

Report of the CAA's Post Implementation Review of the London Airspace Management Programme (LAMP) Phase 1A Module B Airspace Change Proposal – London City Airport RNAV-1 Replications

CAP 1692 B

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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, 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. Module B was sponsored by London City Airport (LCA) and proposed replacing conventional departure and arrival procedures at LCA with RNAV-1 departures and arrivals (known as SIDs and STARs respectively) based on a variation of modern performance-based navigation technology known as RNAV-1.¹
3. Module B proposed RNAV-1 routes up to 4000ft AMSL that match the conventional routes as closely as possible; that is RNAV-1 routes of the low altitude portions of all LCA conventional SIDs, and the introduction of RNAV-1 arrival transition procedures for the LCA radar vectored arrival flight paths to intercept the Instrument Approach Procedures (IAP) for both Runway (Rwy) 09 and Rwy 27. It was also proposed that a portion of the Runway 09 procedure would be used by traffic inbound to Biggin Hill.

¹ Performance-based navigation (of which RNAV-1 is a type) is satellite aviation guidance; in comparison to ground-based navigation aids (such as those used by conventional SIDs) performance based navigational technology will allow aircraft to fly much more accurate and flexible tracks. Satellite guidance will also allow the UK's complicated and busy airspace to be redesigned, increasing capacity and efficiency while maintaining or enhancing safety performance. A route structure optimised for satellite guidance with aircraft flying a pre-programmed trajectory will also reduce the need for tactical intervention by air traffic controllers to instruct pilots to change direction, bringing down the cost of air traffic control, and optimise the climb and departure profiles of aircraft (which is the most expeditious routing of aircraft so far as airlines are concerned, and which also burns the least fuel and overall causes the least noise).

4. Stage 7 of this process is a Post Implementation Review (PIR) that normally begins one year after implementation of the change.
5. 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.
6. 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).
7. During the review process, the CAA considered data provided by LCA. As a result, the CAA has reached the following conclusions:

Operational Conclusions

8. The PBN SID routes and the radar vectored arrival patterns have been successfully implemented from an operational viewpoint and the aims and objectives of the proposal have been achieved.

Complaints conclusion

9. We have analysed the enquiries/complaints received by the Change Sponsor, NATS and the CAA as part of this Review. As a result of our analysis, we have concluded that the themes associated with a significant proportion of the total received are consistent with the traffic patterns we were expecting and observed when carrying out our aircraft track analysis.

Environmental conclusions

10. The noise impacts, as defined by the L_{eq} contours, 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. As anticipated, there has been a net reduction in the number of people overflown, whilst there is also a proportion of the population that are being overflown more often. We also identified three situations where traffic pattern deviates from what was forecast, however in each case we have concluded that the impacts are consistent with the anticipated impacts.

11. This Module, in conjunction with Module C, has not achieved the reduction in annual CO₂ emissions that was expected. Instead these two Modules have resulted in an increase in CO₂ emissions.

Confirmation of LAMP Phase 1A Module B Implementation

12. In respect of Module B of LAMP Phase 1A the CAA confirms that no modification of the RNAV-1 arrival and departure designs are required by London City Airport except for:
 - 1) Chart naming and associated data base coding changes to the ODLEG arrival procedures as described in paragraph 55.
 - 2) A requirement for the CAA to implement the ICAO arrival chart naming convention for London City and Biggin Hill arrival procedures. This is to be discussed between the SARG IFP regulators and NATS with the action ratified to implement this requirement.
Note: this is an operational procedure naming issue and will not affect the position of any of the aircraft tracks over the ground.

In respect of the three situations where traffic pattern deviates from what was forecast, we recommend that the sponsor to investigate why there are some discrepancies. This concludes the CAA's airspace change process in respect of London City Airport's airspace change request dated 16 February 2015.

The PIR Report

13. 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

14. 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).
15. 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.
16. 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.
17. 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

18. 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 for LCA were proposed as Module B 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

19. The following conditions were placed on the sponsor:

1	Thames Radar controller to ensure that traffic entering the ATPEV Hold does not enter the Shoeburyness Danger Areas to the north-east.
2	The TC South Radar controller will monitor the vertical profile of the Heathrow Rwy 09 DET SIDs and take appropriate action to achieve separation between the Heathrow DET SID and the London City Rwy 09 arrivals if the controller considers separation could be eroded.
3	The TC North Radar controller will monitor the vertical profile of the Heathrow Rwy 09 BPK SIDs and take appropriate action to achieve separation between the London City Rwy 27 SIDs if the controller considers separation could be eroded.
4	The TC North Radar controller will monitor the vertical profile of the Heathrow Rwy 09 BUZAD SIDs and take appropriate action to achieve separation between the London City Rwy 27 SIDs if the controller considers separation could be eroded.

20. In the PIR data provided, there were no incidents reported as Mandatory Occurrence Reports (MOR) relating to these conditional reporting requirements therefore we are satisfied that these conditions for monitoring the relevant flight paths have been met.

