



**All NATMAC Representatives  
Environmental Consultees**

20 February 2009

DAP/T/London City SIDs ACP/NATMAC

**CAA DECISION LETTER**

*Dean Kallagher,*

**INTRODUCTION OF REVISED LONDON CITY STANDARD INSTRUMENT DEPARTURE PROCEDURES**

**BACKGROUND**

1.1 In order to incorporate the changes required to conventional London City (LCY) Standard Instrument Departures (SID)s to meet the overall airspace re-design requirements of the NATS TC North airspace change project, during the development phase of this project, the NATS procedure design team had to re-design the conventional SIDs. This was necessary as the SIDs had originally been designed for Stolport operations and had not been updated by the operating authority when the airport commenced operations with Category C<sup>1</sup> (CAT C) aircraft; consequently, the existing SIDs do not meet the CAA and ICAO design criteria for CAT C operations. With the changes in airline fleet mix, CAT C operations now constitute 57% of LCY traffic. As part of the TC North development briefings, my Head of Controlled Airspace advised NATS that a re-design of conventional LCY SIDs to meet CAT C design criteria was required at the earliest opportunity and it was subsequently agreed that these re-designed SIDs should be incorporated within the TC North development project. The CAT C SID conventional designs were therefore incorporated into the NATS TC North proposals that were subject to the TC North consultation in 2008.

**INTRODUCTION**

1.2 Following on from the TC North consultation, with the ongoing NATS evaluation of the TC North consultation feedback and a potential lengthy delay to eventual implementation, I decided that the LCY SID changes to bring conventional

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<sup>1</sup> In order to cover a range of aeroplane speed and performance capabilities, instrument flight procedures can be tailored to one of 5 categories (Category A-E). These are defined using the certificated lowest speed an aircraft is capable of flying a final approach at its maximum landing mass. The SIDs for CAT C aircraft must be able to accommodate aircraft flying in the early part of the procedure up to 176 knots indicated airspeed, and thereafter up to 264 knots.

procedures up to CAT C design criteria could not be delayed any further; therefore, NATS was requested to submit a change proposal to bring the SID designs up to CAA and ICAO CAT C design requirements at the earliest opportunity.

- 1.3 In January 2009 the Directorate of Airspace Policy received a formal proposal from NATS En-route Limited (NERL) to revise LCY SID procedures. This change proposal regularises the existing conventional LCY SIDs and introduces minor changes to VOR radials and the additional use of the Bovington (BNN) and Biggin Hill (BIG) VORs to provide the navigational infrastructure required to permit the revised SIDs to be flown. Speed restrictions are also introduced to ensure that the aircraft track over the ground is as close as possible to those profiles actually being flown today. There is no change to controlled airspace with this change proposal. Whilst some delays in delivering the change proposal were encountered, NATS have sought a target implementation date of 7 May 2009 (AIRAC 5/2009).
- 1.4 At the request of the CAA, the Change Sponsor has therefore submitted a change proposal which ensures that the SIDs are fit for purpose for CAT C operations. There are no capacity and environmental benefits, and no benefits to NATS as such, except that some additional controller workload will be reduced by alleviating the need for additional radar monitoring to ensure that Rwy 28 SIDs via Clacton (CLN) and Detling (DET) VORs are separated from Rwy 28 ILS arrivals. Operationally, the re-design of these procedures will redress some inadequacies in the current SID designs.
- 1.5 The purpose of this letter is therefore to advise you of the proposal and my subsequent decision on it, based upon my statutory duties as set out in Section 70 of the Transport Act 2000 (the Act), the CAA (Air Navigation) Directions 2001, as varied in 2004 (the Directions), and Guidance to the CAA on Environmental Objectives relating to the Exercise of its Air Navigation Functions issued in 2002 by the then Department for Transport, Local Government and the Regions (the Guidance).
- 1.6 The CAA must exercise its air navigation functions so as to impose on providers of air traffic services the minimum restrictions that are consistent with the exercise of those functions.<sup>1</sup> Where there is a conflict between the application of the provisions, the CAA is given discretion to apply these in the manner it thinks reasonable having regard to the provisions as a whole.<sup>2</sup> In reaching a decision I have given careful consideration to whether the proposal is consistent with my statutory duties.

## **STATUTORY DUTIES**

### **2 Transport Act 2000**

#### **2.1 Safety**

- 2.1.1 My primary duty is to maintain a high standard of safety in the provision of air traffic services and this takes primacy over all other duties.<sup>3</sup> In this respect I am satisfied that the proposed SID re-design can be safely adopted. Operations to and from LCY Airport have increased since the Stolport opened towards the end of the 1980s. With the runway extension many years later, CAT C aircraft operations commenced, and whilst the airport operating authorities remain responsible for design of their respective instrument departure procedures, the SIDs were not re-designed until

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<sup>1</sup> Transport Act 2000, Section 70(4).

<sup>2</sup> Transport Act 2000, Section 70(3).

<sup>3</sup> Transport Act 2000, Section 70(1).

NATS incorporated revisions with the TC North development. This change proposal therefore meets CAA and ICAO design criteria and makes the SIDs fit for purpose for CAT C operations.

