LONDON SOUTHEND AIRPORT

AIRSPACE CHANGE PROPOSAL

Introduction of Standard Instrument Departure Procedures
to Routes in The London Terminal Control Area –
Sponsor Consultation - 2016

Part A

Introduction and Background Information

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1. Introduction and background

1.1. Consultees may recall that in 2013 London Southend Airport (LSA) carried out a consultation about the proposed re-introduction of controlled airspace in the vicinity of LSA to enhance the safety and efficiency of the airspace arrangements for passenger carrying Commercial Air Transport (CAT) and for other flights in the vicinity of the Airport.

1.2. The Airspace Change Proposal (ACP) for that project was submitted to the CAA in May 2014. The CAA approved the ACP on 30 January 2015 and implementation of the controlled airspace took place on 2 April 2015.

1.3. In the previous consultation we were not able to include comprehensive details of the formal Standard Instrument Departure (SID) procedures that would need to be introduced because of the pending major changes to the route structure and airspace management arrangements in the south-eastern part of the London Terminal Control Area (LTMA). These changes were being developed by NATS in a major airspace project known as the London Area Management Programme (LAMP)[1] Phase 1a.

1.4. At the time of the development of the LSA controlled airspace proposals the NATS-proposed LAMP airspace configuration and arrangements were not mature. Whilst NATS and LSA were working closely together on developing the future airspace arrangements in the LTMA for LSA arriving and departing traffic, the timetables for the two projects were not compatible for a co-incident implementation of controlled airspace at LSA and the LAMP LTMA changes. Instead, with the agreement of the CAA, it was concluded that, as an interim measure, the existing Preferred Departure Routes (PDRs) from LSA that had been in place for many years should remain in place, albeit they were not in accordance with current CAA policies, until such time as the LAMP Phase 1a route structure within the LTMA had been finalised and an implementation schedule established. The differences between SIDs and PDRs are explained later in this document.

1.5. The airspace and route structure arrangements for NATS LAMP Phase 1a have now been approved by the CAA and were implemented on 4 February 2016. A number of separate consultations[2] were carried out by NATS itself and by other LTMA Airports to enable the implementation of LAMP Phase 1a.

[1] The LAMP is a major airspace change project to be implemented over a number of years to meet the objectives of the CAA's Future Airspace Strategy (FAS). Phase 1a of LAMP involves changes to the way aircraft inbound to London City, London Southend and Biggin Hill Airports are handled and includes changes to departure procedures from London City Airport, London Southend Airport, London Stansted Airport and Biggin Hill Airport. Information about NATS LAMP project, including outcome of the NATS consultation, can be found at www.londonairspaceconsultation.co.uk and information about the FAS can be found at www.caa.co.uk/fas.

[2] Under arrangements agreed between the CAA, NATS and the partner Airports to the LAMP project, NATS assumed responsibility for consultation on changes to procedures and airspace arrangements above 7000ft, the Airports assumed responsibility for changes below 4000ft and changes between 4000ft and 7000ft were handled jointly.

1.6. **This consultation** is being conducted by LSA and is about the adaptation of the existing departure procedures from LSA for designation as formal SID procedures which are compatible with the new airspace management arrangements in the LTMA established for the LAMP Phase 1a as well as with the overarching CAA Policies. The SIDs must reflect current CAA Policy for Performance-Based Navigation[3] (PBN) and CAA Policies for the design of departure procedures. Their introduction must be carried out under the CAA arrangements for airspace change. The CAA has specified that formal SID procedures from LSA should be introduced as soon as practicable after the implementation of LAMP Phase 1a; retaining the PDRs for any period beyond the minimum is not an option from a Regulatory perspective.

1.7. The introduction of SID procedures is to regularise the Air Traffic Management (ATM) and regulatory arrangements. It is emphasised that it is not being done for the purposes of attracting growth in CAT operations at LSA over and above that which is already approved by the Local Planning Authorities under a Section 106 Agreement.

1.8. Finally, it is appropriate at this stage to summarise what is **not** included in the scope of this consultation. This consultation is not about:

- The requirement to introduce SIDs - the CAA requires LSA to change the historic PDRs to SIDs as the PDRs no longer reflect current policies;
- The criteria used to design the SIDs - the CAA requires all SID procedures to be designed in accordance with ICAO PANS-OPS (see Section 2);
- The change to the airspace arrangements that were recently introduced in the LTMA for LAMP Phase 1a - these changes were the subject of extensive consultation by NATS and the airports affected and have been approved by the CAA;
- Future growth of LSA - the introduction of SIDs does not affect the already approved plans for growth of LSA.
- Government Airports Policy.

Any comments in your responses which are about these aspects will be noted but discounted from the analysis.

[3] Performance-Based Navigation is the broad term used to describe the technologies that allow aircraft to fly flexible, accurate, repeatable, 3-dimensional flight paths using on-board equipment and capabilities. Further details of PBN concepts and UK CAA Policy can be found at www.caa.co.uk/pbn

2. What are SID procedures?

2.1. SID procedures are designated Instrument Flight Procedure (IFP) departure routes linking an aerodrome, or a specified runway at an aerodrome, with a specified significant point, normally on a designated Air Traffic Service (ATS) Route at which the en-route phase of flight commences. *(ICAO definition.)*

2.2. They are distributed for aviation use in the UK Integrated Aeronautical Information Package (UK AIP), which is a document published by the CAA[4] in accordance with International Standards and which contains all of the aeronautical information relevant to aircraft operations in UK airspace and at UK airports.

2.3. The purpose of a SID is to:

- Provide a standardised Air Traffic Control (ATC) clearance which provides a link between the aerodrome and/or departure runway and the en-route (or "Network") ATS System[5], which is compatible with both the Network ATM System and the Airport ATM system and which enables reduced inter-ATC Unit co-ordination;
- Ensure adequate clearance from obstacles in the departure path;
- Reflect the Noise Abatement requirements of the Airport Operator;
- Provide a pre-determined flight procedure in graphical and text format so that pilots can brief themselves in advance on the route and altitudes to be followed after departure.

2.4. In promulgating SIDs, complex departure instructions can be simplified, potential misinterpretations can be avoided and Radio-Telephony (RTF) loading can be reduced.

2.5. It is incumbent on the procedure designer[6] to ensure that the procedures:

- **Are safe to fly** by each of the aircraft categories required to use them;
- **Meet the ATS requirement** for the safe integration and separation of aircraft on closely spaced routes in complex terminal airspace;
- **Meet the environmental requirements** of the Airport Operator as closely as practicable.

[4] Civil Aviation Publication (CAP) 32

[5] Generally known as "Airways"

[6] In the UK SID procedures must be designed by qualified procedure designers who have been approved by the CAA.

2.6. There are always likely to be conflicts between the competing ATM and environmental considerations. ATS providers, aerodrome operators, aircraft operators and procedure designers work closely together to derive the best possible compromise whilst still satisfying the procedure design requirements. The safety of the operation of the aircraft and the ATM system is paramount and must be demonstrated at all times.

2.7. The CAA requires that all SID procedures be designed in accordance with international criteria for the design of Instrument and Visual Flight Procedures[7] together with any "Differences" that the CAA has notified[8]. The CAA has published its requirements in CAP778[9] and CAP785[10] and a number of other recent Policy Statements.

2.8. The "PANS-OPS" document describes the various technical parameters for designing the procedure, including atmospheric conditions (based on the International Standard Atmosphere (ISA)), nominal procedure design speeds, nominal turn radii, minimum and nominal climb rates, etc). Thus the procedure design provides a "nominal ground track" appropriate to the specified set of parameters against which obstacle clearance can be assessed. However, "on the day" there will be many variables which may result in aircraft actually following a slightly different flight path to the "nominal ground track" of the procedure, but within the safety parameters for obstacle clearance. For example:

- The actual atmospheric conditions are seldom, if ever, precisely the same as those of the ISA used for the procedure design. Temperature, pressure, wind speed and direction, and the rate at which they change with altitude, are all variables which affect aircraft climbing and turning performance.

- Most aircraft will actually fly at different speeds, both through the air and across the ground, from those used for the nominal procedure design and will have slightly different turn radii and different climb performances at different weights and atmospheric conditions, and so will fly slightly different (albeit within accepted tolerances) actual ground tracks. Aircraft configuration (e.g. flaps up or flaps down) will also affect the climbing and turning performance of the aircraft.