Relevant events since the change

21. Air transport movements are described at paragraph 67.

Data collected for the purpose of the PIR

Sources of Information

Change Sponsor

22. 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. This summary of evidence is also published on the CAA website. 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.
23. During the review process, the CAA considered:
- a commentary summary by the sponsor (PIR requirements B10, B14);
 - track dispersion and density plots of arriving and departing aircraft (PIR requirements B10, B14);
 - track plots for go-arounds in strong wind conditions;
 - altitude track dispersion plots in 1000ft intervals for departures; (PIR requirements B14);
 - details of complaints received; (PIR requirements B15);
 - details on procedure usage (PIR requirements B8, B9, B10);
 - LAeq16hrs contour impact assessment.
24. We have noted that the change sponsor provided all of the data requested.

Operators and Airlines

25. The CAA received some early feedback from some operators on issues with the naming of arrival procedures and associated issues with the loading of flight procedures into the aircraft FMS. This was quickly addressed and resolved – the detail is covered later in the operational issues section of this report.

Air Navigation Service Provider

26. NATS is the air navigation service provider (ANSP) currently providing air traffic control services for arrivals and departures at the Airport. 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.

27. Regarding the Annex A requirements, NATS provided evidence to satisfy all the PIR requirements. Some database coding issues had already been brought to the attention of the CAA during the first year of operations (as alluded to above). Specific aspects are considered in more detail later in the report.

Other data we have considered

28. The CAA, change sponsor, and NATS have all received feedback on the change from groups and residents much of which was directly related to the issues that the CAA required to be considered under the terms, scope and objective of this PIR. Groups and residents local to LCA have raised complaints on aircraft noise, overflight and concentration of flight paths with the airport and the CAA.
29. Complaints to the CAA were received and analysed – see paragraphs 85-89 for the details provided and our analysis of complaints.
30. A total of four petitions were raised by local communities following the implementation of this airspace change proposal, one of which was submitted directly to the CAA by Waltham Forest & Redbridge Green Party on behalf of residents affected by the concentration of flightpaths from LCA over selected communities across London. The other three were submitted directly to LCA and despite numerous requests for them to be, they were not actually forwarded on to the CAA. Whilst this means the raw data has not been seen, the locations/areas responsible for generating these petitions is known by the CAA and therefore they have still been considered as part of our analysis - see paragraph 87.

Objectives and Anticipated Impacts

The original proposal and its objectives

31. As explained in the change proposal, the objective of these changes is to introduce RNAV routes “to match the existing conventional routes as closely as possible” i.e. RNAV Standard Instrument Departures (SIDs) and arrival transitions which match as far as possible the conventional SIDs and concentration of radar vectored arrival flight paths.
32. A further justification for the London City procedures was that they would enable connectivity with the RNAV route structure as proposed in the NATS London Airspace Management Programme (LAMP) Phase 1 Module C airspace change proposal which NATS submitted to the CAA with the proposal. End to end RNAV1 connectivity between the en-route network and the arrivals & departure routes would enable the ATC network to operate more efficiently. NATS forecast environmental benefits which would be achieved by enabling departures to climb higher earlier, and repositioning higher level arrival routes over the Thames Estuary. As a result, the combined LAMP proposal would both reduce the CO₂ impact of each flight, and reduce the noise impact by reducing the time aircraft spend at 3,000-4,000ft over parts of East London, Kent and Essex. These benefits could not be realised without the proposal to introduce RNAV routes for the low-level conventional routes for London City Airport.

Anticipated Impacts

33. As Module B largely reflected the conventional procedures below 4000ft AMSL, but also the SID profiles as far as Clacton, Brookmans Park and Compton above 4000ft, with no anticipated changes to track mileage or vertical profile, there was little expected impact upon either fuel burn or CO₂ emissions. However, the proposal made it clear that this Module was an “enabler” for the changes in Module C, which did have an expected lower fuel burn and therefore coincident lower CO₂ emissions, and the combined impacts that arose from all of the LAMP Phase 1A Modules would therefore benefit operators. A summary of the impacts on CO₂ emissions from the LAMP Phase 1A Modules is at Appendix 1 to the Environmental [Assessment](#) Section 5.1.

34. Whilst anticipating that the CO₂ impact of this Module would be minimal, the CO₂ assessment of this Module was combined with that of Module C in the original proposal. The anticipated combined CO₂ reduction for Modules B and C was estimated to be with the range of 10,100-20,200 tonnes in 2016. However, as discussed in the CAA's Environmental Assessment, overall, the LAMP Phase 1A package of proposals was 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 were 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, (as enabled by Module B) would deliver a reduction of approximately 17,400 tonnes of CO₂ in 2016 and 20,800 tonnes in 2020.
35. We anticipated that there would be no effects on biodiversity.
36. We anticipated there would be no effect on local air quality, or on Areas of Outstanding Natural Beauty and National Parks.
37. There were unlikely to be any adverse tranquillity or visual intrusion impacts as a direct result of these changes.
38. We assessed the anticipated impact of noise emissions on the changes proposed. When doing so we had regard to the altitude-based priorities as given to the CAA by the Secretary of State in the 2014 Guidance to CAA on Environmental Objectives (set out in Annex A to the **CAA Decision: Part applicable to each LAMP Phase 1A Modules A – E**).
39. 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). See the incorporated **CAA Decision: Part applicable to each LAMP Phase 1A Modules A – E**, Annex A for an explanation of the CAA's policy in this regard. As set out in the CAA Environmental Assessment this is because the proposed changes to both departure routes and arrival routes will have no anticipated impact upon the airport's L_{eq} noise contours.²

² Noise contours are used to represent on a map the location of places affected by different volumes of noise.

