborough arrivals based on the traffic samples provided by NATS. It should be read in conjunction with the diagrams which are available via the links and displayed on the CAA webpages for this PIR.

ARRIVAL AND DEPARTURE FLIGHT PLANNABLE ROUTES BEFORE AND AFTER THE CHANGE

Diagrams provided with the ACP are re-produced below for reference only. These diagrams illustrate the route that aircraft would flight plan to follow. The actual flight path comparisons have to be viewed by examining the commentary diagrams or the individual track plots for the relevant aerodromes.

Arrival flight planned routeings before the change (ACP paragraph 5.1).

ACP Figure 3 extract - Current arrival flight plannable routes relevant to this proposal.

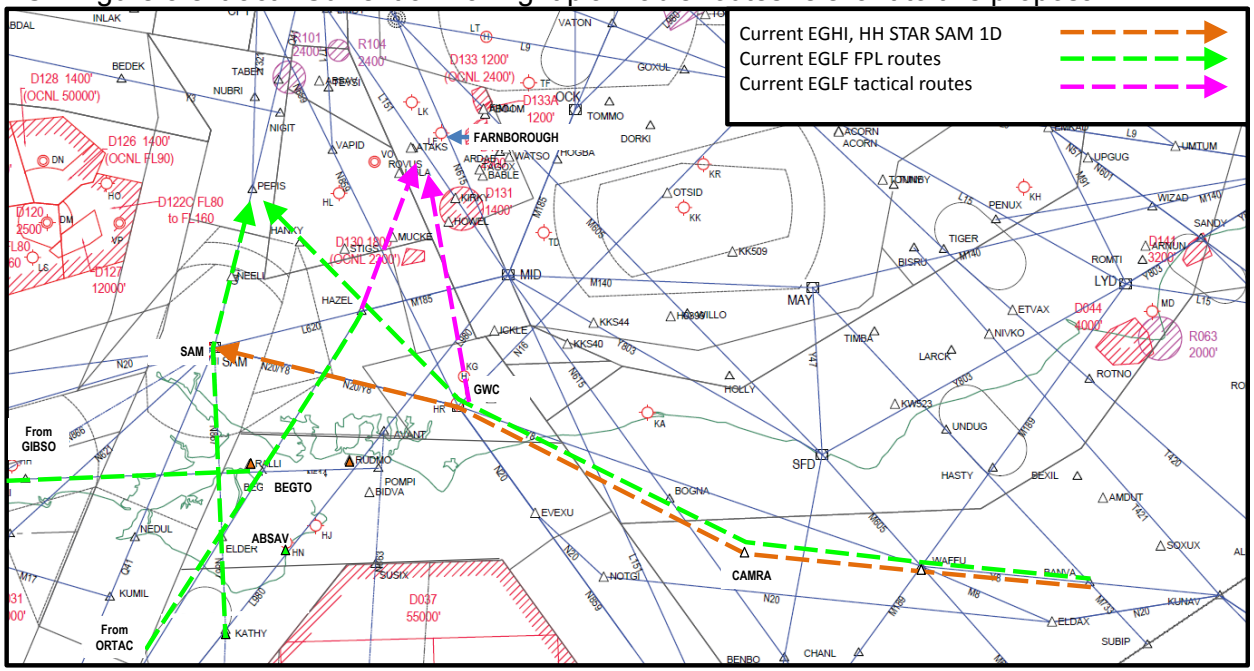


Figure 3 illustrates flight plan routeings[1] before the change which the ACP module sought to change.

In reality Farnborough flights head directly towards Farnborough in broad swathes:

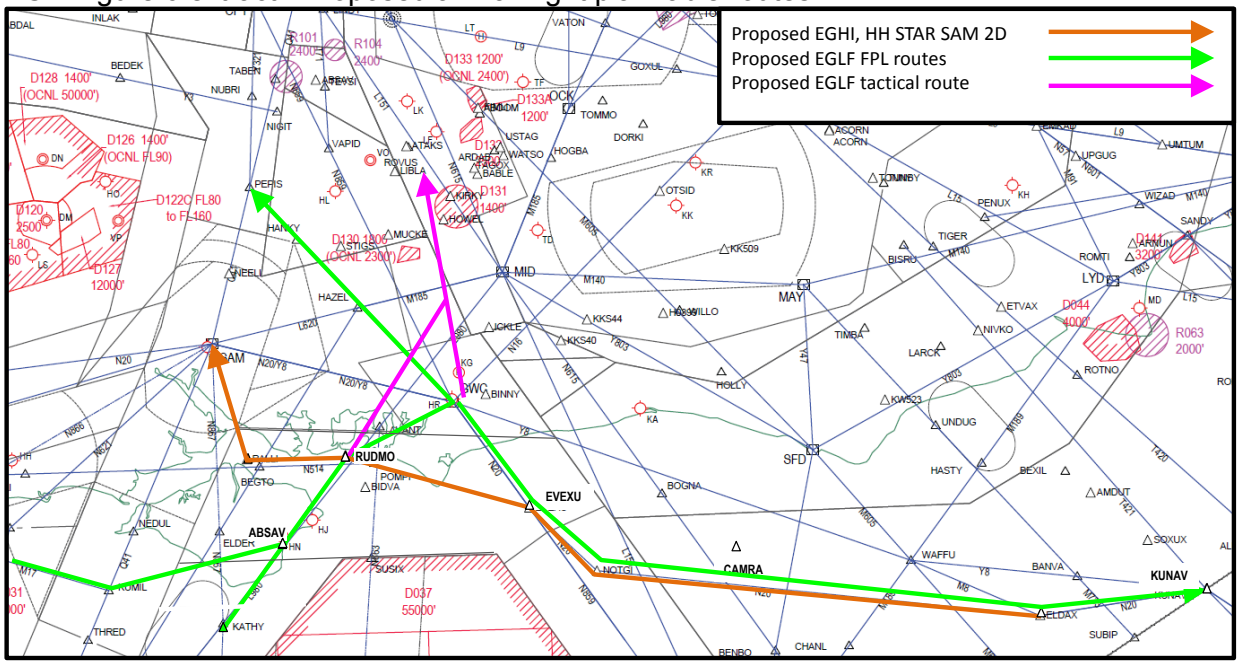
- From the east this swathe is roughly from Worthing to GWC, with a concentration of flights via GWC
- From the south and southwest the swathe is the breadth of the Isle of Wight with a slight concentration around the FPL route heading towards Farnborough via HAZEL

Solent Group arrivals (Bournemouth and Southampton) are in a swathe centred on the SAM 1D STAR as shown.