- The procedure design criteria must always reflect the "worst possible case" in aircraft performance and navigation to protect aircraft from obstacle hazards. Usually, on a day-to-day basis, all aircraft have a considerably better actual

[7] ICAO Document 8168 Volume 2: Procedures for Air Navigation Services - Aircraft Operations: *Construction of Instrument and Visual Flight Procedures* (known as "PANS-OPS")

[8] For example, the UK specifies that after take-off no turn may be commenced below 500ft above aerodrome level (aal), whereas PANS-OPS permits turns to be commenced at 394ft aal.

[9] CAP778: *Policy and Guidance for the Design and Operation of Departure Procedures in UK Airspace*.

[10] CAP785: *Approval Requirements for Instrument Flight Procedures for Use in UK Airspace*.

performance (for example, climbing performance or turning performance) than is reflected in the procedure design criteria, but the design parameters provide for the continued safe operation of the aircraft when a combination of adverse circumstances affect the aircraft.

Thus there will always be dispersion, or a “swathe”, on either side of the nominal procedure design track in which aircraft can be legitimately expected to fly whilst retaining adequate protection from obstacles or other airspace hazards.

2.9. However, using modern aircraft navigation systems and the PBN principles, and provided that procedure design parameters selected are compatible with the performance capabilities of the aircraft using them and provided that the procedures have been designed in accordance with PANS-OPS, then the capabilities of the aircraft navigation system will be able to compensate for many of the variables and enable the aircraft to adhere to the nominal flight path more accurately than was historically the case with conventional navigation techniques.

2.10. As well as describing a route, a SID procedure also includes the vertical profile that the aircraft is required to fly. The vertical profile can be expressed in terms of a minimum climb gradient (for obstacle clearance or ATM requirements) or in terms of minimum or maximum altitudes at specific points along the route (to ensure that the aircraft remains within controlled airspace and is vertically separated from the many other crossing routes in the area). It must specify an upper limit for the procedure. However, once the aircraft is under the control of a Radar Controller after take-off, he/she can instruct the aircraft to climb above the specified levels to achieve safe tactical “real-time” integration of the departing aircraft with other flights and to get the aircraft climbing as quickly as possible to its ultimate cruising level.

3. How do SIDs differ from the existing procedures?

3.1. Historically, SIDs were only applicable to airports that were inside controlled airspace and linked directly to the terminal airspace route structure.

3.2. However, there have been for many years, a number of airports outside controlled airspace (LSA at the time being one of them) that had an ATM requirement for departing aircraft to access the Terminal Control Area (TMA) airspace in a structured manner to simplify the ATM interface arrangements between the Airport ATC Unit and the Area Control ATC Unit, in this case London Terminal Control (LTC). The term Preferred Departure Route (PDR)[11] was introduced by the CAA some 30 years ago for this purpose to clearly differentiate (to pilots) these "outside controlled airspace" procedures from formal "inside controlled airspace" SID procedures.

3.3. PDRs, in general terms took due regard of the SID design techniques that were then in place (although those SID design techniques at the time did not reflect the PANS-OPS procedure design criteria in use today). Whilst entirely safe and suitable for the navigation techniques then in use, the requirements for the design of procedures which are suitable for modern Flight Management Systems (FMS) and RNAV operations are much less flexible.

3.4. However, the principle difference between PDRs and SIDs was that PDRs did not specify, in navigational terms, any particular tracks to be followed whereas SIDs specify tracks to be flown in relation to navigation facilities. (Being procedures outside controlled airspace pilots were required to keep a good lookout and avoid other aircraft not known to ATC; therefore it was considered inappropriate to specify tracks in PDRs that the pilot may not be able to adhere to.) SIDs also fully incorporate the Airport Noise Abatement Procedures whereas PDRs did not. SIDs also, in some cases where necessary, include speed limits to constrain the radius of turn where this is critical, whereas PDRs do not include speed limits as the tracks across the ground are not specified.

3.5. Controlled airspace was introduced around LSA in April 2015 and provides linkage to the overlying LTMA. Thus there is a requirement that the PDRs in place at LSA are redesigned in accordance with the current IFP design criteria applicable to SIDs and the regulatory arrangements now in place for controlled airspace procedures.

3.6. The maturation and recent implementation of the NATS LAMP Phase 1a airspace arrangements allows LSA to make the transition from historic PDRs to formal SID procedures that are compliant with the current regulations and criteria.

3.7. Within the context of the changes to the route structure within the LTMA, the stringency of the modern procedure design criteria and the changes to the regulatory background, we have endeavoured, as far as is practical, to replicate the

[11] Some other terms were also used such as "Standard Departure Route" (SDR).

nominal flight paths historically flown by aircraft departing from LSA on the PDRs to access the Airways System. Nonetheless, some changes to flight paths do arise and these are explained in detail in **Part B** of the Consultation Document.

4. What is RNAV?

4.1. RNAV stands for aRea NAVigation. It is a navigation technique which uses the modern on-board navigation technology in the aircraft (the FMS) to take navigation data from a number of internal and external navigation sources (for example, ground-based and space-based[12] navigation systems, on-board Inertial Reference Systems (IRS)), to work out where the aircraft is, where it needs to go to, and what it needs to do to follow the specified flight path.

4.2. RNAV has essentially replaced the "old fashioned" navigation methodology (known as conventional navigation) whereby routes were defined by tracks aligned between a network of ground-based navigational beacons.

4.3. RNAV allows routes to be defined which are no longer aligned to ground-based navigation beacons but instead are tracks between "points in space". This enables the ATM route structure to be designed more flexibly and efficiently and is an essential feature of both the FAS and the LAMP.

4.4. Furthermore, some levels of aircraft RNAV equipage allow a more precise level of navigational accuracy which, in turn, allows ATS routes to be placed much closer to each other, thereby increasing the overall airspace capacity.

4.5. ICAO, under its Future Air Traffic Management Concept and ICAO Assembly Resolution A.37-11; the European Commission, under its Single European Sky Air Traffic Management Research (SESAR) Programme and the UK's FAS and PBN Policies specify that RNAV-1 should be the minimum navigation Standard for operations in terminal airspace.

4.6. RNAV-1 refers to a comprehensive navigation specification which includes a requirement (amongst other system performance requirements) for a "worst-case" ±1NM lateral navigation tolerance. (The lateral navigation accuracy is not the only performance criterion specified. The Standard also covers aircraft navigation system functionality and integrity requirements and flight crew training.) In reality, aircraft approved for RNAV-1 operations will consistently achieve an actual navigation performance much better than ±1NM. Recent experience of RNAV-1 operations elsewhere indicates consistent achieved navigation performance close to ±0.1NM.

4.7. Whilst the majority of modern airliners are suitably equipped and approved for RNAV-1 (or better) operations in terminal airspace, a few operators using legacy aircraft types are not. In December 2014 the CAA published[13] a mandate for all Instrument Flight Rules (IFR) General Air Traffic (GAT) aircraft using the London

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[12] Space-based navigation satellites are known as Global Navigation Satellite Systems (GNSS), of which the best known system is the Global Positioning System (GPS).

[13] UK Aeronautical Information Circular (AIC) Y092/2014

Area Airports to be equipped and operators to be approved for RNAV-1 operations by 9 November 2017.

4.8. In the meantime, whilst the FAS and PBN Policies require all new terminal airspace procedures to be designed as RNAV procedures, the CAA allows the retention of non-RNAV (conventional) procedures, where necessary, for use by aircraft and aircraft operators that are not approved for RNAV-1 operations.[14]

4.9. In the initial stages of the development of the controlled airspace proposal, LSA carried out a survey of the equipage and approval status of CAT aircraft operators using LSA. It was established that most were, or would be by 2015, equipped and approved for RNAV-1 (or better) operations in European terminal airspace.

4.10. **Therefore LSA proposes to introduce RNAV-1 SIDs only**. **Conventional navigation SID procedures will not be introduced**[15].