40. Although we did not anticipate a significant noise impact as a result of these changes, we did consider that there was likely to be some change in noise dispersion. Experience of implementation of RNAV-1 departures at other airports led us to conclude that departing aircraft from London City after the first turn would more accurately fly the nominal track of the RNAV-1 route and would, consequently, produce a more concentrated track dispersion over the ground than aircraft flying the existing conventional departures. However, because of the type of RNAV design criteria used for the proposed London City departures (specifically because of the use of a 'fly-over' waypoint for the first turn), there was the likelihood of greater concentration than is currently the case because of the characteristics of the SID design. We stated that this may be slightly different to the track of the black dots shown in the consultation diagrams, but that this could only be confirmed after the procedures were actually flown under a representative set of operating conditions. Therefore, for the reasons set out below we anticipated track dispersion was likely to be very similar to the dispersion resulting from existing conventional SIDs around the first turn, but once aircraft had completed these turns, thereafter, the anticipated impact was that aircraft would be more concentrated along the nominal track of the SID as the aircraft fly east, compared with the conventional SID designs.
41. The new RNAV-1 designs for SIDs at London City were based around the use of a fly-over waypoint (as opposed to fly-by) for the first turn followed by a DF (direct-to-fix) path terminator to the next waypoint. This means that aircraft will initiate the first turn at the same point as they do in the conventional procedures.^[1] However, we anticipated there would continue to be some dispersion around the first turn which would vary by aircraft type due to their differing operating speeds and because the aircraft are still accelerating at this point in their flight path. This affects the radius of the turn and may be exacerbated by wind direction and speed under certain circumstances. After the first turn has been completed, there would then be a more concentrated swathe of departures compared with the conventional SIDs. However, because at the point of change to the new procedures, approximately 30% of the aircraft types currently using London City would be unable to fly RNAV-1 SIDs, there would still be some aircraft flying the current conventional profile as this remained as a published alternative. As a result, we anticipated that there may have been some

^[1] A fly-over waypoint is used by database coders when they provide informal RNAV-1 'coded overlays' of the conventional SID designs. There is, therefore, less likelihood of experiencing track dispersion around the initial turns, and consequently, the CAA believes that the designs for the SIDs at London City will provide a better SID replication than the design used for the recent Gatwick Route 4 RNAV-1 SID design.

variance from the track patterns shown in the consultation document diagrams for the departures, but the impact would not become totally apparent until all aircraft were flying RNAV-1 departures (on implementation, there was no anticipated date for this to occur). See paragraph 6 of PART APPLICABLE TO EACH LAMP PHASE 1A MODULES A – E for further detail.

42. Regarding arrival tracks, we anticipated that the consultation diagrams were a fair representation of the track dispersion that was likely to result from the implementation of the changes proposed in this Module. See paragraph 6 of PART APPLICABLE TO EACH LAMP PHASE 1A MODULES A – E for further detail.
43. We therefore considered that some residents should experience a reduction in noise impacts because they would have fewer flights overhead as a result of redistribution arising from concentration. However, some residents already under the nominal tracks of the conventional SIDs the subject of this proposal, were likely to experience more overflight and more noise as a result of this concentration. In our view, this impact was not significant in terms of the Secretary of State's policy and guidance to the CAA set out above.
44. Having carefully considered this information we concluded that overall, the proposals in Module B contributed to and enabled the environmental benefits anticipated from the package of proposals in LAMP Phase 1A. We acknowledged that this was achieved as a consequence of the anticipated concentration and associated noise impact described above.

CAA Assessment

Operational Assessment

45. 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 B. In the track data analysis at Annex B, the SARG IFP regulator recorded whether the procedures were being flown correctly by the operators, and if not, particular issues were highlighted. We also took account of feedback from operators and engagement with database coding houses as illustrated earlier in paragraphs 53 and 55. The following is a summary of the CAA's conclusions.

Safety

46. From the evidence supplied in Annex A (the evidence provided in accordance the PIR requirements), there were no Mandatory Occurrence Reports (MOR) raised by NATS in relation to the particular scenarios where we sought feedback given the nature of some of the design characteristics used for the departure and arrival procedures. We therefore conclude that the procedure designs have been successful in this context.
47. As NATS reported in their Anticipated Impacts and Benefits statement, as a result of the implementation of LAMP Phase 1A, the controller workload in the London Terminal Control ("TC") Thames sector has been greatly reduced as a result of the new systemised airspace design with much less tactical control at low levels overland within a congested area close to the airport. This has resulted in an improvement in safety risk within the Swanwick TC environment and with the TC Thames sector. The reduction in complexity has therefore had a positive safety impact. Whilst this is evident across the regions affected by change in Modules B and C (the network changes), the particular benefits within this Module are associated with the reduced controller workload in managing the Runway 09 arrivals towards the base leg turn as aircraft approach Streatham, and subsequent turn at Lambeth Bridge towards final approach, and the systemised EKNIV SID departure route which is designed to reduced radar vectoring and controller workload enabling departures to the south to be climbed above all the arriving traffic, a factor which was previously tactically managed by

controllers before the change. The CAA recognises that the design has been successful in this regard, and that flight safety has been improved with the changes implemented in this Module.