## 2.2 Airspace Efficiency

2.2.1 I am required to secure the most efficient use of the airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic.<sup>1</sup> I instructed that these SIDs be re-designed to meet CAA regulatory requirements. The revised designs will enable aircraft to be operated consistent with their operating manuals and this will in turn help prevent potential level-busts or speed exceedances. As such the airspace will be operated efficiently.

## 2.3 Airspace Users

2.3.1 I am required to satisfy the requirements of operators and owners of all classes of aircraft.<sup>2</sup> This proposal does not include any requirement for additional controlled airspace, and therefore there is no impact to Class G users. Airlines and business jet operators flying the SIDs from LCY will now be using SIDs optimised for CAT C operating profiles. Whilst there is a very small increase to track miles because of a potentially wider turn on departure, and the slight displacement to the north for the Rwy 28 SIDs via CLN and DET VORs due to the varying nature of how the conventional SIDs will be flown by different aircraft, it is not possible to quantify precisely what the differences are for each type, as some aircraft may fly the initial turns more tightly than others. Therefore, in this respect, this is regarded as a minor technical requirement and it is expected that the additional track mileage will be no more than the approximate figures shown below in Table 1. This should be the worst-case scenario and some operators may not experience the total mileage indicated due to the consequences of flying the procedures using conventional navigation techniques and also that vectoring can be initiated by ATC which will reduce the impact. On the SIDs via CLN and DET, this additional track mileage may not be encountered as controllers will radar vector aircraft in order to expedite the flow of departures and integrate departures with other arrivals throughout the LTMA.

**Table 1 – Approximate Additional Track Miles**

SID Designator	Additional Track Miles	
	Rwy 28	Rwy 10
BPK/CPT	0.5nms	2.1nms
DET/DVR/LYD/SAM	3.1nms	0.1nms
CLN	2.3nms	0.3nms

Notes:

1. Figures supplied by NATS.
2. Rwy 28 is used for approximately 64% of the time.

2.3.2 As the TC North development has been delayed, NATS consulted some of the airlines who operate with CAT C aircraft from LCY to ascertain whether the revised speed profiles of 200kts could be flown for the Rwy 28 BPK/CPT SIDs during the initial turns. The operators indicated that such procedures would be flyable. The remaining Rwy 28 SIDs via CLN and DET VORs, and all of the Rwy 10 SIDs have an initial speed limitation of 210kts, which is again designed to keep aircraft as close as possible to the existing tracks immediately after departure. Thus, the interests of the users of this airspace is enhanced by this change.

<sup>1</sup> Transport Act 2000, Section 70(2)(a).

<sup>2</sup> Transport Act 2000, Section 70(2)(b).

## 2.4 Interests of Other Parties.

- 2.4.1 I am required to take account of the interests of any person (other than an owner or operator of an aircraft) in relation to the use of any particular airspace or the use of airspace generally.<sup>1</sup> Under the TC North consultation, the Change Sponsor has consulted widely with local government authorities and non-governmental organisations whose areas of responsibility or interest lie beneath the revised tracks flown by aircraft following the revised minor alignments to the SIDs.
- 2.4.2 Although the TC North proposals (which included a significant change to the BPK/CPT profiles) are not being implemented with this change proposal, the existing BPK SIDs are being retained with minor modifications until such time that NATS progress with further proposals for the TC North development. With the exception of the further refinements to the BPK/CPT SIDs, details of these changes were highlighted in the TC North consultation. As a result of the requirement to re-design the SIDs to CAT C design criteria, in theory there is now a slightly different track over the ground compared with the existing profiles flown by BPK /CPT Rwy 28 and Rwy 10 SIDs. The remaining SIDs are modified in accordance with the conventional changes proposed with the TC North consultation. It should be noted that a wider first turn can mean that the existing radials adopted immediately after the first turn have to be different from those used today. Where the application of the design criteria has led to changes in route alignment the chosen options are those which, at the earliest opportunity, place the revised route back within the swathe within which aircraft fly today.
- 2.4.3 Although the precise SID track flown will vary due to the nature of flying conventional SIDs (normally flown manually, but some users may have such SIDs programmed into their Flight Management Systems (FMS)), there has nevertheless been a minor change to the profiles presented with the TC North consultation in respect of the Rwy 28 BPK/CPT SIDs; as a consequence there is a small area around Walthamstow where residents, who may not normally be currently overflown by the BPK/CPT Rwy 28 departures on a regular basis, may experience more regular over flight (anticipated altitude of approximately 3000ft). However, as there are occasional times when aircraft will currently overfly this area for a number of reasons, I have concluded that the potential overflight of parts of Walthamstow which are not currently regularly overflown is unavoidable, as there are no other alternatives to the re-design of these SIDs.
- 2.4.4 There have been public objections from the TC North consultation to aircraft overflying the local amenities of Victoria Park and Hackney Marshes, and indeed other communities around the vicinity of LCY airport, because of the close proximity to the airport itself and the fact that the initial departure flight paths are determined by CAA and ICAO SID design requirements. Notwithstanding this, I have concluded that there are no other practical alternatives to re-route BPK/CPT Rwy 28 departures and that overflight of these areas currently occurs with the existing SIDs. The change proposal provided evidence to indicate that there is a concentration of aircraft shown on the eastern side of the BPK/CPT Rwy 28 nominal track which indicates that Victoria Park is currently overflown. It also shows that the area of Victoria Park to the west of the nominal track is overflown on an irregular basis. As my prime concern is the safety of aircraft operations, in this particular case, whilst the objections were noted, I have determined that there are no other alternatives to re-route the SIDs away from these areas and that the areas are currently overflown.

