SENATE STANDING COMMITTEE ON RURAL & REGIONAL AFFAIRS & TRANSPORT

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Inquiry into the Effectiveness of Airservices Australia's management of aircraft noise

SYDNEY, 28 MAY 2010

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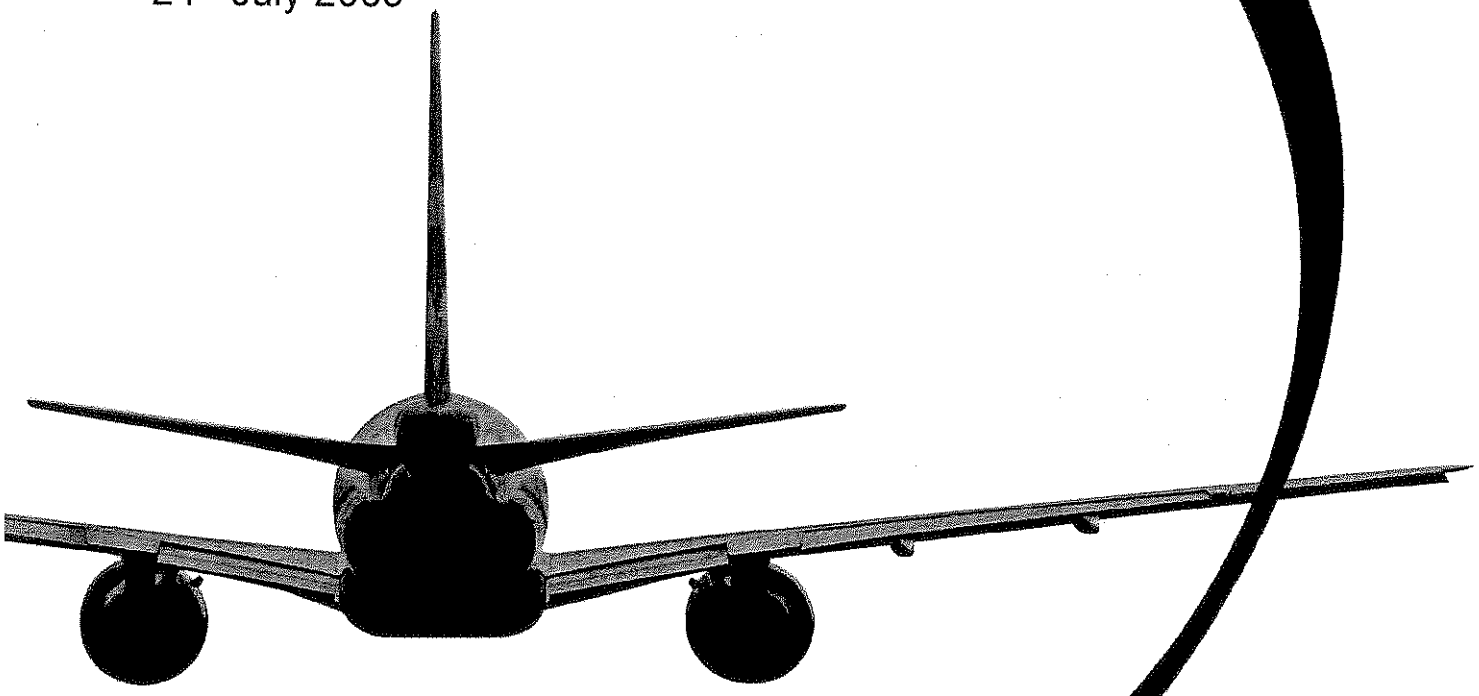
NATS

Safeguards for Airports and the Communities around them - Discussion Paper

The NATS Response Prepared for the Australian Department for Infrastructure, Transport, Regional Development and Local Government

24th July 2009



www.nats.co.uk

Safeguards for Airports and the Communities around them - Discussion Paper

The NATS response prepared for the Australian Department for Infrastructure, Transport, Regional Development and Local Government

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1.0 INTRODUCTION

NATS has been involved in discussions on a variety of aviation-related topics in connection with the development of a White Paper on aviation for Australia. As such, NATS has been invited to respond to the **Safeguards for Airports and the Communities Around Them – Discussion Paper** produced by the Australian Department of Infrastructure, Transport, Regional Development and Local Government.