48. Under PIR requirement B14, NATS was advised to report on any inadvertent penetration of the Southend controlled airspace by traffic arriving into or departing from London City which resulted in an MOR being raised. There were no occurrences reported under the MOR reporting system.
49. Prior to LAMP 1A designs, following an incident in 2010, departures to the south east are technically capped by the SID design to climb not above 3000ft. Therefore, there is a long-standing procedure for all departures which requires ATC to climb aircraft above 3000ft as soon as they are clear of other traffic. During the last year, whilst not specifically reported to the CAA, we became aware of a number of situations when aircraft on departure routing to the east/south east have not been climbed soon enough to remain inside controlled airspace.
50. For LAMP 1A post implementation operations, given the requirement for ATC to climb departures above the arrivals, there was always a necessity to give the climb to departures early enough in order to establish vertical separation prior to the cross-over of both departing and arriving flightpaths. Since implementation, whilst it became apparent that some aircraft have inadvertently left controlled airspace for a short period until climb instructions have been issued by ATC, we became aware of a number of 'in house' procedures which NATS are using to alleviate this situation. At the time of compiling this report, there has been a reduction in such occurrences. Although not attributable to the new airspace design, as the situation existed prior to implementation, the CAA will nevertheless continue to monitor developments.
51. The evidence provided under PIR requirement B8/9/10 forecast RNAV usage at the time of the ACP submission at 70%. However, the actual usage over the first year rose to 92.6%, and to 95.9% in the last quarter of the annual period (4 Nov 16-3 Feb 17). The increased RNAV utilisation is an additional benefit as there is less radar vectoring for non-RNAV 1 aircraft, and hence reduced controller workload; consequently, this is a contributory factor to an improvement in flight safety for both flight deck crews and air traffic controllers.

Operational Feedback

Flyability.

52. Under PIR requirement B1, we asked NATS to provide details of any issues with flyability of SIDs and arrival transitions. There were no flyability issues noted within the flightpaths covered by the Module B proposal. We did however note that NATS illustrated the impact of strong south westerly winds on the Rwy 27 BPK SID at the turn after Woodford during Storm Imogen in February 2016 (see PDF Ref B36-B14). The strong winds did cause some ballooning at the Woodford turn which could be expected in these extreme wind conditions. In normal wind conditions, no flyability issues were noted. We therefore accepted in these extreme conditions that this was not an issue of the procedure - it merely demonstrated the impact that extreme strong winds can have. We therefore conclude that all the procedures have been flown to a satisfactory standard. However, we have a number of observations to make regarding the actual track dispersion achieved and some comments on charting which are detailed below.

Arrival Procedure Identification in Aircraft FMS.

53. Although the arrival procedures were being flown by the operators as intended, it was brought to our attention that the initial introduction of the procedure caused confusion for some operators. This was where some operators were unable to select the STAR and arrival transition procedures as cleared by ATC. This meant that ATC had to provide radar vectors until the various procedures had been recoded/renamed which took some time before all were corrected. The issue was highlighted by NATS under PIR Requirement B12 evidence (see Annex A). As part of the PIR, we have determined that the "Transition Arrival" charts will need to be renamed as "Approach transition" by the procedure sponsor. Action will be initiated by the CAA Instrument Flight Procedures (IFP) Airspace Regulator to address this technicality.

Note: whilst this mainly affects the arrival procedures under the jurisdiction of Module C, this is included here for reference as the arrival procedures cover changes proposed in both Modules B and C.

54. After the introduction of these procedures in 2016, a subsequent requirement as defined in the EASA Reg (EU) 2017/373 requires the UK to comply with the ICAO STAR naming convention. The current UK naming convention for STARs and arrivals is currently predicated on the last waypoint of the procedure, whereas the ICAO naming convention is predicated on the first waypoint of the procedure. This difference means

that all London City STARs/Arrivals will need to be renamed in due course; however, we would highlight that this is a procedure naming issue and will not affect any of the aircraft tracks over the ground. Therefore, to comply with this requirement, it is now recommended that London City STARs and Arrival transitions be re-named once co-ordination between the CAA and NATS has been initiated and appropriate action is agreed to address the issue.

Runway 09 Arrival Procedure via ODLEG.