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<sup>1</sup> Transport Act 2000, Section 70(2)(c).

## **2.5 Environmental Objectives and Impact**

2.5.1 In performing my statutory duties, I am obliged to take account of the Guidance provided by the Secretary of State. In considering this airspace change proposal and following a robust assessment of the proposal by my expert Environmental Research and Consultancy Department, I have determined that the evidence supporting the case for the re-design of the SIDs is based on a CAA regulatory requirement to ensure that the LCY SIDs are fit for purpose and meet CAT C design criteria. My detailed considerations of the environmental aspects of this proposal are covered in Section 3 below.

## **2.6 Integrated operation of ATS**

2.6.1 I am required to facilitate the integrated operation of air traffic services provided by or on behalf of the armed forces of the Crown and other air traffic services.<sup>1</sup> In this respect, the Ministry of Defence operations are not effected by this change.

## **2.7 National Security**

2.7.1 I am required to take into account the impact any airspace change may have upon matters of national security.<sup>2</sup> As there is no change to controlled airspace, national security requirements will not be jeopardised by this implementation.

## **2.8 International Obligations**

2.8.1 I am required to take into account any international obligations entered into by the UK and notified by the Secretary of State.<sup>3</sup> No new international obligations arise as a result of this change proposal.

2.8.2 The new airspace has been designed in accordance with national regulatory requirements and complies with ICAO Standards and recommended practices.

## **ENVIRONMENTAL CONSIDERATIONS**

### **3 General**

#### **3.1 Environmental Assessment Report**

3.1.1 The Environmental Research and Consultancy Department has delivered a comprehensive assessment of the environmental impact of this change. This concludes that:

- The airspace change is expected to result in a slight increase in population within the 57 dBA  $L_{eq}$  contour upon implementation. This means that it is likely that there will be an increase in the number of people highly potentially annoyed by aircraft noise if the airspace change is implemented.

- The impact of aircraft noise as represented by the SEL footprints is mixed. However, on balance it is expected that there will be an increase in number of people within the 90 dBA footprints, and this would be likely to result in an increase in the number of occurrences of sleep disturbances as a result of night flights using the new SIDs if LCY operated at night. (Night flights are typically defined as those

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<sup>1</sup> Transport Act 2000, Section 70(2)(e).

<sup>2</sup> Transport Act 2000, Section 70(2)(f).

<sup>3</sup> Transport Act 2000, Section 70(2)(g).

that occur between 2300 and 0700). It should however, be noted that LCY airport is closed overnight and that the opening hrs are M-F 0630-2200, Sat 0630-1230, Sun 1230-2200, PH 0900-2200 (all times local). Consequently, the impact is considered to be minimal.

- As noted in the report, the impact as depicted by the swathe diagrams can only be considered at a very broad level. The changes in the swathes, where they occur, generally illustrate a wider area beneath the swathes, though it is recognised that some areas will no longer be beneath the swathes. In very broad terms, we would conclude that on balance, a greater area will be beneath the six swathes as a result of the proposed new SIDs. This may mean that some residents experience an increase in overflights, and whilst not within the 57 dBA  $L_{eq}$  contour, they may nevertheless experience an increase in aircraft noise.
- The proposed changes to LCY SIDs are likely to result in a slight increase in CO<sub>2</sub> emissions from aircraft utilising the new SIDs, although the actual increases in track mileage ranges from 0.3 to 3.1 nms in the worst case and this may be offset, at least in part, by more efficient departure profiles enabling aircraft to climb at better flap/speed configuration.
- The impact upon LAQ at the airport and surrounding area is not expected to change significantly as a result of the proposed changes to SIDs.
- Impacts upon tranquillity, visual intrusion and biodiversity are unlikely to be significant, if they exist at all.
- Accepting that certain elements of the NATS analysis of the environmental elements of this airspace change present a worst-case impact, I would still conclude that there is no overall environmental benefit to be gained from the implementation of this proposal, however, the safety benefit must take precedence.

3.1.2 Overall, the change represents a redistribution of departing aircraft, and some residents will benefit from this whilst others are likely to experience an increase in noise and sightings. The numbers of those *most* affected are as detailed in the ERCD report at Enclosure 1.

## CONSULTATION

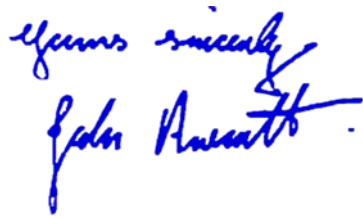
- 4.1 In accordance with the requirements of CAPs 724 and 725, under the auspices of the TC North consultation, the Change Sponsor consulted with affected airspace users and NATMAC bodies, plus non-aviation organisations, including all tiers of local government in the affected area down to parish level, and non-governmental organisations. The consultation was conducted by distribution of hard copies of the document and electronically via the NATS web site.
- 4.2 The original consultation period was extended from 13 weeks to 17 weeks. There were 117 responses relating to the SID design. A number of consultees (44%) raised objections on issues concerning noise, tranquillity, CO<sub>2</sub> emissions, and traffic growth, specifically over Victoria Park and Hackney Marshes. The objections concerning Victoria Park and Hackney Marshes were examined and conclusions reached as detailed in paragraph 2.4.4.