4.11. Any non-RNAV-1 aircraft using LSA and requiring to access the Terminal and Network ATM system (for which RNAV-5 capability is already mandated) will be issued with individual ATC clearances specifying the routes to be followed after compliance with the Noise Abatement Procedures (NAPs) and Omni-Directional Departure[16] (ODD) obstacle clearance requirements, normally using radar direction and/or radar monitoring. This is the same as is currently provided for aircraft which cannot, for whatever reason, comply with the existing PDRs.

4.12. Designing RNAV Routes

4.12.1. The points defining an RNAV route are known as “waypoints” and may be specified as “flyby” or “flyover” waypoints and are specified as geographical (latitude/longitude) positions.

4.12.2. For “flyby” waypoints the aircraft navigation system predicts when the aircraft should start to turn to intercept tangentially the track to the next waypoint. For “flyover” waypoints, logically, the aircraft navigation system takes the aircraft over the waypoint before starting the turn towards the next waypoint.

4.12.3. Flyby waypoints are the general preferred methodology within the aircraft navigation computers as they can provide better navigation accuracy and consistency. However, flyover waypoints may be preferred where it is necessary for all aircraft consistently to reach a specified point on the ground before turning (for example in following NAPs).

[14] Airports around the UK are progressively converting their long-standing conventional SIDs to RNAV procedures.

[15] LSA does retain conventional Instrument Approach Procedures (IAPs) based on the Southend Non Directional Locator Beacon (SND NDB(L)) and the Instrument Landing System (ILS). There is no intention to remove these in the short/medium term, although they will be supplemented by new RNAV Approach Procedures.

[16] ODD procedures are obstacle clearance assessments approved by the CAA for use by aircraft which are not departing on SID clearances.

4.12.4. The type of track to be followed between the waypoints is also specified in the procedure design and can be, for example (this list is not exhaustive):

- "Track to Fix" (TF), in which the aircraft intercepts tangentially the track directly between the two waypoints;
- "Course to Fix" (CF), in which the aircraft intercepts a specified track inbound to the next waypoint;
- "Direct to Fix" (DF), where no inbound track to the next waypoint is specified, the aircraft flies directly towards the fix as determined by its speed and configuration as it turns;
- "Course to Altitude" (CA), where the aircraft flies on a specified track until a specified altitude is reached before turning onto the course to the next waypoint. (As the climbing performance of every aircraft is different there is no specified waypoint position at the end of a CA leg and the resulting aircraft tracks across the ground are dispersed over a wider area.)

4.12.5. In addition, strict rules dictate the minimum distances that can be allowed between successive waypoints so that the aircraft navigation systems are not "confused" by trying to do too many things at the same time. The minimum distances depend on both the types of waypoints and the leg types between the waypoints and the aircraft performance (e.g. speed and angle of bank) and the angle of the turn (track change).

4.12.6. Because RNAV procedures are intended to be interpreted by the numerous different computerised navigation and flight management systems in service on-board the aircraft, very strict protocols must be observed by the procedure designer in developing an RNAV procedure to ensure that the design can be safely flown by any of the systems in service and that the FMS can compensate within its calculations for the varying atmospheric conditions affecting the aircraft.

4.12.7. The strict design protocols that must be observed mean that there is sometimes less flexibility in designing modern, highly accurate RNAV procedures for modern aircraft navigation systems than may have been the case historically for previous generations of aircraft.

5. Why do I see aircraft away from the SID flight paths?

5.1. It is appropriate at this point to explain why aircraft do not always follow the flight path and altitudes specified in the SID procedure all the way to the end of the SID and why, therefore, they may be seen in other areas away from the SID route.

5.2. The SID procedures form a basic strategic framework of terminal airspace routes, along with SIDs from other airports and arrival routes, within which the ATM System operates.

5.3. They enable ATC interface procedures (for example between LSA ATC and the various LTC Sectors, or between the LTC Sectors themselves) to be developed which require the minimum of controller-to-controller co-ordination and dialogue; making for the most efficient way of getting the maximum number of aircraft into the air from a number of airports which are in close proximity to each other and on a myriad of routes which cross each other.

5.4. However, once airborne, the Sector Controllers' task is to get the aircraft climbing as quickly as possible to their cruising level and routing as directly as possible towards their destination.

5.5. Therefore, on a tactical basis, once free from any overarching procedural requirements such as NAPs, controllers may route aircraft away from the nominal SID flight path using tactical radar control techniques (this is known as radar vectoring) to separate aircraft from each other and achieve efficient and expeditious flight profiles. The precise aircraft tracks arising from radar vectoring will vary from flight-to-flight depending on the position, altitude and routing of other aircraft in the System at the time.

5.6. Thus it is perfectly normal and accepted ATC practice that, subject to noise abatement requirements, departing aircraft may be seen away from the SID tracks and will invariably be at higher levels than those specified in the SID procedure itself.

5.7. Having said that, however, the SIDs themselves do represent efficient flight paths into the Airways System, as far as is practicable within the procedure design criteria and the disposition of other routes. Aircraft would generally be left on the SID route if expeditious climb clearance could be given without coming into conflict with other flights. This is more likely to be the case on some departure routes now that LSA lies within controlled airspace and is an integral part of the formal LTMA route structure.

5.8. The likely impact of radar vectoring for each departure route is outlined in **Part B** of the consultation document.

6. Noise Abatement Procedures

6.1. LSA operates comprehensive NAPs for departing aircraft which are intended to minimise the noise impact and the number of people affected in proximity to the airport. The NAPs apply to all aircraft, jet and non-jet, of more than 5.7 tonnes Maximum Certified Weight[17].

6.2. Whilst **the existing NAPs do not change** as a consequence of the introduction of the SID procedures, an explanation is given here to assist understanding of how they have been incorporated in the design of the SIDs.

6.3. Runway 23[18]

6.3.1. Runway 23 (towards the south-west) is used most (approximately 70%) of the time for departing aircraft as the prevailing wind in the UK is generally from the south-west. As far as possible aircraft need to land and take-off into wind (but see also paragraph 6.5 below).

6.3.2. Aircraft taking off from runway 23 are required to fly straight ahead for a minimum distance of 2.5 nautical miles (NM)[19] [20]. This is the NAP and takes the aircraft beyond Leigh-on-Sea before turning.

6.3.3. In addition, aircraft must not turn left or right onto their departure route until they have reached an altitude[21] of at least 1500ft. This means that if the aircraft has not reached an altitude of 1500ft by 2.5NM from the runway then it must continue to climb further straight ahead until it has reached that altitude. Conversely, if it has reached 1500ft before reaching 2.5NM, then it must still continue flying straight ahead to 2.5NM before turning and will thus be higher when starting the turn.

6.3.4. Most aircraft departing on Runway 23 will have reached 1500ft well before reaching 2.5NM and so can be expected to start their turn at 2.5NM, although a few would continue ahead for up to a further half-mile or so to reach 1500ft.

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[17] 5.7 tonnes MCW is equivalent to a light twin-engined aircraft such as the Beech 200 Super King Air

[18] Runway Designation: See Glossary. It should be noted that due to change in magnetic variation the designation of the runway was changed from 24/06 to 23/05 in November 2015.

[19] Nautical miles: See Glossary

[20] The noise abatement procedures reference the earliest turn point as distances based on the aerodrome-sited Distance Measuring Equipment (DME) which operates in conjunction with the Instrument Landing System (ILS). The ILS-DME is “zero ranged to threshold”, which mean that when an aircraft is landing on runway 05 the DME indication is “zero” when the aircraft passes the landing threshold, and similarly for aircraft landing on runway 23. Consequently, for aircraft departing from runway 23 the aircraft passes the “zero” position as it crosses the threshold of runway 05. Thus “DME 2.5” for runway 23 departures is a position on the runway extended centre-line at a distance of 2.5NM from the runway 05 threshold. It should be noted that aircraft RNAV navigation systems do not use ILS-DME data to determine the aircraft position or navigation solution because there is no single geographical position of “zero”.

[21] “Altitude” means above mean sea level (amsl). LSA is 55ft amsl

6.4. Runway 05

6.4.1. Runway 05 (towards the north-east) is used less often (approximately 30% of the time) for departing aircraft as the prevailing wind is not generally from this direction. (However, there may be periods, particularly during hot summer periods, when the weather conditions require runway 05 to be used for extended periods.)