55. The terminating leg of segment 2 where aircraft are on the 'base leg' of the runway 09 arrival procedure, has a fix to manual termination (FM) path terminator seen in the AIP published coding tables. During the PIR analysis, we determined through engagement with database coding houses that due to FMS coding constraints, many coding providers changed the coding from an FM to a Course to Fix (CF) path terminator. This CF is a course of 049° to the intermediate fix on the ILS. Therefore, when the aircraft reaches ODLEG it takes up a course of 049°M to intercept the ILS localiser as cleared by ATC earlier on the base leg. As the current standard practice by ATC is to clear pilots to establish on the ILS localiser before reaching ODLEG, this change of path terminator has had no impact on the track flown after passing ODLEG.
56. The only impact is that should an aircraft experience an RCF the procedure is now coded as a closed procedure terminating at the instrument approach procedure intermediate fix instead of continuing on a heading of 049°. As long as NATS are content with this and are able to manage an RCF situation, this is acceptable.

Note: For the non-technical stakeholder, this effectively means the procedure has performed as expected.

57. This effectively means that database houses have coded up a procedure which is different to that published in the UK AIP. As the published RNAV procedure should reflect what is published in the State AIP, this conflict has to be resolved. To resolve the conflict between the UK AIP chart coding tables and navigation databases, the CAA requires NATS to:
- Confirm that a closed transition is acceptable and that this presents no issues regarding Radio Communication Failure (RCF) implications. If this is acceptable, NATS will need to engage with an Approved Procedure Designer (APD) to amend the existing

procedure design files, and then submit the changes via an APD to the CAA for approval by the CAA IFP section of SARG for implementation in the UK AIP.

Note: this change to the published UK AIP database coding table will not result in any changes to track over the ground.

Air Navigation Service provision

58. There has been adequate resource for service provision to arrival and departures for the elements of the LAMP 1A design in Module B – the requirements were relatively speaking, unchanged, compared with the situation prior to the airspace change.

Utilisation and Track Keeping

59. The CAA carried out an in-depth analysis of the traffic patterns for selected periods during 4 seasonal months throughout the first year of operation. The analysis report is detailed in Annex B. The traffic samples are included on the CAA website. To understand the impacts, interested parties should read the guidance in Annex B before reading the track analysis and associating the comments with the relevant diagrams.
60. We found that:
- 1) There was a minor anomaly with the CLN1H Rwy 09 SID chart and coding table such that a course was missing from LCE01 to LCE02. This has been addressed and an amendment to the chart has been authorised.
 - 2) Procedures were being flown correctly by the operators.
 - 3) The track keeping was broadly as expected, however, there are some differences as discussed below.
 - 4) Direct routings to waypoints were obvious on the track plots when traffic conditions permitted shorter routings to be provided – this would either have been radar vectoring (potentially for the very small number of non-RNAV-1 equipped aircraft) or instructions to route to a particular waypoint to save track mileage and provide a more expeditious routing; for example, for the Runway 09 arrival direct routings to OSVEV are very noticeable.
 - 5) The turn after ODLEG (Streatham) onto final approach to Runway 09 appears to be working well, thus reducing controller and pilot workload.

61. We also determined that there were three situations when tracks over the ground appeared different to those predicted (see paragraphs 62-64).
62. CLN1H Rwy 09 SID. In segment 3 the tracking displacement of RNAV tracks from LCE02-05 was north of the where the concentrated traffic pattern was expected.
63. EKNIV1H Rwy 09 SID. In segment 3 the tracking displacement of RNAV tracks from LCE02-05 was slightly south of where the concentrated traffic pattern was expected.
64. BPK1A Rwy 27 SID. In segment 2 the concentration swathe has slightly widened when compared with the traffic sample in 2013 before the change.
65. In all three cases after investigation and analysis we determined that the impact was such that the noise impacts would not be deemed to be significant. Further detail may be found at Annex B.

Traffic

66. Given that the new LAMP1A departure and arrival procedures covered within Module B were introduced in areas of controlled airspace which were unchanged, there has been no impact on other airspace users. The traffic patterns observed are acceptably close to that forecast by the sponsor and therefore, we would conclude that operational impacts have been as expected. For operators flying into LCA, the RNAV-1 procedures have produced benefits by reducing both controller and flight deck workload as a result of less radar vectoring compared with the situation prior to the change.

Note: Certain operations (mainly those to and from the north and the few flights that fly in and out on westerly routeings from and to Ireland / USA) have experienced extra track mileage and flight times – this is a result of the changes in Module C and is covered in the Module C report.

67. The CAA examined the traffic statistics during the period from 2012 to 2017. Annual traffic figures are shown in Table 1.

Table 1 - Comparison of annual traffic figures with traffic forecast from the airspace change proposal

	Actual						Forecast (2012+20%)
	2012	2013	2014	2015	2016	2017	2016
Total traffic*	64,300	68,100	70,100	79,300	80,400	76,600	77,200

* Air Transport Movements, taken from CAA data. Rounded to the nearest 100.

The traffic forecast that was provided in the original airspace change proposal for 2016 was 2012 volume +20%. Using 2012 traffic volumes as the baseline, this equals a forecast of 77,200 movements for 2016. The actual traffic volume for 2016 was approx. 80,400. This is 4.1% greater than the forecast for 2016, and represents growth of 25% since 2012; this shows that traffic growth has exceeded the sponsor's forecast, although we note that the figures for 2017 appear to be closer to what was forecast for 2016.

68. We also note that the RNAV 1 equipage compliance has significantly increased from that originally forecast and is now above 90% of all aircraft movements.