NATS is considered a world-leading Air Navigation Services Provider, and has the capability to accurately assess not only air traffic management but also other aviation-related activities. In addition to en-route air traffic services, NATS provides air traffic services to 15 of the UK's leading airports, and expert aviation consultancy services worldwide.

This document, in response to the discussion paper, aims to describe and exemplify the skill and expertise across the business, and identify some of the pertinent considerations based on its experience of airport safeguarding policies and practices.

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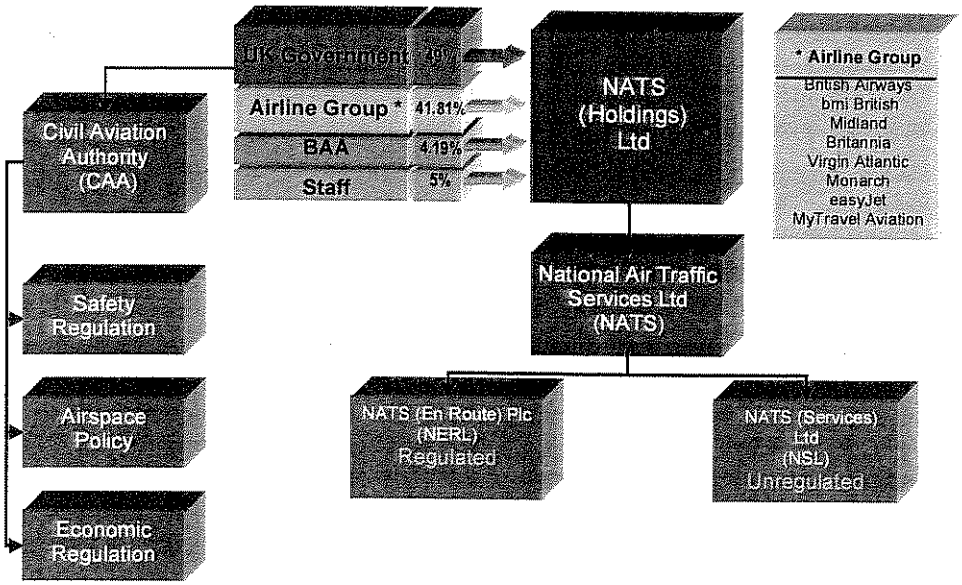
2.0 BACKGROUND

2.1 NATS Company Profile

NATS was originally established in 1962, with both civil and military components. The civil element was incorporated into the UK Civil Aviation Authority (CAA) on its establishment 30 years ago. In 1996, the civil element of NATS became a limited company, a wholly owned subsidiary of the CAA. On 26 July 2001, NATS was established as a Public Private Partnership (PPP). The UK Government retains a 49% stake and the Airline Group (the strategic partner) holds a stake of slightly less than 42%, along with the controlling interest of the company. BAA and the NATS employees hold the remaining stake as illustrated below. The CAA remains the safety, airspace and economic regulator for NATS activities.



NATS is formed internally into 3 distinct parts. NATS (Holdings) Ltd forms the holding company and corporate services for two subsidiary companies:

- NATS (En-Route) plc (NERL) provides regulated services and activities within the UK. These services include civil en-route, terminal control, oceanic control and military co-ordination together with engineering and technical consultancy.
- NATS (Services) Ltd (NSL) is, since privatisation, the unregulated business within NATS. NSL works within a competitive environment delivering both UK and overseas business. All airport operations are won and managed on a competitive basis against strong competition.

NATS turnover in the year to March 2009 was £767.3m and a pre-tax profit of £135.5m was reported. There are currently approximately 5,000 employees, 1,200 of whom are engineers and 2,000 are licensed Air Traffic Controllers.

NATS is the UK market leader in all aspects of Air Traffic Management and its ability to provide services of the highest safety and quality standards is widely recognised and respected. All NATS units operate stringent safety management systems. NATS is ISO9001:2008 (UKAS and TickIT) certified for all its activities, particularly the operation, design, manufacture, programme and project management, installation, maintenance, repair and support of operational systems. The certificate also covers provision of support services including system design and engineering, software development, test and measurement services, and technical documentation.