[1] From AIP and SRD

Arrival flight planned routeings proposed with the airspace change proposal.

ACP Figure 6 extract - Proposed arrival flight plannable routes.



Farnborough arrivals. These are AIP 'procedures for inbound aircraft' and not STARs.
Arrivals from south (KATHY or ORTAC) to route KATHY ABSAV (new) RUDMO (new) GWC PEPIS.

Arrivals from southwest to route GIBSO BILNI KUMIL ABSAV RUDMO GWC PEPIS.

Arrivals from Paris FIR to route N20 GWC PEPIS.

AIP to retain notes detailing the expectation to route via ROVUS (a tactical waypoint for Farnborough arrivals), with PEPIS remaining as the FPL clearance limit for RT Fail purposes. Tactically, all arrivals are routed to ROVUS. Arrivals rarely route to PEPIS in practice.
(AIP AD-2-EGLF-2.22 item d (i) Note 1 clarifies the expected use of ROVUS and PEPIS).

Bournemouth and Southampton arrivals. The new RNAV5 SAM2D STARs take aircraft into the SAM hold, with a new RNAV5 intermediate contingency hold at RUDMO. Aircraft route as follows: ELDAX (new)-NOTGI (new)-EVEXU (new)-RUDMO (new)-MIVLA (new)-SAM.

Departure flight planned routeings before the change.
ACP Figure 4 extract – current departure flight plannable routes

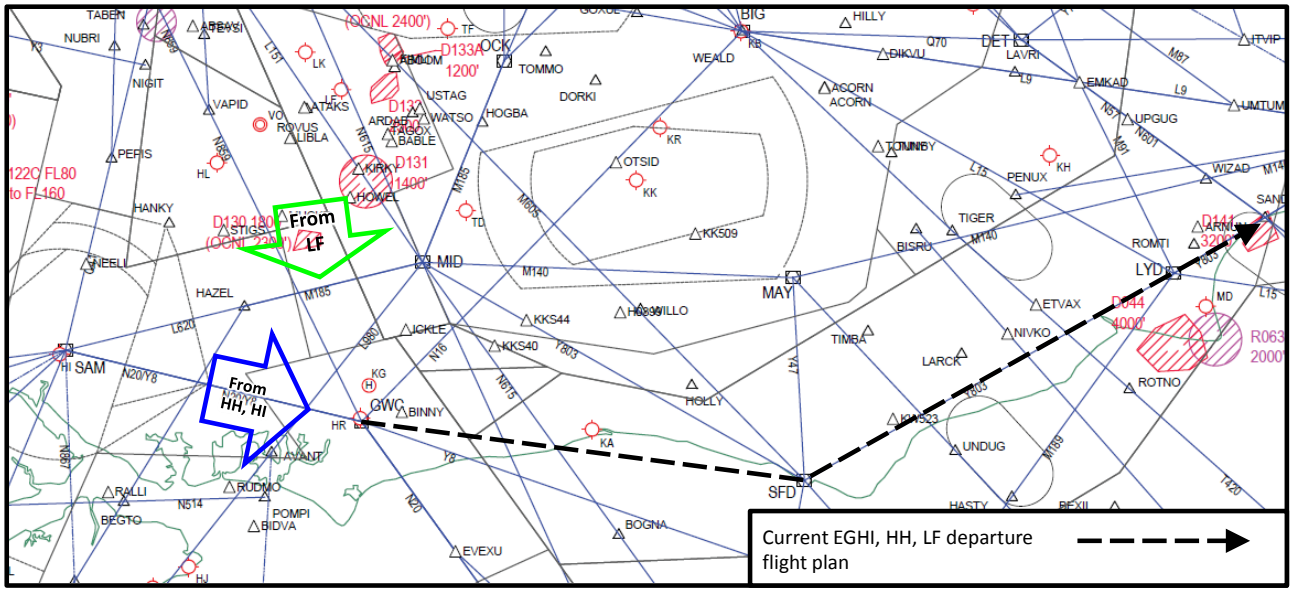


Figure 4 shows the flight plan route for Southampton, Bournemouth and Farnborough departures via DVR. In practice the flights were distributed in a wide swathe along the south coast around GWC.

Departure flight planned routeings after the change.
ACP Figure 7 extract - proposed departure flight plannable routes.

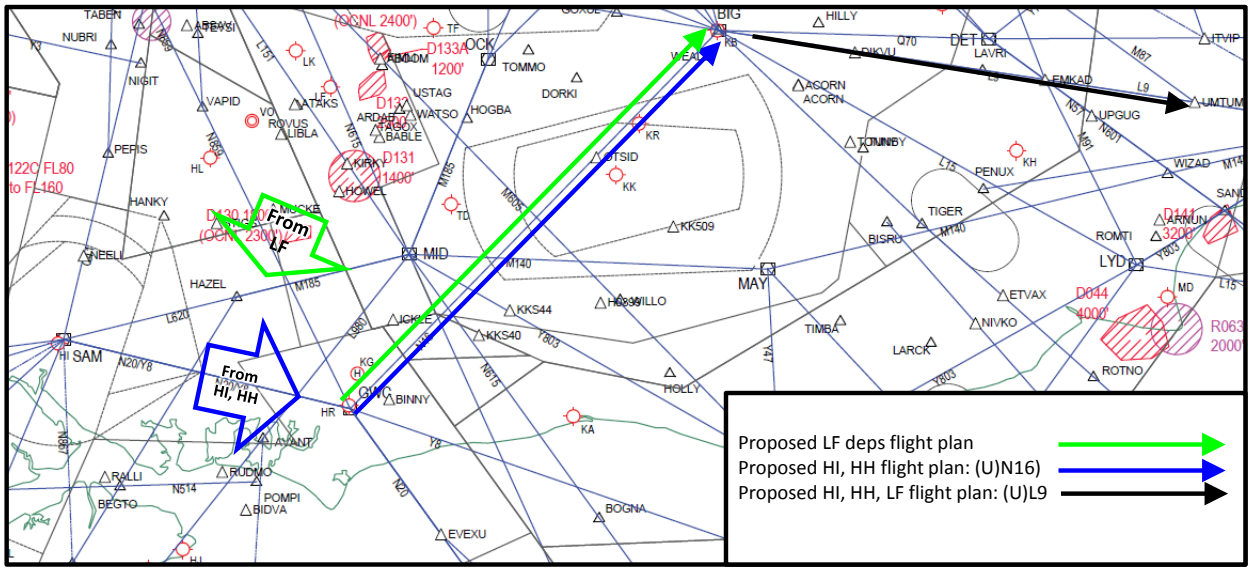


Figure 1 shows proposed DVR departure FPL routes relevant to this proposal (illustration).