Environmental Assessment

69. 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.
70. It should be noted that at the time of the consultation and decision on this Module, the CAA's PBN SID Replication Policy was current and therefore its reduced requirements were applied to this Module.

Noise – Leq Contours

71. The airport's L_{eq} noise contours were not expected to change as a result of the airspace change because any changes to arrival and departure routes would only occur well beyond the 57 L_{eq} dBA contours for London City Airport. NATS has presented a case and evidence for why this has indeed

been the case following implementation (see reference document B-Env1). NATS state that the radar track data density pattern diagrams provided for the four periods in 2016, when compared to the 2013 57dB LAeq 16h contours (slide 3 of the reference), indicate that there has been no noticeable changes to the 57dB LAeq 16 hrs contour post implementation. This supports the expectation that the airspace change does not have an impact on the Leq noise contours and therefore does not have a significant noise impact. By examination of these diagrams we support this conclusion.

72. 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.

Overflights

Summary of “overflight” impacts, as presented in the PIR data from the sponsor:

73. The details in Table 2 and accompanying text should be read in conjunction with the further information at Annex C of this report. Population counts in the table have been rounded to the nearest 100, and therefore differences will be due to rounding.

Note: In Table 2 we refer to CAP 1498. CAP 1498 is a guidance document that describes a standardised method for assessing overflights. This document was developed in conjunction with the Department for Transport, to respond to community feedback on the fact that stakeholders situated outside the noise contour that represents the onset of significant community annoyance can be adversely affected by passing aircraft. It details a standardised metric for describing overflights.”

Table 2 – Summary of overflights (persons overflown)

Modules B & C – London City	Pre-implementation (2013)	Post-implementation (2016)	Increase / decrease
Arrivals			
Direct overflight - Ground to below 4,000ft	881,000	331,000	-550,000
Direct overflight - 4,000ft to below 7,000ft	404,900	72,100	-332,800
Direct overflight - Ground to below 7,000ft	1,285,900	403,100	-882,800
“CAP1498 swathe”	2,439,700	1,231,300	-1,208,400
Departures			
Direct overflight - Ground to below 4,000ft	672,900	416,300	-256,600
Direct overflight - 4,000ft to below 7,000ft	184,800	115,100	-69,700
Direct overflight - Ground to below 7,000ft	857,700	531,400	-326,300
“CAP1498 swathe”	1,447,200	1,317,100	-130,200

Note: The Arrivals and Departures population counts cannot be combined to show a total because some of the geographic areas are common to both Arrivals and Departures, especially for the pre-implementation traffic patterns.

74. NATS has not used the CAP1498 “overflight” methodology to produce a set of contours which would have given a clearer picture the proportion of the population that are being overflown more often as a result of the airspace change.
75. So in the case of Modules B & C, a proxy for gauging the population being overflown more often is the headcount for those within the direct overflight totals (the shaded cells in the table above).
76. Therefore, whilst it is apparent that using the simplified CAP1498 swathe shows that there has been a reduction in the population overflown below 7,000ft, the shaded cells in the table show that there is a portion of the population that is likely to be experiencing an increase in being overflown as a direct result of this airspace change, regardless of the increase in traffic volumes that has occurred despite the airspace change.

Arrivals - Up to 4000ft:

77. The reduction in direct overflight in this altitude band is partly as a result of greater concentration, but also due to a change in traffic pattern that has reduced the number of arriving aircraft over North Kent.

Arrivals - From 4000ft to 7000ft:

78. 76. The reduction in overflight in this altitude band is as a result of a distinct change in traffic pattern resulting from the introduction of Point Merge. This has reduced the number of aircraft arriving over Hertfordshire, North London, East Essex and North Kent in this altitude band. The one location that appears to be overflown more often as a result of change in traffic pattern (other than as a result of concentration) is the Hoo Peninsula/Isle of Grain.

Departures – Up to 4000ft:

79. The reduction in overflight in this altitude band is primarily as a result of increased concentration rather than as a change in general shape of the traffic pattern.

Departures – From 4000ft to 7000ft:

80. The reduction in overflight in this altitude band is primarily as a result of a change in the shape of the traffic pattern. There are much fewer flights heading east across South Essex, coupled with an apparent improved climb profile meaning that aircraft tracks are generally shorter (and therefore overflying a smaller geographic area below 7000ft). In the original consultation and proposal, the sponsor indicated that because aircraft could be tactically vectored from 4000ft, they did not anticipate any change in traffic patterns above that altitude. In our consideration of the impacts, we noted that our experience of previous SID “replications” for other airspace changes when PBN SIDs are introduced suggested that concentration also occurs above the height at which tactical vectoring is possible. This was our expectation at the time of the decision, and the above assessment of the overflight analysis supports that expectation for departures between 4000ft-7000ft.