NATS' role is to plan, provide and operate safe, efficient and expeditious air traffic services within UK airspace and across 650,000 square miles of the North Atlantic which:

- allow all airspace users to fly in safety at an acceptable cost
- provide for future traffic growth without significantly increasing delays or charges.

To support this operation, NATS operates and maintains a nationwide communications, surveillance and navigation network, carries out advanced research and development, develops software for current and new systems and trains air traffic controllers and engineers for its own operations and for customers overseas. Additionally, NATS provides ATC consultancy, engineering support, capacity studies and safety management services to many international customers.

NATS collaborates within many organisations on a commercial basis to deliver solutions. These partnerships vary from the internal delivery of engineering, construction, and software solutions to the external partnering for specific collaborative commercial ventures. Partnership arrangements are also in place on non-commercial strategic programmes, for example the Single European Sky (SES) initiative.

NATS is an active member of the International Air Traffic Management community and is represented at more than 40 relevant international fora at which NATS contributes to the design and development of relevant standards and recommendations. Examples are EUROCAE (European Organisation for Civil Aviation Equipment) Global Navigation Satellite System group, Eurocontrol EATMP Global Navigation Satellite System PSG, and ICAO Groups on CNS/ATM. This ensures that NATS has constant access to best practice and technical know-how. Full details of such groups are available on request.

Furthermore NATS remains: a key member of many other Eurocontrol steering committees; is an extremely active full member of CANSO; provides experts to ICAO Panels and Regional Planning Groups on behalf of the UK Government and it has a major role in advising the UK Department for Transport (DfT).

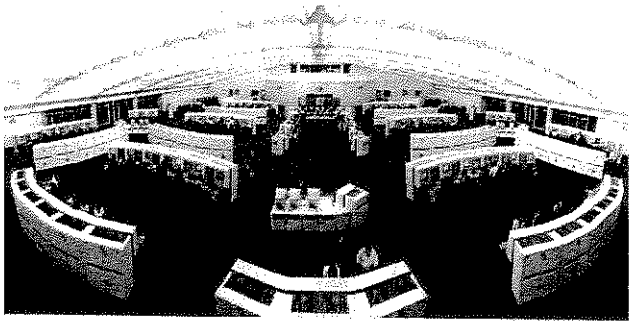
More information about NATS is available from the website http://www.nats.co.uk.

2.2 NATS (En-Route) plc

NATS En-Route Limited (NERL) supply the following services as part of the NATS business:

- A fully integrated civil/military en-route air traffic service within UK airspace, regularly handling more than 2 million flights per year.
- Airspace planning and management, both nationally and internationally.

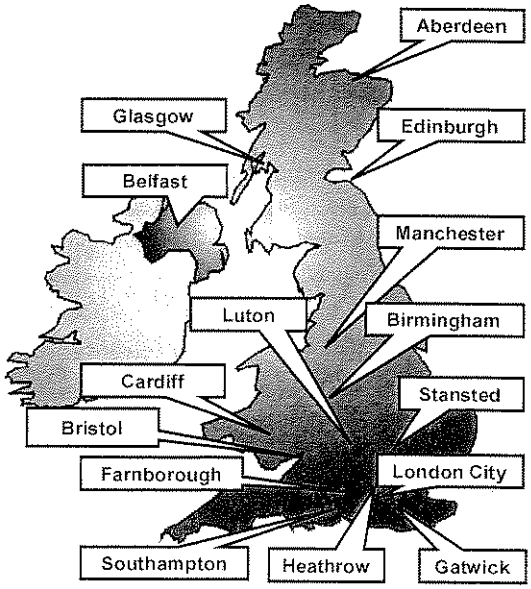
- Oceanic Air Traffic services for aircraft flying over the North Atlantic – a responsibility assigned to the UK by ICAO. The Oceanic Area Control Centre handles up to 110 movements per hour at peak periods (422,000 annual movements) and, through collaboration with NAV CANADA, NATS now has unrivalled expertise in handling trans-oceanic flights utilising Reduced Vertical Separation Minima (RVSM), at all flight levels.



- Off-route air traffic services in the London and Scottish Flight Information Regions.
- UK Aeronautical Information Service (AIS).
- UK Civil Aviation Communications Centre (CACC).