6.4.2. Aircraft departing from runway 05 are required to climb straight ahead for a minimum of 1NM after take-off. This prevents aircraft turning left or right very close to the airport and overflying the more built up areas but it also allows aircraft to turn towards their departure route over the open countryside before reaching Burnham-on-Crouch if practicable. It also enables some southbound aircraft to turn early enough to avoid flying through the Shoeburyness Danger Area airspace to the south-east of LSA[22].

6.4.3. However, in addition, the NAP specifies that aircraft must not turn left or right onto their departure route until they have reached a minimum altitude of 1500ft. This means that if the aircraft has not reached 1500ft before passing 1NM from the end of the runway then it must continue climbing straight ahead until it has reached 1500ft.

6.4.4. Most departing aircraft from Runway 05 will not have reached 1500ft before reaching 1NM from the runway and so will continue straight ahead for a bit longer, depending on their rate of climb, until they have gained the necessary altitude. As aircraft climb at different rates there will be a greater degree of dispersion of the point at which aircraft start their turn on reaching 1500ft than for a turn specified at a position. In general terms, most aircraft would start their turn between 1½ and 3½ NM from the end of the runway.

6.5. Preferential Runway Scheme

6.5.1. In addition to the routing restrictions for departing aircraft outlined above, LSA also operates a Preferential Runway Scheme. Whilst the general rule is that aircraft should land and take-off into the wind, when there is very little wind some aircraft can land or take-off with a slight tail-wind.

6.5.2. In recognition that the areas around LSA are less populated to the north-east of the airport than to the south-west, the Preferential Runway Scheme specifies that, whenever practicable (taking factors such as weather conditions and the air traffic situation into account) aircraft should preferably land on runway 23 (from the north-east) and take-off from runway 05 (towards the north-east).

[22] Shoeburyness Danger Area complex, D136, D138, D138A, D138B

6.6. Section 106 Agreement

6.6.1. The NAPs at LSA are the subject of a "Section 106 Agreement"[23] with Southend Borough Council, Rochford District Council and Essex County Council and are subject to strict monitoring and cannot be changed without the agreement of all parties.

6.6.2. The SID procedures have been designed to reflect the existing NAPs. This consultation is not about the NAPs as they do not change as a consequence of the introduction of SID procedures at LSA.

6.7. Noise and Track Monitoring

6.7.1. LSA utilises a "Noise Desk" Noise and Track Monitoring (NTK) System which measures the noise generated by arriving and departing aircraft and records the tracks flown by aircraft. The track recording uses radar data from the Airport's ATC Radar System.

6.7.2. Historic track data from the NTK system has been used to assist in the development of the SID procedures detailed in this document. Diagrams in this document showing historic tracks flown by aircraft are derived from the NTK System.

[23] Section 106 of the Town & Country Planning Act 1990

7. Noise Contour Charts

7.1. Noise (L_{Aeq}) contour charts are produced by airport operators to show how aircraft noise from both landing and departing aircraft is distributed in close proximity to the airport. L_{Aeq} is the equivalent continuous sound level measured in a unit called the "A-weighted decibel" (dB(A)), where dB means decibel (a unit of "loudness") and A-weighted means matched to the frequency response of the human ear.

7.2. The noise contour charts are calculated to show the noise distribution over a daytime 16-hour period ($L_{Aeq\ 16\ hour}$) between 0700 and 2300 for a typical summer's day. This is mainly because airports are normally busier during the summer period and a greater number of movements are likely to produce higher L_{Aeq} values. Also, as aircraft tend to climb less well in hot weather they will be slightly closer to the ground and so L_{Aeq} values will tend to be slightly higher than in cold weather. Thus, the noise calculation produces a cautious estimate (i.e. tends to over-estimate) noise exposure. Noise levels from 57dB(A) to 69dB(A) at 3dB(A) intervals are plotted. This methodology is standard throughout the UK.

7.3. From the noise contour charts the number of households and the population within each contour can be assessed and so the effects of changes to routes and traffic profiles close to the Airport can be estimated.

7.4. The CAA requires noise exposure contours to be produced for any airspace change which entails change to departure routes below 4000ft. The contours must be produced for the current situation; the situation immediately following the change; and the predicted situation after traffic has increased under the new arrangements (typically five years after implementation).

7.5. LSA engages specialist noise consultants (Bickerdike Allen Partners) to produce new noise contour charts every two years. The most recent chart is for Summer 2014 traffic. (The CAA has confirmed that this is acceptable for use as the base case.) This chart is shown at **Figure 1 below**. Our consultants have then adapted the contours (using the 2014 base data) to show the effects of the proposed SID procedures at the same traffic levels. This is shown at **Figure 2**. Then the contours have been further adjusted to show the effect of forecast traffic growth 5 years after the introduction of the changes (2021). This is shown at **Figure 3**.

7.6. It can be seen that in each case the $L_{Aeq\ 16\ hour}$ 57dB(A) contour does not extend as far as the end of the NAPs at D2.5/1500ft (Runway 23) and D1.0/1500ft (Runway 05). Whilst the contours exhibit some expansion between the 2014 contours and the 2021 forecast contours this is attributable to the forecast growth in traffic and would occur irrespective of whether the departure procedures remain as current or change to those proposed. Thus, as the NAPs are not affected by the introduction of SID procedures, **the noise contour charts will not be affected by any of the procedures detailed in this document.**

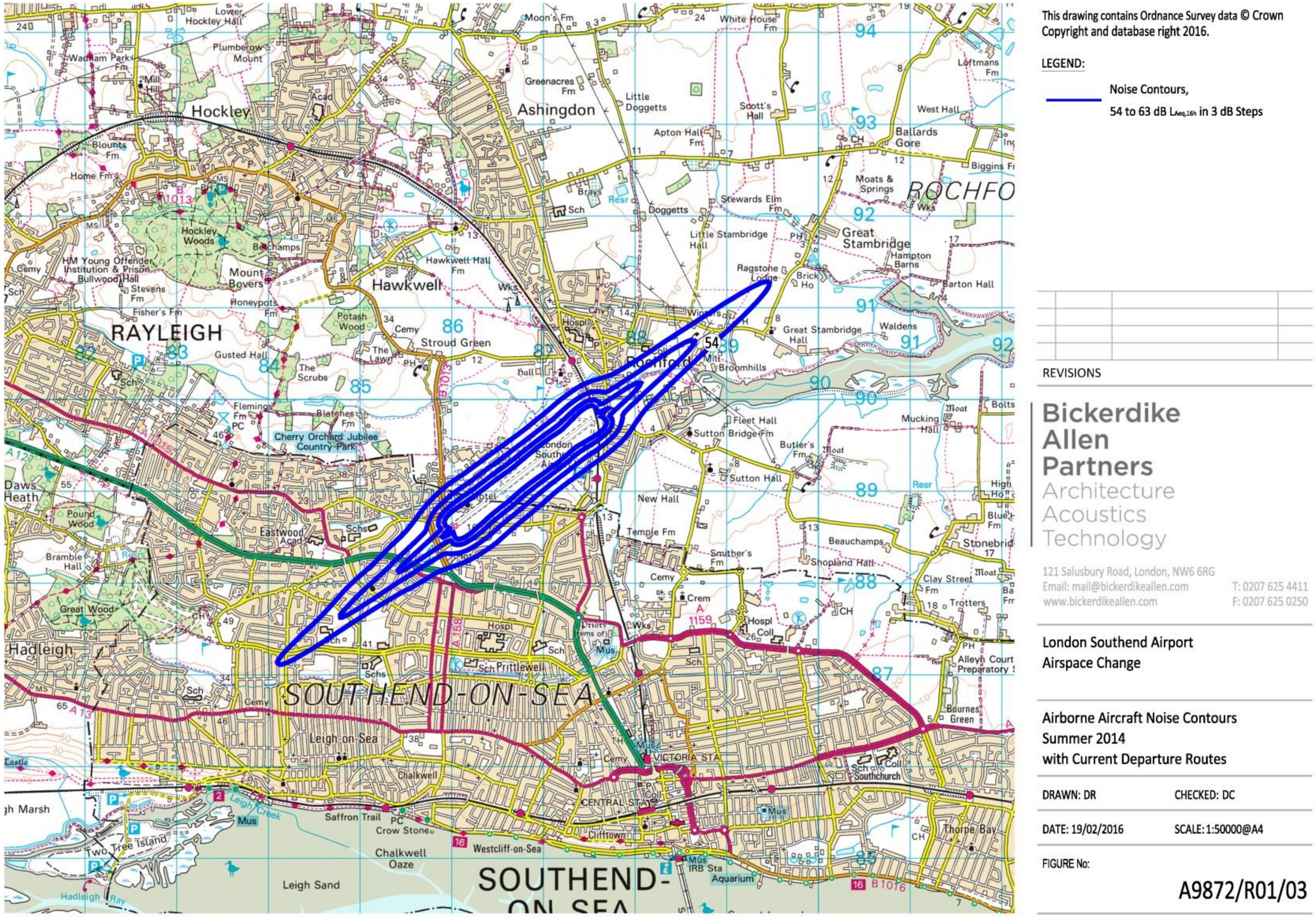

Figure 1: Noise contours 2014. (PDRs in place)