Solent Departure Route Requirements.

This is an AIP 'procedure for outbound aircraft' and not a SID. Southampton and Bournemouth departures routeing via DVR requesting to fly at FL200 and above would now route via GWC, then the new ATS route (U)N16-BIG-(U)L9-DVR etc. Before the change, as per ACP Fig 4 flights routed via GWC-SFD-DVR.

Farnborough Departure Route Requirements.

This is an AIP 'procedure for outbound aircraft' and not a SID. Departures routeing via DVR requesting to fly at FL200 and above would now route via HAZEL-GWC, then the new ATS route (U)N16-BIG-(U)L9-DVR. Before the change, as per ACP Fig 4, flights routed via GWC-SFD-DVR.

Bournemouth arrival routeings before the change 4000-7000ft.
Consultation Document Figure D 6 – Bournemouth typical arrival flows from the east to both runways, 4,000-7,000ft.

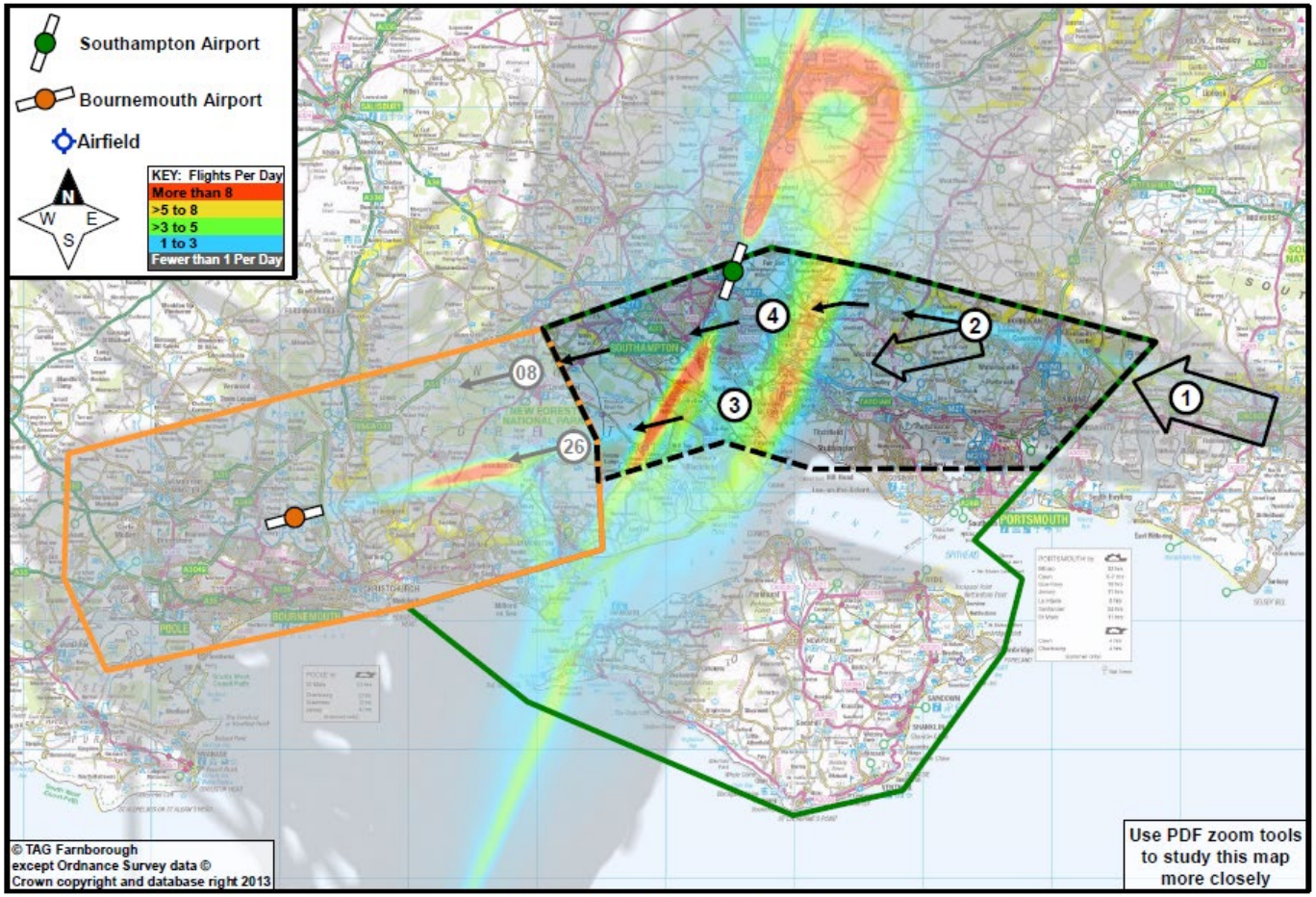


Figure D6: Arrows/dotted lines - typical current BOURNEMOUTH arrival flows from the east to both runways, 4,000ft-7,000ft (Radar data is all Southampton and Bournemouth air traffic up to 7,000ft)

Bournemouth arrival routeings before the change below 4000ft.
Consultation Document Figure D 7 – Bournemouth arrival flows from the east to both runways below 4,000ft.