2.3 NATS (Services) Limited

As the preferred provider of air traffic services in the UK, NATS also provides air traffic control services through its wholly owned subsidiary NATS (Services) Limited, known as (NSL), at 15 of the nation's largest airports and has recently won the contract to provide services in Gibraltar.



NATS operates at all seven BAA airports including London Heathrow, the world's busiest for international traffic, and London Gatwick, which is the world's busiest single-runway airport, having recently achieved a record hourly air traffic movement rate of 60 movements.

The airport portfolio also includes other key regional gateways such as Manchester International, Birmingham International and Glasgow International, together with smaller, but rapidly developing airports such as London City, London Luton, Southampton, Farnborough and Cardiff.

NATS' airport ATC contracts account for around 85% of the air transport movements in the UK, giving NATS a dominant position in the marketplace as well as unrivalled experience in conducting airport ATC operations.

In addition to the above, NATS also provides air traffic services to customers with specific requirements such as helicopter companies operating in the North Sea oil

fields, small regional and outlying islands airports which lack an approach service and the Ministry of Defence for their missile testing ranges.

With the commercial freedoms available under the Public Private Partnership, NATS now makes available to other international organisations the expertise derived from the operations described above. This may, for example, take the form of consultancy, training, engineering support or ATC operations. It is through our competent, multi-disciplined staff that NATS has been able to position itself as a world leader in Air Traffic Service provision with a safety record that is recognised by all of its customers.

2.4 Consultancy Excellence

NATS Development and Investment Division is the main NATS division which provides expertise in support of operational services in 4 main areas:

- Airspace design
- ATM Tools and Policy
- Research and Development
- Operational Analysis

It has a proven track record in taking operational concepts from the initial research, through simulation, implementation, operational trial and integration in to the operational environment. Furthermore, it has delivered increased capacity with a reduction in delays in complex airspace and within the framework of a mature safety management system.

The Airport Services group within NSL delivers operational expertise on a variety of areas direct to airport customers. It maintains operational services at 15 UK airports ensuring the proactive management of safety and enhancement of capacity within the regulated airport environment.

Public Safety Zone consultancy is undertaken within the Operational Analysis Department, which comprises 55 operational analysts. Significant operational research experience has been gained within the department, encompassing: airport and airspace capacity modelling, delay modelling, post-operational analysis, safety projects and numerous Third Party Risk (TPR) and Public Safety Zone (PSZ) assessments at over 40 UK and overseas airports.

NATS has over 15 years experience in the field of PSZs, successfully developing a national methodology for use throughout the UK. Over this time the methodology has been tried and tested at major international airports such as Heathrow, through to smaller airfields with PSZ concerns. NATS expertise in PSZ issues has resulted in it being a best-practice leader on a worldwide scale.

3.0 SAFEGUARDING DISCUSSION PAPER TOPICS

The issues raised in the Safeguarding Discussion paper are considered below in their sections, along with appropriate background context.

3.1 Planning for Compatible Development

Issue: *The need for a nation-wide cooperative land use planning approach that protects both the operations to and from the airport and the interests of surrounding communities*

Background

As the issues in this section are primarily focused on the mechanism of land-use planning as a means to mitigate the impact of noise on local communities in Australia, the following response considers the way noise mitigation is handled in the UK in order to highlight relevant concerns.

Noise mitigation

Aircraft noise in the UK is governed through international, European Union and national regulation, with responsibility for noise mitigation generally residing with the airport operator. Measures to reduce noise range from the application of ICAO Chapter classification standards, various bespoke local controls on an airport and on individual aircraft noise events.

The three London airports (London Heathrow, London Gatwick and London Stansted) are 'designated' under section 80 of the Civil Aviation Act 1982, which requires that the UK Secretary of State has responsibility for noise abatement (administered by the Department for Transport). The noise mitigation controls available for use at the airports may include:

a) Operational Restrictions

- Noise Preferential Routes (NPRs) – designed to avoid over flight of built-up areas where possible. They lead from the take-off runway to the main UK air traffic routes, and form the first part of the Standard Instrument Departure routes (SIDs).
- Enforcement of ICAO chapter standards.
- Departure noise limits - To ensure that best practice departure operating procedures are used at the designated airports, departure noise limits are enforced. In place since 1959, fines for infringements were introduced in 1993. This follows a wider policy of noise concentration at the designated airports.
- Specification of certain geographic height/operational minima.
- Continuous Descent Approach procedures for flights (low power and low drag procedures) – guidance provided to pilots, airlines and airports to adopt this procedure which reduces noise and aircraft emissions.