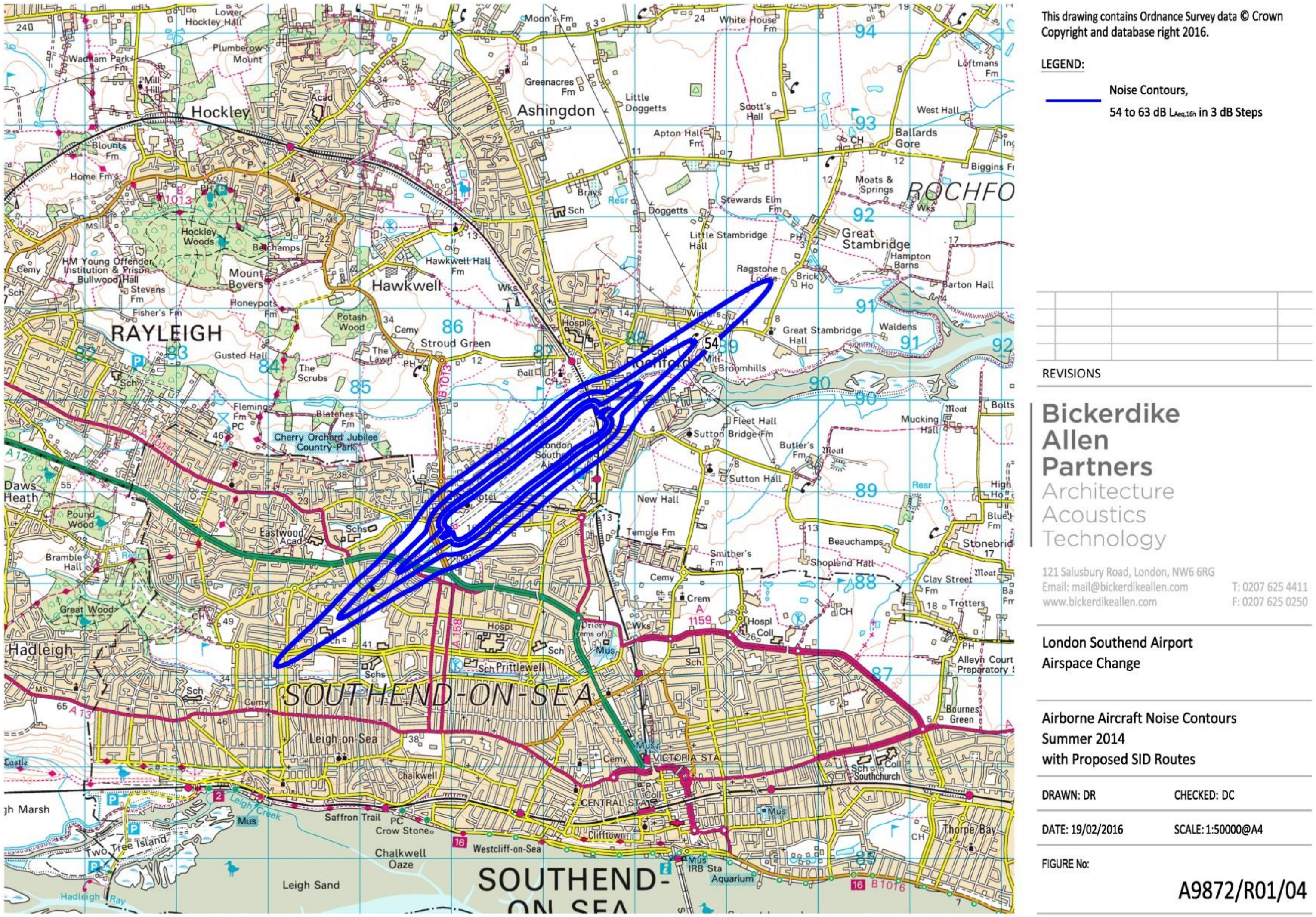

Figure 2: 2014 Noise Contour Charts adjusted to reflect SIDs.

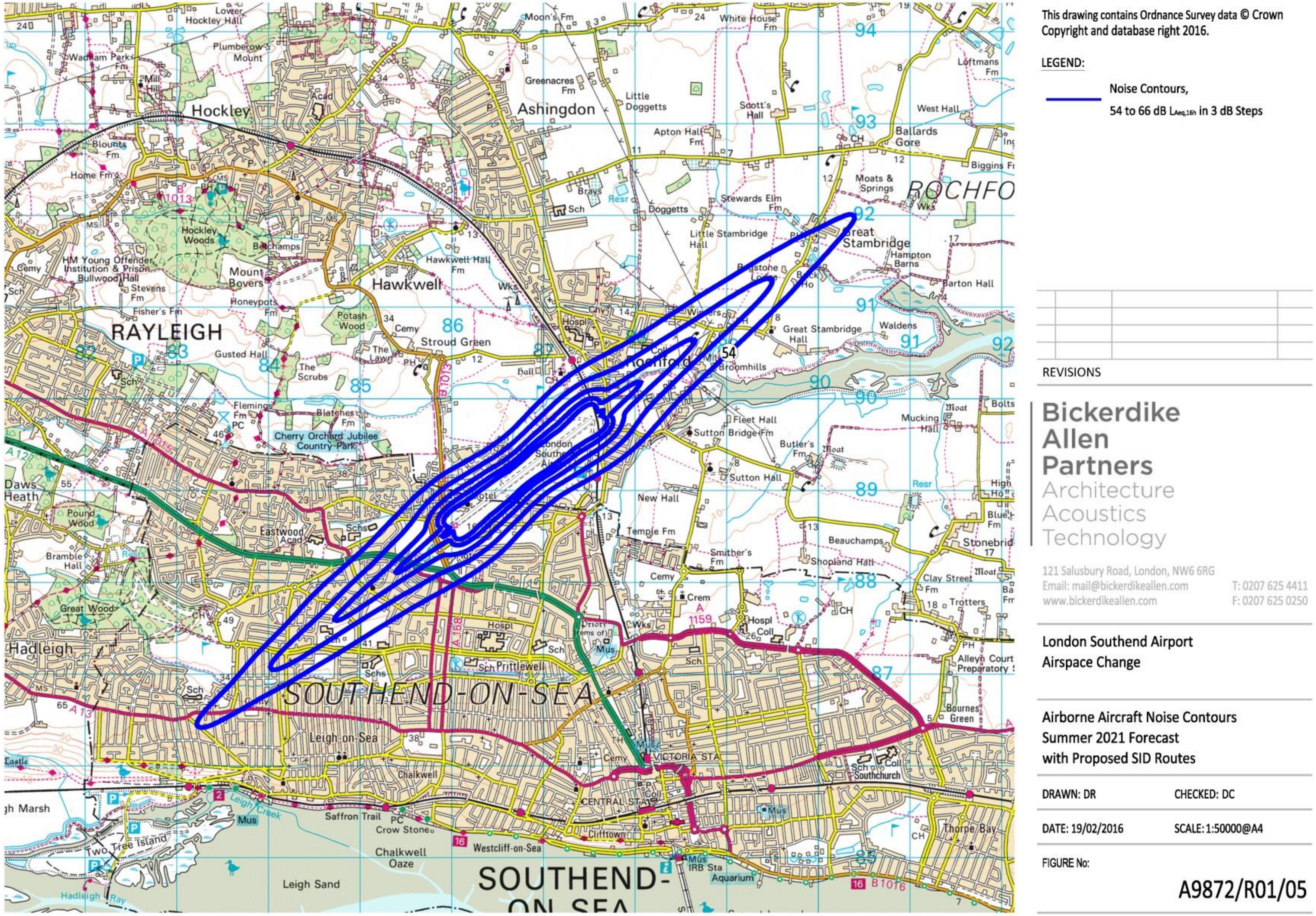

Figure 3: Forecast Noise Contours for 2021 traffic levels.