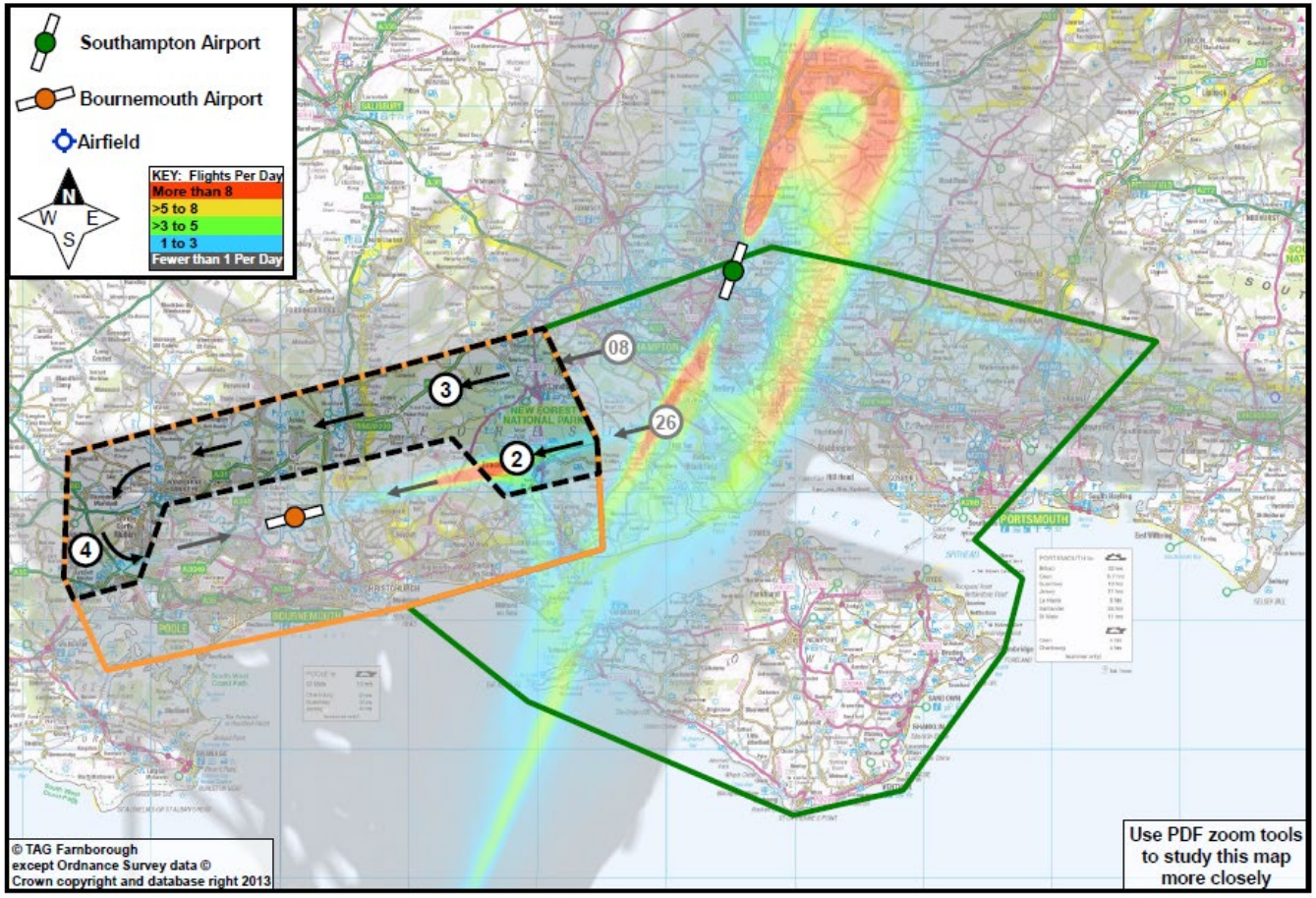


Figure D7: Arrows/dotted lines - typical current BOURNEMOUTH arrival flows from the east to both runways, below 4,000ft (Radar data is all Southampton and Bournemouth air traffic up to 7,000ft)

Bournemouth proposed arrival routeings after the change 7,000-2,5000ft.
Consultation Document Figure D 9 – proposed Bournemouth arrival flows from the east to both runways, 7,000ft-2,500ft.

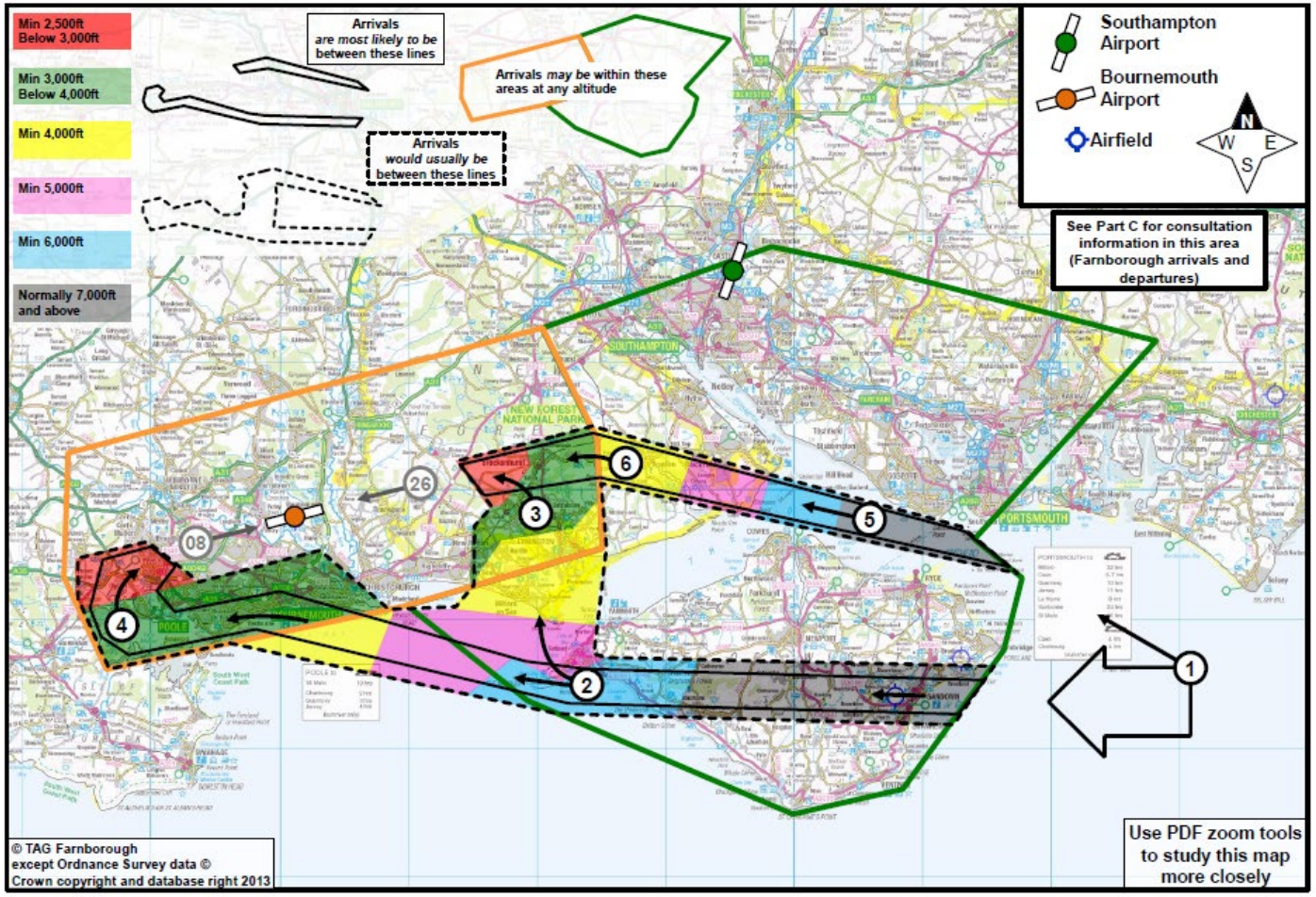


Figure D9: Proposed BOURNEMOUTH arrival flows from the east to both runways, 7,000ft to 2,500ft

Southampton arrival routeings before the change.
Consultation Document Figure D 5 – Southampton typical arrival flows from the east to both runways 4000-7000ft.