- Night-time Quota Count System – UK noise classification and quota system to cap noise exposure at night. This criteria has become a global design standard for major aircraft manufacturers.
- Night-time operating restrictions for the noisiest types of aircraft.
- Noise exposure area cap – which may lead to restrictions on numbers or type of aircraft.
- Airport-specific operational restrictions on the mode of operation and use of runways.
- Economic instruments such as landing charges that vary according to the noise performance of aircraft, or an airline's record on track keeping.

b) Noise Indices and Assessment

A variety of noise indices are used to portray aircraft noise, including maximum based metrics, such as Sound Exposure Level (SEL) and L_{max}, to indices that describe long-term noise exposure.

Since 1990, the established noise exposure index in the UK for the purposes of aircraft noise assessment and control has been the Equivalent Continuous Sound Level index, abbreviated L_{Aeq}.

L_{Aeq} can be defined as the level of notionally steady sound which over a given period of time contains the same amount of sound energy as the actual variable sound. As such L_{Aeq} provides an indication of the average energy dose.

UK Government sponsored research has shown that the L_{Aeq} index provides a suitable correlation between aircraft noise exposure and community annoyance, with 57dBA L_{Aeq} marking the approximate onset level of significant daytime community annoyance.

The magnitude and extent of noise around an airport is depicted on maps showing contours of constant noise exposure, or L_{Aeq} values. Standard modelling practice is to produce L_{Aeq} noise exposure contours based on a 16 hour average summer day 0700 to 2300 local time, and contours are conventionally plotted from 57dBA to 72dBA in 3dBA steps, each successive contour representing a doubling of average energy.

In addition to L_{Aeq}, airports with in excess of 50,000 movements are required to produce L_{DEN} noise contours in accordance with the European Noise Directive Regulations, which have been adopted into national law. The adopted Environmental Noise (England) Regulations 2006 require airport operators to develop Action Plans based on the results of L_{DEN} modelling, to manage noise issues and effects, including a reduction to movements if necessary.

NATS works with the Civil Aviation Authority's Environmental Research and Consultancy Department on the production of noise-exposure contours for airspace change proposals when required, and NATS has a growing capability to produce noise exposure contours using the FAA's commercially available Integrated Noise Model (or INM). The indices used by NATS to communicate noise effects and potential future noise effects range from L_{Aeq} contours through to the use of maximum-based noise and operations diagrams describing the number of expected aircraft events. The latter two methods being used in particular to communicate noise impact scenarios to the public.

UK CAA guidance on airspace change requires that the proposer of a change must undertake a public consultation of the likely noise and other environmental impacts. Through this process NATS has built considerable expertise in producing and communicating environmental impact assessments, and a deep understanding of community reaction to aircraft noise.

NATS recent airspace change proposal for a region of airspace called 'Terminal Control North' provides a good case in point; this region of airspace is one of the most complex areas of airspace in the world, covering an area with a population of 12 million people, and home to some of the UK's busiest airports. As a result, NATS carried out detailed environmental assessments for all proposed airspace changes, which were communicated as part of its largest consultation to date.

c) Land-use Planning and Insulation

In the UK, the World Health Organisation's "Guidelines on Community Noise" are applied predominantly through Building Regulations. The planning restrictions that are applied are similar to the Australian Standard AS2021, with some differences between the noise exposure 'bands' which define 'acceptability' of noise.

In the immediate vicinity of airports, UK Local Planning Authorities apply land-use and planning restrictions to limit noise exposure, on the basis of modelled noise exposure predictions. These are set out in Planning Policy Guidance (PPG) Note 241.

Many UK airports are located in populated areas, so the potential for land-use planning controls to reduce noise exposure from existing airports is limited. However, planning has a role to play both for new developments near existing airports and for the development of new airports. Two methods can be employed to mitigate noise: considerations for accepting planning applications, and 'zoning'.