8. Sound Exposure Level Charts

8.1. In addition to the Noise Contour Charts the CAA has recommended that we also produce Sound Exposure Level (SEL) Charts. SEL Charts show noise energy levels generated from a single aircraft event, for example an aircraft taking off, in contrast to the summing of noise exposure events depicted in the noise contour charts detailed above. The SEL footprint can be useful in evaluating options by identifying the relative contribution of individual aircraft types, routes and operating procedures on the total noise impact.

8.2. SEL footprints can also be useful in portraying the impact of aircraft movements at night on sleep disturbance. Research has shown that residents tend to be awoken by a single noise event, as measured by SEL, rather than by an aggregation of noise events as measured by L_{Aeq}. The research has shown that for outdoor noise events below 90dB(A) SEL the average person's sleep is unlikely to be disturbed.

8.3. The CAA requires SEL footprints to be calculated when any changes to the distribution of flight paths **at night** below 7000ft within 25km of a runway are proposed. "Night" for LSA operations is set out in the Section 106 Agreement as the period between 11.00pm and 6.30am (Local Time).

8.4. However, it should be noted that no scheduled passenger departures take place at LSA during the night period unless delayed from earlier scheduled operating times or diverted from other airports[24]. Night flights are limited to a maximum of 120 per month under the Section 106 Agreement[25].

8.5. However to assist in understanding the effects of the change to SID procedures for daytime operations, our Noise Consultants (Bickerdike Allen Partners) have produced SEL charts for the Airbus A319 (which is the noisiest aircraft types to be regularly used for scheduled passenger flights using SID procedures in the immediate future) for the proposed departure routes. (Other aircraft types, such as Boeing 737 or BAe146 may occasionally operate on the SID procedures, for example on post-maintenance delivery flights, but the use of larger or noisier aircraft types for passenger operations is limited by the runway length.) The SEL Charts are included, where appropriate, in the **Annexes to Part B** of the consultation document.

[24] Flights between 2300 and 0630 are subject to prior permission from LSA and are approved only in accordance with the Section 106 Agreement.

[25] In the year March 2014 to February 2015 only 18% of the agreed annual limit for night flights was utilised.

9. Environmental guidance on developing departure procedures

9.1. Department for Transport guidance

9.1.1. In 2014 the Department for Transport (DfT) issued revised guidance to the CAA on how it should exercise its functions[26] relating to the environmental impact of civil Aviation. The 2014 Guidance contains substantial differences from the Guidance previously issued in 2002. (The previous LSA controlled airspace change proposal was developed against the 2002 Guidance then in place.)

9.1.2. The 2014 Guidance introduces the concept of altitude-based priorities for the development of airspace and associated route structures. These are summarised below.

9.1.3. Below 4000ft amsl the priority should be to minimise the noise impact of aircraft and the number of people on the ground significantly affected by it; but where options for route design below 4000ft are similar in terms of impact on densely populated areas then the value of maintaining legacy arrangements should be considered.

9.1.4. As aircraft climb above 4000ft their noise impact reduces. Between 4000ft and 7000ft the focus should continue to be minimising the impact on densely populated areas, but this may be balanced by the need for an efficient and expeditious flow of traffic that minimises emissions.

9.1.5. In the airspace above 7000ft the priority is the efficient use of airspace with a view to minimising aircraft emissions. The impact of noise is no longer a priority.

9.1.6. Furthermore, all changes below 7000ft should take into account local circumstances in the development of airspace structures.

9.1.7. Departure procedures should be designed to enable aircraft to operate efficiently and to minimise the number of people subject to noise nuisance on the ground whilst taking account of the overriding need to maintain an acceptable level of safety.

9.1.8. It should be noted that the latter aspect – the overriding need to maintain an acceptable level of safety - is satisfied through the CAA requirement that all SID procedures must be designed in accordance with PANS-OPS procedure design

[26] Under the auspices of the Transport Act 2000, the Secretaries of State (SoS) for Transport and Defence issue Directions to the CAA amplifying its functions and responsibilities, including Directions with respect to minimising the environmental impact of aviation. The DfT Guidance amplifies how the SoS expect the CAA to carry out these environmental functions. The CAA, in turn, exercises its responsibility through the auspices of CAP725 and requires the sponsors of airspace change to take into account, inter alia, the DfT Guidance ikn developing their proposals.

criteria (which thereby ensures compatibility with aircraft navigation systems) and by the application of an upper limit to the procedures which ensures safe procedural vertical separation from other routes crossing above (this is explained in more detail in **Part B** of the consultation document).

9.2. Concentration vs dispersion

9.2.1. The DfT Guidance discusses the impact of concentrating the flight paths of aircraft over narrowly defined routes against the alternative possibility of dispersing flight paths over a wider area. This is principally considered in the context of any necessary overflight of densely populated areas. Government Policy has, for many years, been that the best environmental outcome was derived from the concentration of departures over the least number of practical routes designed specifically to minimise the number of people overflown at low levels.

9.2.2. However, of course, whenever possible, subject to the safety and operational constraints, routes should avoid densely populated areas at low level and flight over less populated open countryside would be preferred.

9.2.3. In the context of the LSA operations, the NAP from runway 23 concentrates all departing aircraft over 5700kg on a “straight ahead” flight path until reaching 2.5NM from the end of the runway. This affects fewer people on the ground than if the departures were allowed to turn left and right earlier, which would result in low altitude overflight of the conurbations of Southend-on-Sea and Leigh-on-Sea to the south and Rayleigh to the north.

9.2.4. The NAP from runway 05 concentrates all departing aircraft over 5700kgs on a “straight ahead” flight path to a minimum distance of 1NM from the end of the runway, and thereafter until they have reached a minimum altitude of 1500ft. This ensures that departing aircraft turn clear of the conurbations of Rochford to the north and Southend-on-Sea to the south. However, as the climb performance of departing aircraft varies from aircraft to aircraft, and with the wind conditions prevailing, the point at which aircraft reach 1500ft is variable and so dispersion of aircraft tracks over the less populated areas to the north-east results. This also allows routes to be designed which avoid, as far as is practicable, direct overflight of Burnham-on-Crouch.

9.2.5. Thus we conclude that the NAPs from both runways 23 and 05 continue to comply with the government guidance and can be sustained in the development of SID procedures. As noted earlier, the NAPs are embraced within a Section 106 Agreement with Southend Borough Council. Rochford District Council and Essex County Council and there is no requirement to alter the current arrangements.

9.3. The impact of PBN and RNAV

9.3.1. It is widely acknowledged, and supported in the DfT guidance, that the application of PBN principles to terminal airspace operations, including the introduction of

RNAV SID procedures, will serve to enhance aircraft track-keeping accuracy, meaning that aircraft will be more concentrated towards the nominal track of the published procedures. This means that noise impacts will be spread over a smaller area and fewer people will be exposed to aircraft noise than has historically been the case with conventional navigation procedures.

9.3.2. In designing the SID procedures from runway 23 to the north, we have tried, as far as is practicable within the procedure design criteria and the required operational linkages to the LTMA route structure, to respect the legacy route configurations whilst also better aligning the routes away from conurbations (such realignments being within the historically demonstrated "spread" of tracks achieved by conventional navigation). Thus no "new" populations would be overflown. However, in common with most airports, it is inevitable that some conurbations (for example, parts of Benfleet and Basildon) will continue to be encompassed within the route swathe. Conversely, the more accurate and consistent track keeping can be expected to narrow down the lateral spread of tracks in the initial turn and lead to fewer people being overflown. This is in accord with the Government guidance.