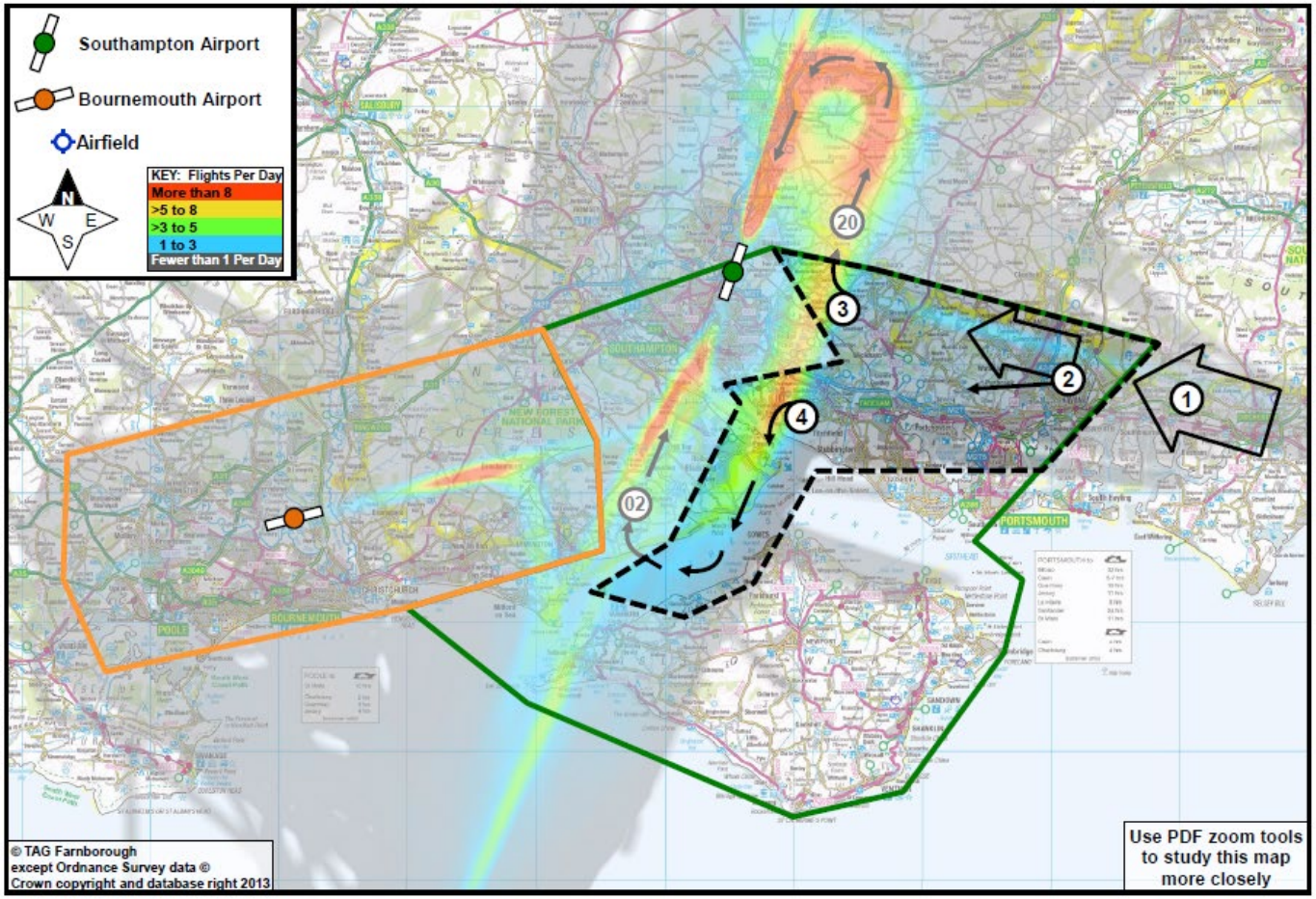


Figure D5: Arrows/dotted lines - typical current SOUTHAMPTON arrival flows from the east to both runways, 4,000ft-7,000ft (Radar data is all Southampton and Bournemouth air traffic up to 7,000ft)

Southampton proposed arrival routeings after the change.
Consultation Document Figure D 8 – proposed Southampton arrival flows from the east to both runways 4000-7000ft.