CO₂ Emissions

81. Further detail of the PIR assessment of the change in fuel burn and CO₂ emissions can be found in Annex D of this report which summarises the impacts across all of the LAMP Phase 1A Modules. The assessment of CO₂ emission that supported the original airspace change proposal and which the CAA took account of in making its decision was a combined assessment that reflected the totality of the changes related to London City Airport (i.e. Modules B and C). In the same way, the CO₂ assessment for the PIR has also combined these two Modules. That said, the expectation was that the majority if not all of the change in CO₂ emissions would relate to Module C because that was the Module that reflected the large changes

to the arrival routes. By comparison Module B was intended to be a “replication” of the existing departure and arrival routes, and therefore was not expected to have any notable change in CO₂ emissions.

82. In the original ACP, the fuel burn and CO₂ estimates for London City routes reflected the sponsor’s expectations of an increase in track mileage generally for arrivals, but also balanced this against expected savings in both holding time and improved vertical profiles for arriving aircraft. The result was that fuel savings and CO₂ reductions were forecast for London City flights.
83. The PIR assessment shows that Modules B and C have not achieved a CO₂ reduction in line with the estimated change in emissions that was proposed and considered when the CAA made its decision to approve the airspace change. On the contrary, the emissions assessment indicates that rather than deliver an anticipated reduction in CO₂ emission, these two Modules have resulted in an increase in emissions. This is due to the change in the arrival routes not delivering the expected benefit rather than a result of the changes made to the departure routes.

Environmental Conclusion

84. The CAA’s conclusion in this PIR is that the environmental impacts consequential on the implementation of the airspace changes are as expected other than the CO₂ emissions impact noted above and are consistent with the impacts we took into consideration in making our original decision.

Community Stakeholder observations

85. 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 this airspace change. Within their PIR data submission, the Change Sponsor included details in relation to a total of 175 enquiries/complaints which they have determined as falling within scope of this Review. The Change Sponsor also advised the CAA that they received four petitions following the implementation of this airspace change proposal; one was submitted directly to the CAA and the other three were not forwarded on by LCA. All of this data has been reviewed and assessed by the CAA for the purpose of this PIR.

86. The 175 enquiries/complaints that the Change Sponsor has determined fall within scope of this Review were generated by 141 individuals/organisations, all of which were located within the boundaries of 14 different London Boroughs; the Change Sponsor requires individuals/organisations to provide a full postal address when registering an enquiry/complaint and summary address information (partial postcode and confirmation of relevant London Borough) was included in their PIR data submission. The Change Sponsor used this information to produce an indicative heat map, which included an overlay showing complaint/enquiry locations (by London Borough). This map clearly shows that the 175 enquiries/complaints were generated by individuals/organisations who reside within London Boroughs that fall directly under the centrelines associated with some of the instrument flight procedure that were implemented following the regulatory approval of this airspace change proposal. The main themes identified when analysing these enquiries/complaints concerned the concentration of traffic patterns and the general burden of aircraft noise/overflight, the need to introduce respite routes and the unfairness of the regulatory decision to approve the implementation of the procedures associated with this airspace change proposal.
87. With regards to the four petitions referenced above, two were from Waltham Forest and Redbridge Green (355 and 676 signatories) and two were from Lewisham (70 and 91 signatories). Whilst the CAA received a copy of one of the Waltham Forest & Redbridge Green petitions, the other three were submitted directly to LCA and despite requests for them to be, they were not actually forwarded on to the CAA. Whilst this means the raw data has not been seen, the locations/areas responsible for generating these petitions is known and therefore they have still been considered as part of our analysis. The CAA notes that Waltham and Redbridge are London Boroughs that fall directly under the departure routes associated with this airspace change, whilst Lewisham is a London Borough that falls directly under the arrival routes associated with this airspace change proposal.
88. A comparison of complainants' locations in relation to London City's traffic patterns both before and after the implementation of the change has been completed, with the main conclusion being that there have been no unanticipated impacts – please refer to Annex E (Complaints Analysis) for more information.

89. In addition to the feedback noted and considered above, the CAA has also analysed the correspondence which it received directly from stakeholders following the implementation of this airspace change.
90. During this time, the CAA received a total of 63 enquiries/complaints which specifically relate to London City airport and aircraft activity associated with it. Of the total received, 12 fell outside of the scope of this review as they focussed solely on the correctness or otherwise of our original regulatory decision, sought clarification on the requirements of the airspace change process and/or concerned un-related aircraft activity. As this correspondence did not specifically concern the impact of aircraft activity following the implementation of this airspace change, it was not considered for the purposes of the PIR conclusions.
91. Of the remaining 51 enquiries/complaints, 33 were received directly from individuals whilst 18 were received from elected representatives (16) and representative organisations (2).
92. Focussing initially on the 33 enquiries/complaints the CAA received from individuals, 31 provided the full or initial part of their postcode, 1 provided a general location for their residence (i.e. town/village name) and 1 did not specify any address details in their submission. We have used the information provided to plot 32 locations during our analysis and we note that all of the locations plotted fall directly under or within close proximity (2-mile radius) of the instrument flight procedure centrelines associated with this airspace change proposal. Several common themes were identified when reviewing the content of these enquiries/complaints, with much of the correspondence received by the CAA highlighting that there had been a noticeable change/increase in the amount of aircraft noise experienced at their property since the implementation of the change. Other common themes concerned a change in aircraft activity/patterns and the concentration of aircraft tracks. Whilst it is important to acknowledge that a number of individuals challenged the adequacy of the consultation associated with this airspace change proposal in their correspondence, the primary objective of this Review is to assess the success of this airspace arrangement and its progress since implementation in order to identify any operational issues that may have arisen.
93. Similar themes were identified when reviewing the 18 enquiries/complaints that were received from elected representatives and representative organisations. The CAA has analysed the location of the various

constituencies and areas of interest and notes that they all fall directly under or within close proximity (2-mile radius) of the instrument flight procedure centrelines associated with this airspace change proposal.