## REGULATORY DECISIONS

- 5.1 The LCY SIDs change proposal submitted by NERL is considered to be safe, which satisfies my principle statutory duty. Class G airspace users are not affected by this

proposal. Furthermore, the re-design of the SIDs will bring the SIDs up to the required design criteria stipulated by both the CAA and ICAO.

- 5.2 I consider the environmental impact of the changes has been mitigated to the greatest extent possible consistent with the safe operation of aircraft and the most efficient use of the airspace and does not confer significant detrimental environmental impacts upon the community as a whole.
- 5.3 Therefore, I am satisfied that the Change Sponsor has met safety (in particular the protection of public transport flights), efficiency and environmental requirements and I have decided to approve the introduction of this change proposal. The changes will take effect from 7 May 2008 (AIRAC 5/2009) and will be subject to operational review by members of my staff approximately 12 months after implementation.

A handwritten signature in blue ink, reading "Yours sincerely, John Arscott". The signature is written in a cursive style and is positioned to the left of a vertical red line.

J R D Arscott  
Director

Enclosure:

1. LCY SIDs Airspace Change Proposal - Environmental Report For DAP.

## London City SIDs Airspace Change Proposal - Environmental Report For DAP

### Introduction

1. This report describes the environmental considerations relevant to the proposed implementation of revised SIDs for London City Airport. The Airspace Change Proposal (ACP) has been submitted by NATS.
2. The report considers the environmental impact by comparing the current situation against the proposal. In some instances, the proposed design is the same as or so close to elements consulted upon in 2008 for TC North (TC N) that the previous analysis undertaken by NATS is still valid (e.g. SEL footprints for SIDs via CLN and DET). In other cases, the design and/or other elements are different such that new analysis has been undertaken by NATS (e.g.  $L_{eq}$  contours, SEL footprints for SIDs via BPK).

### Guidance to DAP

3. Guidance issued to the Civil Aviation Authority<sup>1</sup> sets out a framework within which DAP operates in discharging air navigation functions. This guidance states that changes to airspace arrangements should be made after consultation, only where it is clear that an overall environmental benefit will accrue or where airspace management considerations and the overriding need for safety allow for no practical alternative.

### Airspace Design

4. This report is based upon two key points:
  - That this ACP has been developed, proposed and delivered at the specific request of the CAA in order that the SIDs at London City Airport become compliant with accepted conventional design criteria;
  - That DAP is satisfied that there is no alternative design option other than that proposed by NATS, and that this also means there is no “do nothing” option.
5. For these reasons, this ERCD assessment of NATS environmental analysis has recognised that the environmental impact will not play a part in the final decision of whether or not to implement this proposal, but that an assessment is still required under CAP 725. The report ensures that all relevant environmental factors have been considered and assessed to an acceptable degree.
6. However, accepting that the environmental impact will not be a factor in the final decision, it was agreed with NATS that the analysis could portray a worst-case impact rather than undertake a more realistic (and therefore more detailed and costly) analysis. In simple terms, this means that whilst the two main environmental impacts (noise and

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<sup>1</sup> DTLR, Guidance to the Civil Aviation Authority on Environmental Objectives relating to its Air Navigation Functions, January 2002

CO<sub>2</sub> emissions) are likely to be negative, the analysis for both shows a negative impact that is likely to be greater than the actual impact.

7. The proposal document (paragraph 2.6) advises that this proposal has no environmental benefit. It is useful to note relevant paragraphs from NATS formal proposal document:

- Paragraph 2.6 - "This proposal has no environmental benefit. The objective of this proposal is to meet a DAP requirement to redesign all London City's existing SIDs so that they meet the design criteria. Where the design criteria require change to the SID design, a further objective is to ensure that the redesign follows common radar tracks over the ground (as observed today) as closely as is feasible. However, some deviation from today's radar tracks is required to ensure design compliance for all aircraft types which may use the procedures. This means that the proposal will change the areas that are regularly overflown."
- Paragraph 2.7 - "A redesign to meet the design criteria will also lengthen the published route, and therefore some aircraft may have additional route mileage."

8. NATS also explains in its proposal that the first turns on each of the proposed SIDs are as close as possible to existing aircraft tracks, whilst still being compliant with design criteria:

- Paragraph 2.10 - "All the proposed turns and radials have been designed with the intention of meeting the appropriate SID design criteria given fleet mix, whilst matching the common radar tracks as observed today as closely as possible."
- Paragraph 2.11 - "These criteria are limiting such that there is no option but to widen the radius of the first turn on the SID design."
- Paragraph 2.12 - "A wider first turn can mean that the existing radials adopted immediately after the first turn have to be different from those used today. Where the application of the design criteria has led to changes in route alignment the chosen options are those which place the revised route back within the swathe of where aircraft fly today at the earliest opportunity."