- Planning permission – government planning guidance advises that planning permission for housing should normally be refused in areas exposed to noise from any source louder than 66dBA L_{Aeq} during the day (and 57dBA L_{Aeq} at night). At noise levels between 57 and 66dBA L_{Aeq} where it is considered that permission should be given, for example if there are no known quieter sites available, conditions should be imposed to ensure a commensurate level of protection. Below 57dBA L_{Aeq}, planning controls need not be considered.
- Zoning – land around airports can be demarcated as either qualifying for compensation and support for noise insulation, or as being inappropriate for residential development given current or future noise levels.

The provision of insulation can be required on a statutory basis under Section 79 of the UK Civil Aviation Act 1982, however, current airport noise insulation schemes are provided on a voluntary basis by airport operators, and are often supported by local planning agreements. Airport operators are expected to:

- Provide households at 69 dBA L_{Aeq} and above assistance with the costs of relocating.
- Acoustic insulation (applied to residential properties) to other noise-sensitive buildings, such as schools and hospitals, exposed to medium to high levels of noise (63 dBA L_{Aeq} or more).

- Further schemes may be implemented at local airport level. For example, London Heathrow airport operates a scheme to mitigate against night-time noise from arrival aircraft by providing help towards insulation for dwellings inside the footprint of the noisiest allowable aircraft.

Under the Government's Aviation White Paper it was recognised that provision of additional airport capacity to accommodate aviation growth out to 2030 may both lead to significant increases in noise where there were previously low levels of noise exposure, or increase noise within community's already subject to medium to high levels of noise. The Government expects airport operators to:

- purchase those properties suffering from both a high level of noise (69 dBA L_{Aeq} or more) and a large increase in noise (3 dBA L_{Aeq} or more)
- provide acoustic insulation to any residential property which suffers from both a medium to high level of noise (63 dBA L_{Aeq} or more) and a large increase in noise (3 dBA L_{Aeq} or more)

Other statutory powers exist outside the planning system and insulation requirements. Major legislative instruments include:

- Under the Environmental Protection Act 1990/Noise and Statutory Nuisance Act 1993, local authorities are required to serve abatement notices where the noise is emitted from any premises, or from vehicles, machinery and equipment in the street which constitute a statutory nuisance
- The Control of Pollution Act 1974, which gives local authorities powers to control noise from construction sites, and introduces the concept of a Noise Abatement Zone or NAZ (also known as a Noise Perimeter Zone or NPZ)

Lastly, the requirements for noise protection for the UK population are applied in a number of other ways - for example, personal individuals' noise exposure at work is governed through the Noise Exposure at Work Regulations 2005, and protective measures applied through provision of suitable Protective Personal Equipment. Peak noise level exposure is assessed by peak frequency *and* average daily exposure (similar to the way in which the WHO guidelines are expressed) and restrictions applied according to the results of these two criteria.

Discussion Questions

1. Does the ANEF system provide an effective basis for planning in noise affected areas?

For aviation, ANEF and L_{Aeq} type indices are in widespread use around the world to assess noise exposure, and for the purposes of land-use planning and building regulations. These indices use the underlying principle of average energy dose, and have been found to be more highly correlated to community reaction than any other index. It is worth considering other benefits to the use of such an index. These include the relative ease of measurement and calculation, and the practical benefit of being able to express both long-term and short-term noise exposures through a simple, single-valued index, which allow for simple comparisons of noise exposure changes over time. This is particularly important when considered changes at airport level, as the index is responsive to changes to the number and noise intensity of aircraft events.

To move away from the average energy principle would be to put disproportionate weighting on either the number or the intensity of aircraft events.

Given these qualities, the ANEF system is considered as an appropriate land use planning tool. It is difficult at this time to see a better alternative. It should be noted that such indices were never designed or intended as a means of communicating noise impact to the public. As noted in the discussion paper, they are difficult to comprehend and highly criticised by the public for many of the reasons already cited within the discussion document. However, it is felt that opportunity exists to better understand community reaction to a wider range, and tighter graduations (or bands) of noise exposure level.

2. How effective is the ANEF system as a land use planning standard for greenfield developments around airports?

Similar arguments as given above about the suitability of this index to accurately assess noise exposure apply here also. In relation to greenfield sites the standard provides a basis to preclude development of housing and define acoustical adequacy of buildings based on the ANEF system.