9.3.3. In designing the SID procedures from runway 23 to the south we have had to realign the route slightly away from the legacy tracks to take account of the airspace restrictions on the Isle of Grain and also the new ATM arrangements for LAMP Phase 1a. Conversely, the more accurate and consistent navigation accuracy for RNAV-1 operations will narrow down the lateral spread of tracks previously seen with radar vectored departure clearances across the Thames Estuary.

9.3.4. In designing the SID procedures from runway 05 we have sustained the legacy arrangements of the NAPs which provide for dispersion of departure routes over the less populated areas in the initial turn. Thereafter we have been able to define nominal route centre-lines which avoid, as far as is practicable, direct overflight of the larger conurbations at low altitude. Furthermore, the revised configuration of the LTMA arrangements for arriving aircraft to LCY have enabled us to revise the departure route towards Clacton so that it overflies the sparsely populated areas of the Dengie Peninsular rather than directly overflying Burnham-on-Crouch. Again this is in accord with the Government guidance that, wherever practicable, departure routes and arrival flight paths should not overfly the same areas. To the south, we have had to take due regard of the Shoeburyness Danger Areas in the operation of the SID procedures and this is explained in more detail in **Part B** of the consultation document

9.4. Radar vectoring below 7000ft

9.4.1. As noted previously, the new DfT guidance on the design of departure routes has introduced an altitude-based priority concept of "below 4000ft"; "4000ft to 7000ft" and "above 7000ft". Unlike LSA, many Airports, particularly in the London Area, have NAPs which specify Noise Preferential Routes (NPRs) that must be adhered to until aircraft have reached a specified altitude (normally 4000ft).

9.4.2. It is emphasised that the Section 106 Agreement applicable to LSA operations imposes no such route or altitude restrictions beyond 2.5NM (runway 23) or 1NM (runway 05) or above 1500ft.

9.4.3. Furthermore, the ATM safety requirements for integration of departure routes from LSA with departure and arrival routes from/to other airports precludes the design of SID procedures with an upper limit higher than 3000ft. (This is explained in more detail in **Part B** of the consultation document). At all times the safety requirements take precedence.

9.4.4. The ability for ATC to radar vector aircraft once beyond the lateral and vertical limitations of the NAPs has always been in place at LSA, and indeed was essential before the introduction of controlled airspace in order to avoid unknown traffic in proximity to LSA flight paths.

9.4.5. The legacy arrangements for radar vectoring will remain in place with the introduction of SIDs. However, it is anticipated that, with the exception of routes to the northwest[27], the frequency of radar vectoring at the lower altitudes will be reduced now that controlled airspace is in place and more formalised ATM arrangements are in place through the introduction of the SID procedures and inter-Unit Standing Agreements.

9.4.6. Furthermore, the removal of LCY arriving traffic from overhead LSA under the new LTMA LAMP Phase 1a arrangements (particularly LCY aircraft holding overhead LSA down to 4000ft) will enable climb clearance above 3000ft to be given much earlier. Thus departing aircraft are likely to be much higher, and in most cases above 3000ft, before any radar vectoring is initiated.

9.4.7. The need for ATC to route aircraft away from the SID nominal routes to achieve an efficient and expeditious flow of traffic is recognised in the DfT guidance.

9.5. Understanding the noise numbers

9.5.1. Some of the environmental information given in the **Annexes to Part B** of this consultation relates to theoretical maximum noise levels that may be experienced by people on the ground from an aircraft flying directly overhead. This is known as L_{max}. The unit of measurement is A-weighted decibels (dB(A)) (loudness of the noise matched to the frequency response of the human ear).

9.5.2. The CAA Environmental Research and Consultancy Department (ERCD) has produced L_{max} data as a function of aircraft height above the ground (together with the degree of uncertainty of the data) for representative groupings of aircraft. The CAA data has been developed over many years using the CAA's Aircraft Noise

[27] The operational requirement for tactical routing of aircraft departing to the northwest is explained in detail in **Part B** of the consultation document.

Contour Model (ANCON) version 2, which the CAA uses to produce noise contours for the DfT for LHR, LGW and STN Airports.

9.5.3. We have extracted data from the CAA documentation which is pertinent to the aircraft types that are likely to operate from LSA and utilise the SID procedures.

9.5.4. In order that members of the public can relate the aircraft noise levels detailed in the tables to other sounds experienced in everyday life, **Table 1** below provides some equivalents.

Noise	Noise Level (dB(A))
Chainsaw at 1m distance	110
Disco, at 1m from speaker	100
Diesel truck passing by 10 m away	90
Kerbside of a busy road, 5m away	80
Vacuum cleaner, 1m away	70
Conversational speech, 1m away	60
Quiet Office	50
Room in a quiet suburban area	40
Quiet Library	30

Table 1: Everyday examples of noise levels

9.5.5. The aircraft types predominantly operating services from LSA (currently ATR-72 and Airbus A319) are grouped together with other comparable aircraft for noise measurement purposes as detailed in **Table 2** below.

Specific aircraft types	Noise Grouping
ATR-42; ATR-72; DHC Dash-8 100/200/300/400	50-70 seat regional turboprop
Bombardier CRJ; Embraer 135/145	50 seat regional jet
Bombardier CRJ700/900; Embraer 170/175/190/195	70-90 seat regional jet
Airbus A318/319/320/321; Boeing B737-600/700/800/900	125-180 seat 2-engine jet

Table 2: Aircraft Noise Groups (NB: Only aircraft groups relevant to LSA operations have been included here; larger aircraft are not included).

9.5.6. **Table 3** below gives the L_{max} noise levels that the CAA noise modelling has developed for these aircraft groups for departing aircraft as a function of height above the ground.

Height (ft)	50-70 seat Turboprop	50 seat regional jet	70-90 seat regional jet	125-180 seat 2-engine jet
1000-2000	78-71	78-70	85-75	85-75
2000-3000	71-67	70-65	75-68	75-70
3000-4000	67-64	65-60	68-64	70-66
4000-5000	64-62	60-57	64-61	66-63
5000-6000	62-60	57-55	61-58	63-60
6000-7000	60-58		58-56	60-59

Table 3: Average L_{max} for departing aircraft for noise assessment purposes

(NB: Data uncertainty: Approximately 68% of individual measured noise values would typically lie within ±2.5dB of the average value.)

9.5.7. The **Annexes to Part B** of the consultation document include NTK altitude-referenced colour-coded track plots showing the achieved climb profile of departing aircraft over a sample period. These plots enable the reader to estimate their expectation of noise exposure in their locality.

9.5.8. Furthermore, it is also noted that, notwithstanding the initial altitude limitations that must be placed on the design of the SIDs, it is expected that the recently implemented LAMP airspace arrangements wll permit more efficient use of the airspace and we expect to see earlier climb clearance for LSA departures on a more routine basis when traffic conditions allow.

9.5.9. Our Noise Consultants (Bickerdike Allen Partners) have used the International Noise Model (INM), which is a recognised noise modelling tool for aviation purposes, to develop the noise contour charts and SEL data which are included in **Part A** and the **Annexes to Part B** of this consultation document.

9.5.10. The Government's Aviation Policy Framework states that the Government will continue to treat the 57dB $L_{Aeq16hour}$ contour as the average daytime aircraft noise marking the approximate onset of significant community annoyance. However, it also makes clear that not all people living within this contour will experience significant adverse effects from aircraft noise, nor does it mean that no-one living outside this contour will consider themselves annoyed by aircraft noise. (Note: $L_{Aeq16\ hour}$ depicted in the Noise Contour Charts and L_{max} detailed in Table 3 above are different units of measurement. See paragraph 7.2 and Glossary for definitions.)

9.6. Swathes and population counts

9.6.1. The CAA advises in CAP725 that one method of portraying the potential noise impact of an airspace change is by a simple count of the population residing beneath the affected airspace, although it acknowledges that decisions as to what constitutes the appropriate area for consideration is somewhat arbitrary. However, the use of population counts accords with Government Policy.

9.6.2. On this basis, therefore, we have commissioned our Noise Consultants to carry out a comparative population count for the current situation and with the SIDs in place.