94. To summarise, we have analysed the enquiries/complaints received by the Change Sponsor and the CAA as part of this Review. As a result of our analysis, we have concluded that the themes associated with a significant proportion of the total received are consistent with the traffic patterns we were expecting and observed when carrying out our aircraft track analysis and do not give rise to any unforeseen impacts of the proposal.

Ministry of Defence Operations

95. Operations by the Ministry of Defence were not affected by the proposals in Module B.

Conclusion

Operational Conclusions

96. No MORs relating to procedure designs and flyability were attributed to any scenarios where we specifically as requested feedback. We therefore conclude that the procedure designs have been successful in this context.
97. Early issues with the naming of the arrival procedures which were loaded onto some operator's (but not all operators) aircraft flight management systems were resolved once the issues had been investigated. This was a database coding issue with procedure naming conventions and not associated with the actual designs themselves. The SARG IFP regulators have noted these issues and will ensure that future designs are named appropriately.
98. ATC complexity has been reduced by the introduction of RNAV1 procedures which has reduced ATC workload, which in turn reduces flight deck workload and RT transmissions between ATC and flight crews due to the more systemised nature of operations which has meant less radar vectoring by controllers. This has been a positive impact on flight safety. The benefits of the RNAV Design have been realised by more operators than perhaps first thought as RNAV 1 equipage rates have risen from an estimated 70% on implementation to almost 96% at the end of the first year of operations.
99. The EKNIV SIDs have seen an improved climb performance for departures flying to the southeast and south, although the benefits of these procedures are more associated with Module C rather than with Module B, although both modules are related in this aspect.
100. In the main track keeping on all procedures has been as expected, and the Runway 09 arrival procedure has not presented any issues on the base leg turn onto final approach. However, a change to data base coding for the Runway 09 ODLEG arrival procedure is to be progressed by the sponsor in conjunction with their APD as outlined in paragraph 57 to reflect how the procedures have been coded by the database houses.

101. With the exception of three instances highlighted in this report the traffic pattern anticipated and as shown in consultation has been realised.
102. The change proposal has delivered the operational impacts and benefits which were anticipated in consultation and have been successfully implemented from an operational viewpoint.

Environmental conclusions

103. The noise impacts, as defined by the L_{eq} contours, 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.
104. As anticipated, there has been a net reduction in the number of people overflown, whilst there is also a proportion of the population that are being overflown more often.
105. This Module, in conjunction with Module C, has not achieved the reduction in annual CO₂ emissions that was expected. Instead these two Modules have resulted in an increase in CO₂ emissions.
106. With the exception of three instances highlighted in this report the traffic pattern anticipated and as shown in consultation has been realised

Overall Conclusion and Confirmation of LAMP 1A Implementation.

107. In respect of Module B of LAMP Phase 1A the CAA confirms that the operational aims and objectives have been achieved. No modification of the RNAV-1 arrival and departure designs are required by London City Airport except for the chart change and database coding change modification as discussed in paragraphs 55-57. The CAA's airspace change process in respect of London City Airport's airspace change request dated 16 February 2015 has now concluded.
108. Notwithstanding our overall conclusion, in view of the three differences of actual track dispersal from what was predicted as shown in consultation diagrams relating to:

- 1) Runway 09 CLN Departures, Segment 3 where the traffic pattern runs north of the predicted concentration pattern as shown in consultation;
- 2) Runway 09 DVR/EKNIV Departures, Segment 3 where the traffic pattern runs south of the predicted concentration pattern as shown in consultation;
- 3) Runway 27 BPK/CLN/EKNIV Departures, Segment 2 where the traffic pattern of departures is slightly wider than expected,

In each case we have concluded that the impacts are consistent with the anticipated impacts, however we recommend that the sponsor examine why this has occurred and to propose further action, if any.

Note on plain language

109. 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.** London City Airport Arrival and departure Track Analysis Assessment.
- Annex C.** General commentary on the sponsor's assessment of populations overflowed.
- Annex D.** CO₂ Emissions Summary.
- Annex E.** Complaints Analysis.

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

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 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 <u>directly comparable</u> 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-CO ₂ -Analysis Bridge-Population-Overview-Analysis For MORs regarding overloads, see Bridge-Safety-Confidential-MORs
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 routeing 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	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:

Source Material	Data Required	Remarks	Responsibility	Evidence
	those flights specifically routeing eastbound after CLN on the original SID routeing, and those routeing via (U)M84 to KONAN.			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

Source Material	Data Required	Remarks	Responsibility	Evidence
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
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	See note 2	NATS	No MORs were attributed to this scenario