Comparing the Australian system to the UK PPG24 system, whilst the general spirit appears to be the same, the UK system would appear to be a bit more lenient than the Australian standards.

Taking 20 ANEF as being comparable to 57dBA 16hr L_{Aeq} the difference between AS2021 and UK PPG24 is that development in areas above 57dBA L_{Aeq} is only allowed provided appropriate insulation is incorporated and with development allowed to occur up to 66dBA L_{Aeq}. Even above these levels development can take place with appropriate insulation provided that no quieter site can be found. Only at the highest levels of noise exposure >72dBA L_{Aeq} is development entirely precluded.

As a methodology for restricting development or specifying conditions for development, such as the appropriate level of commensurate insulation required, the ANEF system, or similar energy average index is considered suitable. The ability to correlate noise exposure level to significant community reaction/annoyance, and in particular understand the percentage of people affected provides a suitable basis for effective planning. Once again opportunity remains to change the levels at which conditions and exclusions come into play. However given that the index allows planners to understand likely community reaction at a number of noise exposure levels, suitable flexibility is provided.

3. Are the acceptable levels of aircraft noise for particular developments identified in AS2021 consistent with current community expectations?

AS2021 standards show that appropriate steps have been taken to protect noise-sensitive buildings through the setting of limits based on building type. Whilst it would be expected that public attitudes would vary accordingly to the building type, NATS cannot provide comment on the specific community expectations within Australia.

4. How can the current planning arrangement to address developments in noise-affected areas around airports and under flight paths be improved to take account of community expectations, while also providing for the reasonable growth of aviation activity at airports?

Previous experience has shown that communication of a range of sources of noise analyses improves community expectations. Of prime importance is the need to supplement ANEF contours with information that depict the likely impact of airspace and airport changes beyond the extent of the 20 ANEF. These may include a number of different methods to show the spatial distribution and density of tracks, operational and respite statistics, and maximum based noise indices.

In addition, difference contours based on L_{max} and SEL can be computed, alongside reference to the human perception of loudness instead of energy (for example a 10dB change is often perceived as a halving or doubling of noise intensity). Often, the sole use of energy averaged indices to communicate likely noise impacts is seen as being disingenuous by the public. The general community perception of these is that noise impact is confided within the contours, when in reality significant changes in noise environment can occur outside of these contours without any impact being portrayed; the inclusion of appropriate supporting material would reduce such misconceptions.

5. For developments around the major capital city and freight airports, should state governments have to refer residential development within a defined buffer zone to the Commonwealth Transport Minister or Secretary for approval?

NATS is not suitably familiar with Commonwealth legislation, nor Australian State and National Governmental involvement in development decisions to provide an appropriate response to this issue, therefore, NATS has not provided any further detail.

3.2 Protection of Operational Airspace

Issue: *Development of a uniform policy guideline for planning authorities to regulate the potential impact on aviation from new tall structures and vegetation (i.e. trees) on and off airports.*

Background

UK airport safeguarding policy, in relation to the control of developments that may impact airport operations, is based upon ICAO baseline principles and standards and due to the uniqueness of UK airspace, it has had to expand and in some cases deviate from the ICAO standards. Safeguarding at UK airports is covered under the UK Civil Aviation Authorities' Licensing of Aerodromes (CAP 168) document in support of the discretionary powers relating to the granting of an aerodrome licence contained in the UK Air Navigation Order (ANO).

The Civil Aviation Authority (Chicago Convention) Directions 2007 require the UK Civil Aviation Authority (CAA) to ensure that it acts consistently with the obligations placed on the UK under the Convention on International Civil Aviation, agreed in Chicago on 7 December 1944 (the Chicago Convention). Not all ICAO Standards and Recommended Practices (SARPs) and procedures have been fully implemented directly in the ANO, therefore, where the CAA has discretionary powers to grant a

licence, certificate or approval (provided it is satisfied as to the suitability of the applicant), the CAA is expected to implement such SARPs through its policy documents such as CAP 168. Where the UK has formally notified ICAO of differences to any of the SARPs in Annex 14, these differences are also published in the UK Aeronautical Information Publication (AIP) at GEN 1.7.