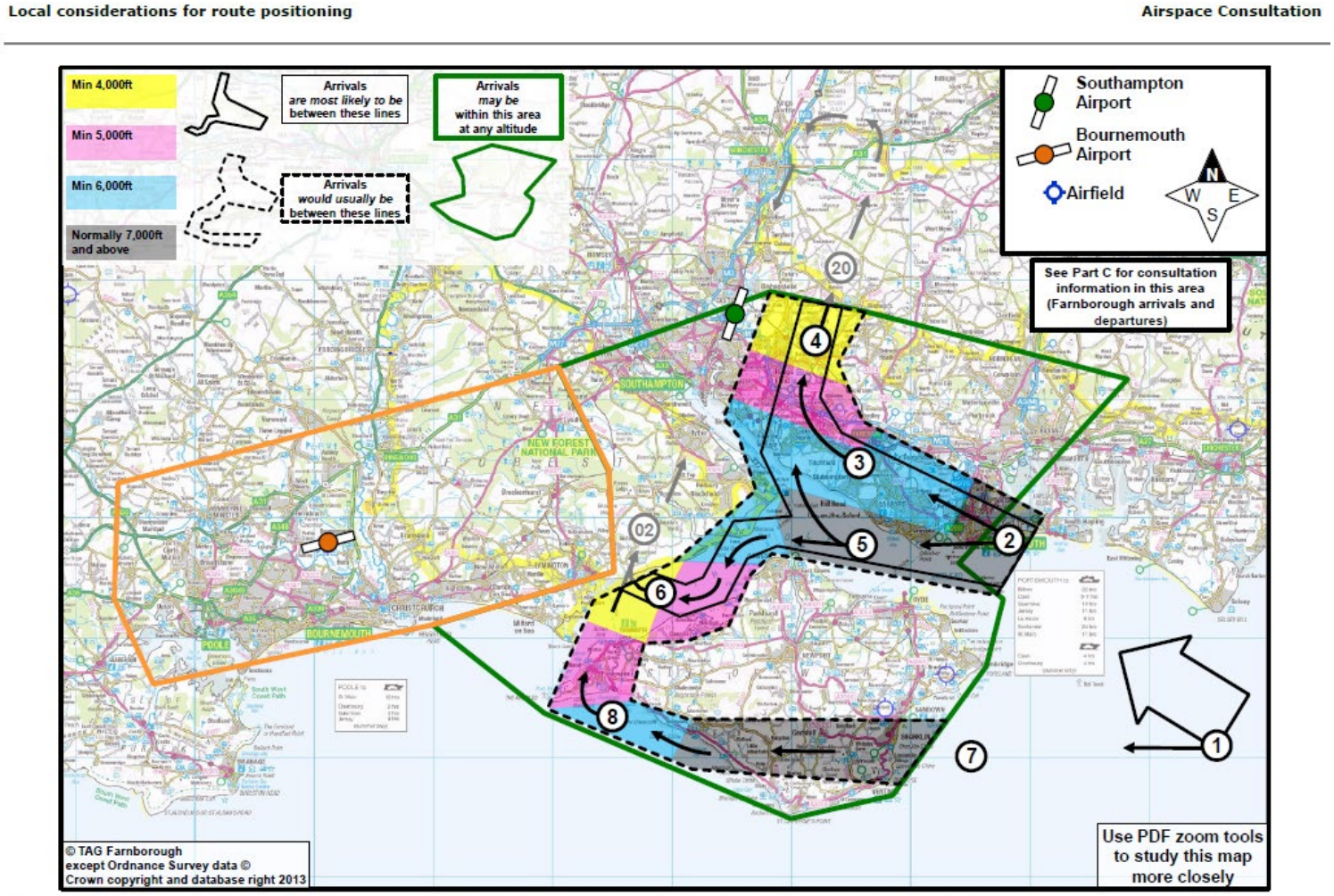


Figure D8: Proposed SOUTHAMPTON arrival flows from the east to both runways, 4,000ft-7,000ft

Summary of route utilisation including traffic numbers.

PIR data supplied by NATS (reproduced below from data) illustrates traffic numbers prior to, and after the change:

	Pre-implementation arrivals from the east/southeast August 2015 10-day sample	Post Implementation arrivals from the east/southeast August 2016 10-day sample	CAA Remarks
Bournemouth	27	22	
Southampton	41	68	
Farnborough	270	297	

PIR Track distribution plots

The sponsor provided a 10-day sample of track dispersion plots for arrivals comparing traffic patterns of Bournemouth, Southampton and Farnborough in August 2015 with the traffic patterns experienced after the change during August 2016. Five individual days were illustrated to illustrate patterns for the airports using westerly and easterly runways (NB: for Southampton this means Runway 20 for westerly and Runway 02 for easterly operations).

The impacts of the change are described in Table 1 below.

Table Key:

Column a illustrates the ACP reference diagrams. 65

Column b is the anticipated impact as forecast in the ACP.

Column c is a commentary on the description of traffic pattern prior to the change.

Column d is a commentary on the description of traffic pattern after the change.

Column e indicates CAA remarks.

Note: Links to the PIR track plots are shown in Columns (c) and (d) in red.

Links to data references in this document will be completed as soon as possible after initial publication.

Table 1 – Bournemouth arrival traffic pattern from the east analysis.

Track Analysis / ACP reference (a)	Anticipated impact as forecast in the ACP (b)	Pre-implementation Track Analysis 10-day sample period August 2015 (c)	Post Implementation Track Analysis 10-day sample period August 2016 (d)	CAA Remarks (e)
Consultation Fig D 9	**Consultation Fig D 9** From the east traffic would route via points 1, 5 and 6 or points 1, 2 and 3 for Runway 26, and via points 1, 2 and 4 for Runway 08.	**ACP Fig 3 – arrival flight planned routes before implementation** Solent Group arrivals from the east are in a swathe centred on the SAM 1D STAR as shown. **PIR submission commentary Page 5/6** **E01** As shown by the diagram on page 5/6, the main flow of arrivals from the east is via Goodwood (GWC) and then just north of the Chichester Harbour AONB (Arrow 1), it splits at Arrow 2 (after passing the A3 M, and then follows either the direction indicated by Arrow 2 towards point 3 for a straight in approach to Runway 26 or Arrow 4 to proceed downwind for Runway 08.	**PIR submission commentary Page 7/8** **E01** As shown by the diagram on pages 7 & 8 (Page 8 can be used to compare with the Consultation Fig D9 to illustrate what was forecast), instead of following the pre-implementation route described in column (b), the main traffic flow is routeing over the northern half of the Isle of Wight (IOW). before turning northwards at Point 2 (approximately at the Needles) for Runway 26. For Runway 08 arrivals, it is impossible to determine if any aircraft are following the intended southerly route as shown in Consultation Fig D9 or continuing towards the west and point 4. We believe that runway 08 arrivals are following a northerly track from the needles towards Lymington (Point 3 in Consultation Fig D9) , and then following the flight path used before the change. On close examination, there are some aircraft tracks still routeing through Goodwood. The CAA queried these and we were advised that these related to 3-or 4 aircraft flying from Shoreham to Bournemouth, thus, not using the new SAM2D STAR.	The traffic pattern was not as predicted; NATS advised that this was due to the CAA requirement to change the lower limit of controlled airspace over the IOW and raise it to FL75, the effect being that the route illustrated in consultation via points 1, 2 and 3 (Rwy 26) or points 1, 2 and 4 (Rwy 08) would not be used given the raised lower limit from what was proposed (FL65) to what was approved by the CAA (FL75). However, given the low volume of arrival traffic inbound to Bournemouth from the east, (in this 10-day sample it was 22 arrivals (an average of 2.2 per day) the impact appears to have been insignificant.