9.6.3. In developing the areas (swathes) beneath the routes, given that the PDRs have no specified navigational tracks whilst the SIDs do have specified tracks and a navigational performance of RNAV1, we have used the following methodology:

9.6.4. For the current routes, a width of 3km (1.62NM) centred on the nominal demonstrated departure track plots (i.e. ±1.5km/±0.81NM). We have used a swathe width of 3km because most airports which have notified NPRs[28] have traditionally used a swathe width of 3km to assess adherence to the specified NPR tracks by departing aircraft and for any associated population counts[29].

9.6.5. For the proposed SIDs we have used a swathe width of 2km (1.08NM) (±1km/±0.54NM) centred on the SID track (although a sensitivity test was also carried out with a 3km width). We have used a swathe width of 2km because of the improved track adherence expected to result from the specification of tracks within the SIDs and the RNAV1 navigation standard. A number of airports that have introduced RNAV1 SID procedures have reduced, or are considering reducing, their NPR swathe widths to 2km[30].

9.6.6. For the length of the swathe after departure we have used the nominal distance at which an A319 would be expected to reach 7000ft (as predicted by the INM software) if given unrestricted climb from the runway. We have used this criterion because both the DfT guidance and the CAP725 require the consideration of noise impact up to 7000ft. However, it must be noted that, as explained in detail in **Part B** of the consultation document and the associated Annexes, the upper limit of both the existing PDRs and the proposed SIDs is 3000ft for flight safety reasons until further climb clearance can be given by the LTC Sector controllers. (LSA has no jurisdiction over the LTMA airspace.) Notwithstanding this, we expect that the improvements to the overall airspace efficiency arising from the LAMP airspace arrangements and the introduction of formal SID procedures will result in earlier and expeditious climb clearance given to LSA departures when traffic conditions in the surrounding airspace allow.

9.6.7. Details of the swathes and population counts for each route are given in the **Annexes to Part B** of the consultation document.

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[28] LSA does not have notified NPRs.

[29] The value of 3km swathe width traditionally used for NPR adherence assessments is different to the navigational tolerance used for the route width for conventional navigational route design, which is ±5NM (±9.26km), because aircraft day-to-day achieved navigational performance is inherently better than the "worst case plus safety margins" used in route design.

[30] Again the value of 2km swathe width is different to the RNAV1 navigation tolerance used for route design, which is ±1NM (±1.852km) because day-to-day achieved navigation performance is better than the "worst case plus safety margins" used for RNAV1 route design. We anticipate, based on experience elsewhere, that day-to-day achieved navigation performance for aircraft using the SIDs will be closer to ±0.2NM (±0.37km)

10. Air Quality

10.1. Technical guidance material from the CAA does not require LSA to make an assessment of air quality as neither the airport nor the surrounding airspace lie within an Air Quality Management Area (AQMA).

10.2. Government guidance states that, due to the effects of mixing and dispersion, emissions from aircraft above 1000ft are unlikely to have a significant effect on local air quality. There are no changes affecting flight paths below 1000ft in the SID procedures.

10.3. The introduction of SID procedures is not for the purposes of attracting growth in CAT operations at LSA over and above that which is already approved by the Local Planning Authorities under the Section 106 Agreement.

11. Visual intrusion and tranquillity

11.1. Although difficult to measure, the potential visual intrusion and impact on tranquillity is recognised.

11.2. Close-in to the Airport, there will be no changes to the routing of aircraft in carrying out the NAPs.

11.3. In general, the alignment of the SID procedures reflects the alignment of the long-standing PDRs and the historic day-to-day routing of aircraft, as closely as is practicable within the constraints of procedure design criteria and the configuration of the route structure in the overlying LTMA.

11.4. In the particular case of Runway 05 departures to the east (CLN) the departure route has been realigned to reduce direct overflight of Burnham-on-Crouch and to reduce ATM complexity in the integration of departing and arriving aircraft. Avoiding populated areas is in line with Government guidance. The realigned route overlies the sparsely populated Dengie Peninsular. However, it should be noted that both departing and arriving flights currently operate routinely in this area. Figure 4 below depicts typical overflight of the Dengie area by arriving and departing aircraft in a 5-week period in July/August 2015.

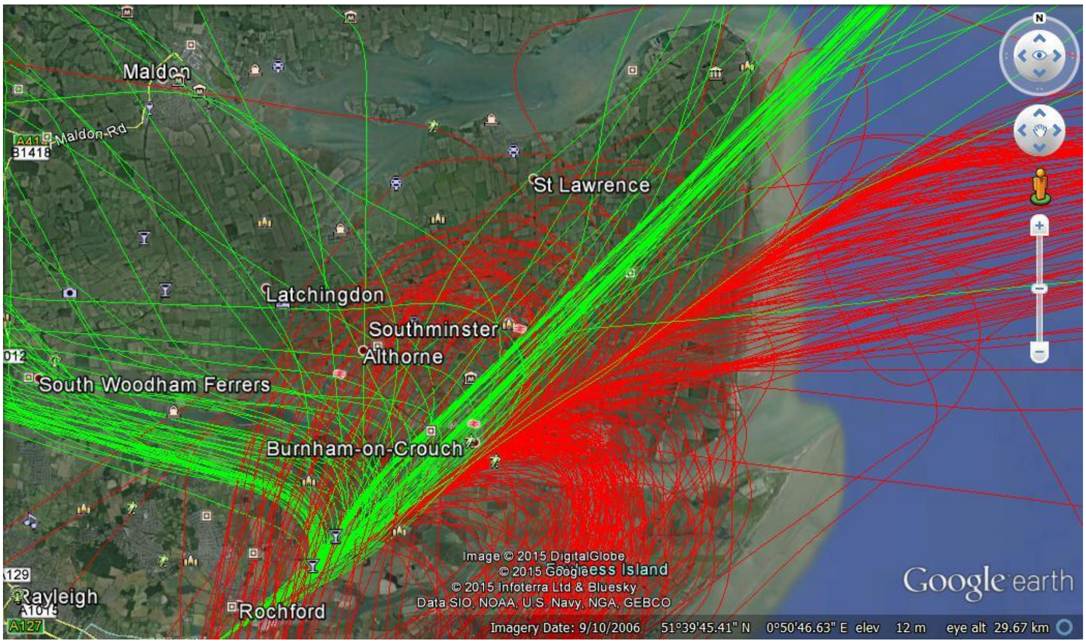

Figure 4: Sample arrival (red) and departure (green) plots over The Dengie

11.5. To the south, the existing tactical radar directed operation has been replicated as closely as possible taking due regard of the airspace restrictions, including Gas Venting Stations, on the Isle of Grain and the realignment of the arrival routes to LCY and LSA which are a part of LAMP Phase 1a.

11.6. To the north of the Thames no Areas of Outstanding Natural Beauty (AONB) are overflown by LSA departure routes.

11.7. To the south of the Thames all aircraft departing from LSA, in common with aircraft outbound from and inbound to other London Area Airports, overfly the Kent Downs AONB. However, by the time LSA departing aircraft reach the Kent Downs AONB they will be clear of conflicting traffic above and will have climbed above the initial levels specified in the SID and directed towards their en-route Airway routing. Thus the level and distribution of LSA departing aircraft over the Kent Downs AONB will be essentially very similar to that experienced today. Indeed, the improved overall airspace efficiency that will be delivered by LAMP Phase 1a can be expected to also improve the flight profiles for LSA departing aircraft, albeit procedural safety must be built into the procedure designs. (Note: Aspects of the impacts of LAMP Phase 1a on the Kent Downs AONB were covered in the NATS consultation on LAMP Phase 1a.)

11.8. The introduction of SID procedures is not for the purposes of attracting growth in CAT operations at LSA over and above that which is already approved by the Local Planning Authorities under the Section 106 Agreement.

12. Summary of Part A

12.1. In **Part A** of this sponsor consultation document we have explained in some broad detail the background to the various operational, regulatory and environmental considerations that must be taken into account in the design and application of SID procedures to support the ATM arrangements. Each of these areas of consideration are, in themselves, complex technical subjects, often with competing priorities.

12.2. In developing SID procedures which are suitable for operational use it is necessary for a careful balance to be struck between the competing priorities. At all times, however, the safety of both the operation of aircraft and the operation of the ATM System remain paramount.

12.3. **Part B** of this sponsor consultation document goes on to describe each of the proposed SIDs designs in detail and explains how the competing requirements have been balanced to arrive at the definitive procedure configuration.