9. NATS has assumed that there will be no changes to the fleet mix using the airport in the five years following implementation. It has also stated that the change is not being made to facilitate growth over and above the level of growth already anticipated if the change were not implemented. No P-RNAV SIDs are being proposed at this time.

## **Noise**

10. The noise assessment for both the original TC N consultation and this proposal was prepared by ERCD as independent expert noise consultants. A summary of noise metrics is included in Appendix A.

### Comparison of L<sub>eq</sub> Contours

11. CAP 725 requires L<sub>eq</sub> contours to be prepared if the proposed airspace change results in changes to departure routes below 4,000 ft. As the 2008 fleet mix at the airport differs materially from that in 2006 (a large proportion of twin-turboprop aircraft replaced by BAe 146/Avro RJ aircraft), new L<sub>eq</sub> contours were produced to support this proposal. The impact of the proposed changes has been analysed by ERCD on behalf of NATS; the findings are summarised in Appendix B of this report.

12. As the summary shows, it is expected that approximately 1,600 more people will fall within the 57 dBA contour upon implementation; there are no other anticipated increases in affected population within any of the contours above 57 dBA, though a small decrease for the 60 dBA contour is noted.

13. Allowing for five years of traffic growth after implementation, the increase in population within the 57 dBA contour is approximately 8,850, and there will also be an increase in both the 60 dBA contour (approximately 1,100 people) and 63 dBA contour (approximately 1,050 people).

#### Comparison of SEL Footprints

14. CAP 725 requires SEL footprints to be prepared for both the noisiest and most frequent aircraft types if the proposed airspace includes changes to the distribution of flights at night below 7,000 ft and within 25 km of a runway.

15. After reviewing the changes proposed in this ACP and comparing them with the changes proposed in the original TC N consultation, it was concluded that there would be no difference between some of the SEL footprints produced previously for TC N and any that would be prepared for the latest proposal (i.e. for the SIDs via CLN and the SIDs via DET), therefore only selected SEL footprints have been updated specially for this airspace change (i.e. only those for the SIDs via BPK).

16. In the original TC N consultation, 80 dBA and 90 dBA SEL footprints were prepared for both the noisiest (BAe 146) and most frequent (large twin-turboprop) aircraft on each of the six new SIDs. These aircraft were selected on the basis of a 2006 traffic sample for London City. After reviewing a similar sample for 2008, it has emerged that the noisiest and most frequent aircraft using the airport is now the same aircraft - the BAe 146. Therefore, for this proposal, SEL footprints for only the BAe 146 have been considered.

17. The population counts for each footprint show differing impacts - some increases and some decreases. The results from the noise modelling are summarised at Appendix C.

18. Of all of the 90 dBA footprints, only those for runway 10 show any difference between pre- and post-implementation. The new SID via BPK from runway 10 shows a small decrease in the population, whilst the new SIDs via DET and CLN from runway 10 show a larger increase within the footprint.

19. Within the 80 dBA footprint, the impact is much more mixed. All of the SIDs from runway 28 show an increase in population within this footprint, whilst the same aircraft type using the SIDs from runway 10 results in a decrease in population within this footprint. The decreases in population for runway 10 SIDs are smaller than the increase for runway 28 SIDs.

20. The population counts on their own do not necessarily portray the full impact; the position of the footprint is also relevant, e.g. a small change in population count may obscure the fact that it is a different population that will be overflowed after implementation. Equally, knowing the expected frequency of each type of aircraft aids understanding of the noise impact.

#### Comparison of Swathes

21. Swathe diagrams have been produced for this proposal to illustrate the anticipated areas that aircraft on the new SIDs will be overflying, and their minimum heights. These swathes are not required under CAP 725 and are not accompanied by details of the population or area beneath each swathe. Without this information, no judgement can be

made whether more or less people will be overflown as a result of the proposed changes. The only assessment that these swathes allow is a very broad and general comparison between the areas currently overflown by the SIDs, and the areas that are most likely to be overflown if the new SIDs are implemented.

22. In general terms, the new SIDs have been designed to match the existing distribution of air traffic as closely as possible whilst still complying with design criteria. This should result in minimising the impact of the change in terms of where aircraft overfly.

23. Key aspects of the swathes are worth noting based on NATS description of the diagrams:

- The swathes have the aim of showing where aircraft are likely to change their flight path as a result of the proposed changes.
- The swathes represent the areas where aircraft that are contained within a specified traffic flow might be seen on a regular basis, as identified by operational experts on the basis of observed track data.
- The swathes are then further refined to illustrate the narrower areas in which aircraft are most likely to be during normal operations e.g. when traffic is busy, compared with the wider swathe which represents the wider distribution of aircraft during “off-peak” periods. The majority of traffic will be during normal operations.

24. Figure 1 (page 23) in the main Airspace Change Proposal document illustrates an area the south-eastern part of Walthamstow that represents the area that is potentially newly overflown based upon the swathes. It is identified as the only area that:

- Is not currently overflown; **and**
- Was not shown as being overflown by the proposals in the TC N consultation; **and**
- Is shown as being beneath the swathe for the flights departing Runway 28 in the submitted Airspace Change Proposal.

25. However, if a direct comparison is made between current swathes and the proposed swathes in the ACP, there are further areas that will be newly overflown, particularly on the wider swathes associated with the initial turns for the new SIDs.