Track Analysis / ACP reference (a)	Anticipated impact as forecast in the ACP (b)	Pre-implementation Track Analysis 10-day sample period August 2015 (c)	Post Implementation Track Analysis 10-day sample period August 2016 (d)	CAA Remarks (e)
		2015-HH-90-00-overview E02 The altitude in descent is apparent when looking at slides 2 to 8 as arriving traffic continues towards the airport in descent.	**2016-HH-90-00 overview E03** The altitude in descent is apparent when looking at slides 2 to 8 as arriving traffic continues towards the airport in descent and can be compared with the slides indicating the profile for the pre-implementation traffic pattern.	From the whisker plot, the vertical profile indicates that aircraft are in the FL70-FL60 band, although, in fact they should not be lower than FL 70 until the controlled airspace boundary changes to the west of Newport on the IOW given that the lower limit of controlled airspace is FL 65. The commentary page 9 indicates that 17 aircraft are FL 68-FL70 until passing the gate location. After passing the gate, they may be given further descent as they enter the Solent CTA where the lower limit of controlled airspace drops to 2500/2000ft.

Table 2 – Southampton arrival traffic pattern from the east analysis.

Track Analysis / ACP reference (a)	Anticipated impact as forecast in the ACP (b)	Pre-implementation Track Analysis 10-day sample period August 2015 (c)	Post Implementation Track Analysis 10-day sample period August 2016 (d)	CAA Remarks (e)
Consultation Fig D 8	**Consultation Fig D 8** From the east traffic would route via points 1, 2, 3 and 4 or via points 1, 2, 5 and 4 for Runway 20, and via points 1, 2, 5 and 6 or via points 1, 7 and 8 for Runway 02.	**ACP Fig 3 – arrival flight planned routes before implementation** Solent Group arrivals from the east are in a swathe centred on the SAM 1D STAR as shown. **PIR submission commentary Page 12/13** **E01** As shown by the diagram on page 12/13, the main flow of arrivals from the east is via Goodwood (GWC) and then just north of the Chichester Harbour AONB (Arrow 1); it splits after Arrow 2 (after passing the A3 M, and then follows either the direction indicated by Arrow 2 towards point 3 to proceed downwind for Runway 26 or towards point 4 to proceed downwind for Runway 02.	**PIR submission commentary Page 14/15 and gate analysis on Pages 16&17 E01** As shown by the diagram on pages 14 - 17 (Page 15 can be used to compare with the Consultation Fig D8 to illustrate what was forecast), we describe the traffic patterns provided for analysis. **Runway 20 arrivals:** instead of following the pre-implementation route described in column (b) routeing either over Portsmouth, north of Gosport towards Junction 9 of the M27, or via Portsmouth south of Gosport along the Solent before turning north towards Locks Heath heading towards Point 4 for Runway 20, after passing Selsey Bill, the arrivals are following a variety of traffic patterns: 1. Approximately 50% of arrivals are being routed slightly further north of the intended track passing further north of Portsmouth over Hilsea, north of Porchester following the alignment of the M27 and then remaining north north of the	The traffic pattern using the more northerly route inbound to Southampton Runway 20 was not as predicted.

Track Analysis / ACP reference (a)	Anticipated impact as forecast in the ACP (b)	Pre-implementation Track Analysis 10-day sample period August 2015 (c)	Post Implementation Track Analysis 10-day sample period August 2016 (d)	CAA Remarks (e)
			M27 overhead Fareham before turning in the Wickham area downwind for Runway 20. 2. Approximately 50% of the arrivals take a more southerly routeing, more as predicted in consultation, with a routeing over Portsmouth to Gosport then turning north to Point 4. 3. A third pattern is evident which is the flow along the northern area of the Solent before turning southwest towards Yarmouth for Runway 02. 4. On close examination, there are a few aircraft tracks still routeing through Goodwood. It is unclear what this traffic is, but it could be a result of varied routeings provided by ATC. There is no evidence indicating arrivals are following the alternate route over the southern area of the IOW as predicted by Points 1, 7 and 8 towards Runway 02. This is no doubt due to the raised level of the Portsmouth CTA 2 which is FL 75 as opposed to what was proposed by the sponsor – i.e. FL 65.	The traffic pattern on the southerly route over Portsmouth was as predicted, although as alluded to above, the spread of traffic in this traffic sample which is now evident (clearly shown on slide 15), shows traffic spread across a slightly wider area than predicted. In essence, the traffic pattern has moved further south with 50% of the arrivals where they were predicted to be, and 50% are slightly further north than predicted – these flights are now overflying an area between the previous flow and what was predicted but are relatively low in numbers of aircraft per day. On slide 16, the gate analysis showed a total of 35 aircraft in the 10-day period through the gate which is positioned just to the east of the M27/M275 junction, and north of the predicted traffic flow. At this gate, there were 27 flights at or below 7000ft, and 8 above 7000ft out of the total of 68 flights from the east, but of the other 33 flights, it is unclear how many of those arrivals are on the approach to Runway 20 or Runway 02. On slide 17, 33 aircraft were through the second gate, all below FL 70

Track Analysis / ACP reference (a)	Anticipated impact as forecast in the ACP (b)	Pre-implementation Track Analysis 10-day sample period August 2015 (c)	Post Implementation Track Analysis 10-day sample period August 2016 (d)	CAA Remarks (e)
		2015-HI-90-00-overview E04 The altitude in descent is apparent when looking at slides 2 to 8 as arriving traffic continues towards the airport in descent.	**2016-HI-90-00 overview E05** The altitude in descent is apparent when looking at slides 2 to 8 as arriving traffic continues towards the airport in descent and can be compared with the slides indicating the profile for the pre-implementation traffic pattern. .	NATS advised that this may be as a result of the CAA requirement to change the lower limit of controlled airspace over the IOW and raise it to FL75, the effect being that the route illustrated in consultation for the Bournemouth arrivals via points 1, 2, 3 (Rwy 26) and 1, 2 and 4 (Rwy08) would not be used given the raised lower limit from what was proposed (FL65) to what was approved by the CAA (FL75), hence, because the Bournemouth traffic is further north, NATS believe this may have caused 50% of the Southampton arrivals from the east to be slightly further north than predicted.. However, given the number of flights arriving into Bournemouth from the east is an average of 2.2 per day in the 10-day sample), it is difficult for this rationale to stand up as being the case for the displacement of 50% of Runway 20 arrivals to be displaced further north than what was predicted. The CAA believes that other traffic may also be a factor. If no other traffic conflicts with an arrival flight path which would be more expeditious, then it would be logical for controllers to give a more direct routeing.

Track Analysis / ACP reference (a)	Anticipated impact as forecast in the ACP (b)	Pre-implementation Track Analysis 10-day sample period August 2015 (c)	Post Implementation Track Analysis 10-day sample period August 2016 (d)	CAA Remarks (e)
				Given that one of the main reasons of the proposal was to take the Southampton and Bournemouth arrivals from the east away from Goodwood, and to deconflict the arrival flows from the departure flows from Farnborough, Southampton and Bournemouth, this has still been achieved despite the more northerly traffic pattern for 50% of the Southampton runway 20 arrivals. In any event, from the evidence provided, 50% of the Runway 20 arrivals are not flying where they were predicted to fly, but given the small numbers of aircraft being vectored further north, even though aircraft are below 7000ft, we do not consider this as a significant impact as the impact from noise is below the threshold which would trigger a significant noise impact arising from an airspace change.

Table 3 – Farnborough arrival traffic pattern analysis.

Track Analysis / ACP reference (a)	Anticipated impact as forecast in the ACP (b)	Pre-implementation Track Analysis 10-day sample period August 2015 (c)	Post Implementation Track Analysis 10-day sample period August 2016 (d)	CAA Remarks (e)
	ACP Fig 3 – arrival flight planned routes before implementation Solent Group arrivals from the east are in a swathe centred on the SAM 1D STAR as shown. **Forecast traffic distribution ACP page 9 (NATS description)** In reality Farnborough flights head directly towards Farnborough in broad swathes: From the east this swathe is roughly from Worthing to GWC, with a concentration of flights via GWC. From the south and southwest the swathe is the breadth of the Isle of Wight with a slight concentration around the FPL route heading towards Farnborough via HAZEL	**PIR submission commentary Page 22.** **E01** At FL 90 and below, from the southeast, there is a broad band of arriving traffic from Worthing to Goodwood which then reduces as traffic gets closer to Farnborough. At FL 90 and below, from the southwest, there is a spread of traffic north of Portsmouth which routes over and west of Petersfield towards Farnborough	**PIR submission commentary Page 23.** **E01** The traffic pattern from the southeast is very similar to that before the change, except that the arrivals from the southwest are being routed more towards Goodwood the Farnborough. This was predicted in Fig 6 of the change proposal (see earlier in this document).	The traffic patterns are as forecast by the sponsor.
	See above	**2015-LF-90-00-overview** **E06** 90-80 Aircraft in this band over the sea and inland widespread across the area as described above.	**2016-LF-90-00 overview** **E07** 90-80 Virtually no change.	

Track Analysis / ACP reference (a)	Anticipated impact as forecast in the ACP (b)	Pre-implementation Track Analysis 10-day sample period August 2015 (c)	Post Implementation Track Analysis 10-day sample period August 2016 (d)	CAA Remarks (e)
		80-70 Aircraft in this band over the sea and inland widespread across the area as described above. 70-60 Aircraft in this band over the sea but not as far out as in the higher bands and inland widespread across the area as described above. 60-50 Aircraft in this band now mainly overland north of Worthing and widespread across the area as described above. 50-40 Aircraft in this band overland north of Midhurst and the A272 and widespread across the area as described above.	80-70 Virtually no change. 70-60 Virtually no change. 60-50 Virtually no change. 50-40 Virtually no change.	

Annex D - CO2 Emissions Summary

Comparing forecast CO_2 impact from the original Airspace Change Proposal (ACP) documents with the Post-Implementation Review (PIR) outputs

	Forecast for 2016 (per original ACP)				PIR Results	
ACP Module	**Base case annual "enabled" fuel saving (tonnes)**	**Base case annual "actual" fuel saving (tonnes) – reduction of 21%**	**Convert to CO_2 @ 3.18 (tonnes)**	**Range for CO_2 annual saving per ACP - i.e. 50% as low case (tonnes)**	**NATS Report (A17035, V1.0) – fuel saving (tonnes)**	**Convert to CO_2 @ 3.18 (tonnes)**
Module A - Stansted	4,298	3,395	10,796	5,398 - 10,796	3,557	11,311
Module B – London City Replications	0[2]	0	0	0	0	0
Module C – London City Network (plus Gatwick & Southend)	LCY = 4,082 Gatwick (TIMBA STARs) & Southend = 3,959 **Total = 8,041[2]** (no separate figures for Biggin Hill)	6,352	20,199	10,099 - 20,199	LCY = -3,779 Gatwick = 178 Southend = - 81	-11,709
Module D – Luton & Northolt	1,815	1,434	4,560	2,280 - 4,560	Luton = 678 Northolt = -1	2,153
Module E – South Coast (Farnborough, Southampton, Bournemouth)	-265	-209	-665	-332 - -665	Farnbourgh = -89 Southampton = -48 Bournemouth = -8	-461
Total	**13,889**	**10,972**	**34,890**	**17,445 – 34,890**	**407**	**1,294**

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

Conclusion

The key difference in impact between the ACP and the PIR (as shown in the table above) is for Modules B & C (i.e. the changes at London City airport). An overall fuel saving and CO_2 reduction was estimated at the time of the proposal – instead the PIR shows a significant increase in fuel and CO_2 , most notably for the arrivals. For the other modules (A, D & E) the changes in CO_2 impacts are broadly consistent with the estimated ranges that were considered when the CAA decision to approve was taken.

Notes

- It should be recognised that the original estimate submitted with the ACP, as with all such CO_2 estimates, has to make various assumptions when modelling the most likely changes to fuel burn and emissions. By their nature, they include a degree of uncertainty.
- The original ACP estimate (doc 44165/RPT/144, V1.2) did specifically adjust for tactical vectoring. (For example, read the statement made in the Introduction of that document about adjusting for tactical interventions in order to reflect “actual” flight trajectories. Equally the explanation of the adjustments made in Section 6 of that document to reflect “actual” fuel burn). However what it did not do was make any assumptions about possible changes to the rate/proportion of tactical vectoring that would occur after implementation.
- The original CO_2 analysis for the ACP modelled two years, 2016 and 2020.
- Original ACP – the fuel burn and CO_2 estimates for London City routes did reflect the sponsor’s expectations of an increase in track mileage generally, but also balanced this against expected savings in holding time and improved vertical profiles for arriving aircraft. The result was that fuel savings and CO_2 reductions were forecast for London City flights.

- The analysis excludes traffic from 4 Feb 2016 to 29 Feb 2016 because it was a period of “bedding-in” for the change. It includes traffic from 1 March 2016 to 3 Feb 2017. However, the number of movements for the full year has been used when calculating an annual total.
- The PIR assessment adjusts for fleet mix to ensure it is consistent, so that the changes in fuel burn and CO_2 are not a reflection of a change in relative proportions of aircraft types.
- The anticipated number of affected arrivals in the ACP for implementation year was 116,742. In the PIR analysis the number of arrivals is actually 122,129.
- The anticipated number of affected departures in the ACP for the implementation year was 56,839. In the PIR analysis the number of departures is actually 64,715