26. Comparing each of the six SIDs in turn, the following observations were made about the current swathe and the proposed swathe.

#### 27. SID via BPK from Runway 28

- The first turn will become wider, thereby extending the swathe over parts of Shoreditch, Bethnal Green, Hackney and Leyton.
- The second turn, towards BPK, will occur further north, thereby moving the swathe so that it will no longer be above parts of Barkingside, Woodford Bridge and Wanstead.
- The proposed swathe shows aircraft achieving 2000 ft earlier than currently.
- There is no difference between the current and proposed swathes north of Woodford.

#### 28. SID via BPK from Runway 10

- The first turn will become wider, thereby extending the swathe over parts of Dagenham, Becontree and Seven Kings.

- The proposed swathe shows aircraft achieving 2000 ft and 3000 ft earlier than currently.
- There is no difference between the current and proposed swathes north of Barkingside.

#### 29. SID via CLN from Runway 28

- The first turn will become wider, thereby extending the swathe over parts of Shoreditch, Bethnal Green, Hackney and Leyton.
- The wider turn means that the swathe no longer sits above areas of East Ham, Barking and Becontree.
- The portion of the swathe representing traffic at 2000-3000 ft will be shifted further north, over areas of Barkingside, Seven Kings and Romford. These areas are already beneath the current swathe, but only that part of the swathe representing aircraft over 4000 ft.
- There is no difference between the current and proposed swathes east of Brentwood.

#### 30. SID via CLN from Runway 10

- The difference between the current and proposed swathe are minor, largely because the only change to the SID is a wider first turn. The result is a small extension of the proposed swathe further over Dagenham. In all other respects, the two swathes are the same.

#### 31. SID via DET from Runway 28

- Due to the wider first turn, the proposed SID extends further north-east than the current SID. This has the result of extending the swathe northwards, such that it will be over a number of areas such as Barkingside, Harold Hill Collier Row, Gidea Park, Great Warley, Brook Street and Herongate. This is the only change to the extent of the swathe.
- The proposed swathe shows aircraft achieving 2000 ft earlier than currently.

#### 32. SID via DET from Runway 10

- There is no change to the extent of the swathe.
- The proposed swathe shows aircraft achieving 2000 ft and 3000 ft earlier than currently.

### **Emissions**

33. NATS has used its own in-house emissions model (KERMIT) to assess the impact on both fuel burn and CO<sub>2</sub> emissions. A factor of 3.18 has been used to convert the volume of fuel burned to the volume of CO<sub>2</sub> emitted. KERMIT derives performance data from BADA 3.6, and models flight profiles designed by NATS' ATC experts.

34. Due to the particular characteristics of this proposal (as set out above in paragraph 4) it was agreed with NATS that a reasonable approach for assessing emissions would be to use a number of assumptions that would result in a "worst case" emission impact. The three key assumptions that have been made when modelling the CO<sub>2</sub> emissions are:

- Only one aircraft type was used for the modelling - the one that is the least fuel-efficient. From the various aircraft that use London City airport, the RJ85 was selected as it has the highest rate of fuel consumption below 7,000 ft. A more realistic assessment would have used a fleet mix that represented the traffic at the airport.
- Lateral profiles - the centre line of each SID has been assumed to be the route used by all aircraft. This is likely to maximise any increase in track mileage as it is more likely that aircraft will be vectored off the SID by ATC once it is safe to do so, with the expectation that this will result in a more direct route than if the aircraft had stayed on the SID.
- Vertical profiles - the minimum climb gradients for each SID have been used for the modelling. In reality, aircraft are more likely to climb at steeper gradients, thereby burning less fuel by achieving higher altitudes sooner.

35. The emissions assessment only considers the portion of a flight profile that will be affected by the proposed change (i.e. not the entire flight from gate to gate), and therefore any percentage changes should be viewed in that context.

36. Based on these assumptions, and accepting that this results in an impact that is likely to be worse than reality, the total annual increase in CO<sub>2</sub> emissions for a year are estimated to be:

- Approximately 7,100 tonnes in 2009, upon implementation
- Approximately 8,700 tonnes in 2014 using NATS traffic forecasts

[This airspace change will not enable or facilitate traffic growth over and above expected traffic growth if the change were not implemented.]

37. The figures above assume traffic growth based upon NATS' central case forecasts. The proposal also included high case traffic forecasts, and if these were applied instead, the estimated annual increase in CO<sub>2</sub> emissions would become:

- Approximately 7,600 tonnes in 2009, upon implementation
- Approximately 11,300 tonnes in 2014 using NATS traffic forecasts

38. Regardless of whether central case or high case forecasts are used, these results represent an increase of 6.7% in total annual CO<sub>2</sub> emissions for that portion of the flight affected by the change.

39. However, even accepting that this assessment presents a worst-case impact, even if more realistic assumptions were to be made, it is still likely that there would be a negative CO<sub>2</sub> emissions impact as a result of the additional track mileage. It is expected that this negative impact would be much less than the worst-case impact because, based upon track dispersal maps produced by NATS, current day traffic is already flying within swathes that are closely matched to the proposed swathes.

## **Local Air Quality**

40. An assessment of the expected impact upon local air quality (LAQ) at London City Airport and surrounding area was undertaken by consultants (Envisa) on behalf of NATS for the TC N consultation undertaken in 2008. Its findings and assumptions were based upon the designs presented for consultation at that time.

41. Neither the TC N airspace change nor the current change to the SIDs were proposed in order to increase the air traffic at the airport, and no increase in air traffic over and above normal growth is anticipated if the current change is implemented. Therefore, the LAQ assessment only considered the impact of changes to the SIDs.

42. The report modelled the impact of one of the proposed new SIDs, based on 2006 fleet mix and weather conditions. The impact upon LAQ of this change was found to be negligible. (The airport itself is not within an Air Quality Management Area.)

43. Further work by NATS shows that extrapolation of this result to all six proposed SIDs is also likely to have an insignificant impact upon LAQ. Recognising that some aspects of the TC N design have been changed for this proposal, we still consider that key elements of the LAQ report are valid, to the extent that its findings are also still valid - but also accepting the specific characteristics of this proposal previously explained in paragraph 4 above.

### **Tranquillity and Visual Intrusion**

44. The new SIDs do not take aircraft over any AONBs or National Parks. The SIDs are within existing controlled airspace, and will take aircraft over densely-populated urban areas that are already overflown to varying degrees by aircraft. Therefore, issues of tranquillity and visual intrusion are unlikely to be issues for this airspace change.

### **Biodiversity**

45. It is not considered likely that there will be any direct effect on biodiversity as the result of this airspace change. However, this does not exclude the possible impact upon biodiversity as a result of global climate change that may be contributed to by growth in aviation; consideration of these second order effects is beyond the scope of this report.

### **Continuous Descent Approaches (CDAs)**

46. CDAs are not relevant for this proposal as the changes will only affect departing aircraft.

### **Consultation Responses**

47. For the reasons set out in paragraph 4 of this report, consultation responses (from the TC N consultation, relating to London City airport) have not been reviewed in order to gauge to what extent environmental issues were raised or subsequently addressed in the current proposal. However, as noted earlier in this report, NATS advises in its proposal that it has tried to ensure that the new SIDs are as close to current flight paths whilst still ensuring that they meet design criteria.

### **Conclusions**

48. The airspace change is expected to result in an increase in population within the 57 dBA  $L_{eq}$  contour upon implementation. This means that it is likely that there will be an increase in the number of people highly annoyed by aircraft noise if the airspace change is implemented.

49. The impact of aircraft noise as represented by the SEL footprints is mixed. However, on balance it is expected that there will be an increase in number of people within the 90 dBA footprints, and this is likely to result in an increase in the number of occurrences of sleep disturbance as a result of night flights (if any) using the new SIDs. Night flights are typically defined as those that occur between 2300 and 0700.

50. As noted in the report, the impact as depicted by the swathe diagrams can only be considered at a very broad level. The changes in the swathes, where they occur, generally illustrate a wider area beneath the swathes, though it is recognised that some areas will no longer be beneath the swathes. In very broad terms, we would conclude that on balance, a greater area will be beneath the six swathes as a result of the proposed new SIDs. This may mean that some residents experience an increase in overflights, and whilst not within the 57 dBA  $L_{eq}$  contour, they may nevertheless experience an increase in aircraft noise.

51. The proposed changes to London City SIDs are likely to result in an increase in CO<sub>2</sub> emissions from aircraft utilising the new SIDs.

52. The impact upon LAQ at the airport and surrounding area is not expected to be significant as a result of the proposed changes to SIDs.

53. Impacts upon tranquillity, visual intrusion and biodiversity are unlikely to be significant, if they exist at all.

54. Accepting that certain elements of the NATS analysis of the environmental elements of this airspace change present a worst-case impact, we would still conclude that there is no environmental benefit to be gained from the implementation of this proposal.

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4 February 2009

## Appendix A

### Noise Metrics - additional information extracted from CAP 725.

#### L<sub>eq</sub> (Equivalent continuous sound level)

In order to assess environmental noise exposure, it is necessary to consider and take into account the impact of many events over longer periods - days, months, years - living near an airport. These events will generally differ in magnitude; there will be different numbers in each hour or day; and they will occur at different times of day. Most indices for these assessments are L<sub>eq</sub> - based. Equivalent continuous sound level or L<sub>eq</sub> is defined as the level of hypothetical steady sound which, over the measurement period, would contain the same (frequency-weighted) sound energy as the actual variable sound.

The most commonly used method of portraying aircraft noise impact in the UK is the L<sub>eq</sub> noise exposure contour. Noise exposure contours show a set of closed curves on a map. Each contour shows places where people get the same amounts of noise energy - L<sub>eq</sub> - from aircraft (the 'eq' subscript is an abbreviation of the word equivalent i.e. L<sub>eq</sub> is the equivalent continuous sound level). They are analogous to the contours on an ordinary map showing places at the same height. Noise exposure is generally used to indicate the noise environment averaged over some time interval.

Research has indicated that L<sub>eq</sub> is a good predictor of a community's disturbance from aircraft noise. L<sub>eq</sub> is measured in a unit called dBA, where dB means 'decibel' and the A suffix means A-weighted (which matches the frequency response of the human ear).

#### L<sub>max</sub> (Maximum sound level)

The simplest measure of a noise event such as the overflight of an aircraft is L<sub>max</sub>, the maximum sound level recorded. Diagrams portraying L<sub>max</sub> for specific aircraft types at a number of locations at ground level beneath the airspace under consideration may be helpful in describing the impact on individuals.

#### SEL (Sound Exposure Level)

The sound exposure level (SEL) of an aircraft noise event is the sound level, in dBA, of a one second burst of steady noise that contains the same total A-weighted sound energy as the whole event. In other words, it is the dBA value that would be measured if the entire event energy were compressed into a constant sound level for one second.

SEL footprints show the extent of noise energy generated from a single aircraft event, for example, an aircraft either taking off or landing (in contrast to the summing of events in noise exposure). This footprint shows a contour of equal SEL values. Thus, a 90 dBA SEL footprint shows the area in which SEL values are greater than (or equal to) 90 dBA. These footprints are useful in evaluating options by identifying the relative contribution of different aircraft types, routes and operating procedures on the total noise impact.

Footprints are particularly useful in portraying the impact of aircraft movements at night on sleep disturbance. Research has shown that residents tend to be awoken by the noise levels in a single noise event, as measured by SEL, rather than by an aggregation of noise events, as measured by L<sub>eq</sub>.

## Appendix B

### L<sub>eq</sub> Contours - Summary

Contour (dBA)	2009 - Current Design			2009 - Proposed Design						2014 - Proposed Design					
	Area (Km <sup>2</sup> )	Population	Households	Area (Km <sup>2</sup> )	Increase on 2009 current	Population	Increase on 2009 current	Households	Increase on 2009 current	Area (Km <sup>2</sup> )	Increase on 2009 current	Population	Increase on 2009 current	Households	Increase on 2009 current
57	7.2	17,300	8,100	7.2	0	18,900	1,600	8,800	700	8.6	1.4	26,150	8,850	12,200	4,100
60	3.7	4,800	2,250	3.7	0	4,700	(100)	2,250	0	4.5	0.8	5,900	1,100	2,850	600
63	1.8	1,150	600	1.8	0	1,150	0	600	0	2.2	0.4	2,200	1,050	1,000	400
66	1.0	<50	<50	1.0	0	<50	0	<50	0	1.2	0.2	<50	0	<50	0
69	0.6	<50	<50	0.6	0	<50	0	<50	0	0.7	0.1	<50	0	<50	0
72	0.3	<50	<50	0.3	0	<50	0	<50	0	0.4	0.1	<50	0	<50	0

### L<sub>eq</sub> Contours - Area

Contour (dBA)	2009 - Current Design		2009 - Proposed Design		2014 - Proposed Design			
	Area (Km <sup>2</sup> )		Area (Km <sup>2</sup> )	Increase on 2009 current	Increase (%)	Area (Km <sup>2</sup> )	Increase on 2009 current	Increase (%)
57	7.2		7.2	0	0	8.6	1.4	19
60	3.7		3.7	0	0	4.5	0.8	22
63	1.8		1.8	0	0	2.2	0.4	22
66	1.0		1.0	0	0	1.2	0.2	20
69	0.6		0.6	0	0	0.7	0.1	17
72	0.3		0.3	0	0	0.4	0.1	33

### L<sub>eq</sub> Contours - Population

Contour (dBA)	2009 - Current Design	2009 - Proposed Design			2014 - Proposed Design		
	Population	Population	Increase on 2009 current	Increase (%)	Population	Increase on 2009 current	Increase (%)
57	17,300	18,900	1,600	9	26,150	8,850	51
60	4,800	4,700	(100)	-2	5,900	1,100	23
63	1,150	1,150	0	0	2,200	1,050	91
66	<50	<50	0	0	<50	0	0
69	<50	<50	0	0	<50	0	0
72	<50	<50	0	0	<50	0	0

### L<sub>eq</sub> Contours - Households

Contour (dBA)	2009- Current Design	2009 - Proposed Design			2014 - Proposed Design		
	Households	Households	Increase on 2009 current	Increase (%)	Households	Increase on 2009 current	Increase (%)
57	8,100	8,800	700	9	12,200	4,100	51
60	2,250	2,250	0	0	2,850	600	27
63	600	600	0	0	1,000	400	67
66	<50	<50	0	0	<50	0	0
69	<50	<50	0	0	<50	0	0
72	<50	<50	0	0	<50	0	0

## Appendix C

### SEL Footprints - Summary

New SID	Runway	Aircraft	SEL Footprint (dBA)	Population Increase *	Population Increase (%)
Via BPK (replacing current BPK)	10	BAe 146	80	(5,000)	-11
			90	(500)	-15
	28		80	17,500	24
	90		0	0	
Via BPK (replacing current CPT)	10	BAe 146	80	(4,500)	-10
			90	(500)	-12
	28		80	7,000	8
	90		0	-5	
Via DET	10	BAe 146	80	(5,000)	-10
			90	2,500	7
	28		80	16,500	22
	90		0	0	
Via CLN	10	BAe 146	80	(3,500)	-8
			90	2,500	7
	28		80	17,500	23
	90		0	0	

\*Headcount for population has been rounded to the nearest 500, whilst the percentage increase/decrease reflects the unrounded difference.

LTT = Large Twin-Turboprop