The ANO requires that, in the UK, most flights for the public transport of passengers, and all flights for the purpose of flying instruction, take place at a licensed aerodrome, or at a Government aerodrome. The Order also makes provision for an applicant to be granted an aerodrome licence subject to such conditions as the CAA deems fit. The purpose of the CAP 168 document is to give guidance to applicants and licence holders on the procedure for the issue and continuation of, or variation to, an aerodrome licence issued under Article 128 of the ANO 2005, and to indicate the licensing requirements that are used for assessing a variation or an application. The document also describes the CAA's aerodrome licensing requirements relating to operational management and the planning of aerodrome development. This document represents the minimum standards necessary to meet the licensing requirement.

Obstacle Safeguarding

The effective utilisation of an aerodrome may be considerably influenced by natural features and man-made constructions inside and outside its boundary. These may result in limitations on the distance available for take-off and landing and on the range of meteorological conditions in which take-off and landing can be undertaken. For these reasons, certain areas of the local airspace must be regarded as integral parts of the aerodrome environment. The degree of freedom from obstacles in these areas is as important in the granting and retention of an aerodrome licence as the more obvious physical requirements of the runways and their associated runway strips, and is determined by way of survey in accordance with CAP 232 – Aerodrome Survey Requirements. Due to the extent of obstacles/structures that might impact on aerodrome operations, it is imperative that national and local legislation standards are in place to regulate planning applications around aerodromes.

To support this process, NATS provides safeguarding expertise and specialist software tools to manage these services on behalf of aerodrome licensees. This might include training aerodrome personnel in the use of the software or for NATS to lead the design process. Safeguarding the Obstacle Limitation Surfaces (OLS's) is not the only function necessary to limit obstacle growth around airports but is also used to initiate a set of pre-defined processes to analyse the impact of such structures/obstacles on aerodrome operations. NATS can provide this expertise to analyse the impact on Instrument approach and departure procedures at aerodromes, and has been an integral part in many airport procedure redesigns worldwide.

As this issue is controlled at the regulator level, while NATS has provided brief considerations and opinions to support the discussion questions, no specific recommendations have been provided.

Discussion Questions

6. Should the current protection of airspace regulatory provisions be strengthened and broadened to cover all CASA-Certified and Registered aerodromes?

There are a number of existing guidelines which support the protection of airspace via regulatory provisions at Australian airports. Without sufficient experience in the Australian aviation regulatory system it would not be appropriate to comment on whether the existing provisions are sufficient, however it would seem sensible for a common policy to be used at all aerodromes to ensure equality and maintain the high levels of safety on a nationwide level.

7. How might state, territory and local government planning rules help protect airports from encroachment by unsafe intrusions into airspace?

As the obstacles and potential intrusions around each airport can vary significantly, planning guidelines that can be used across different tiers of government must be flexible, but also be easy to understand and enforce. In the UK, it is the responsibility of the airport operator/license holder, to ensure the safety of the airport operation; however, it is the UK CAA who have the remit to revoke operating licenses should an airport fail to comply with relevant safeguarding policy. Therefore a pertinent consideration in the development of policy for Australia would be that such policy must be enforced by legislation that enables the safety regulator to independently verify an airport's compliance with national guidelines.

3.3 Turbulence and Wind Shear

Issue: *To establish effective protocols for the assessment and possible mitigation of turbulence and wind shear potentially arising from new development in close proximity to runways.*

The control of development in the vicinity of an airport is largely controlled via Obstacle Limitation Surfaces as defined by ICAO. The additional national policy of Public Safety Zones in the UK (see section 3.8) often means new developments that may cause noticeable issues with the delivery of airport services are not allowed. These result in no formal requirements for detailed mechanical turbulence modelling assessments on proposed developments.

In the UK it is the airport operator's responsibility to ensure the safety of aircraft using the airport, and as such, NATS is often involved in consultancy projects to determine the impact of proposed developments on its flight operation. NATS does not explicitly model the effect of mechanical turbulence as it is not a problem in the UK, for the reasons detailed above. Therefore, NATS has not provided any further response to the discussion questions under this topic.

Discussion Questions

8. Should there be a consistent industry standard for mechanical turbulence and wind shear? If so, should the standard be proscriptive or allow for a case by case assessment?

9. Should expert modeling reports on turbulence and wind shear be mandatory for developments in close proximity to runways and who should bear the cost?

3.4 Wildlife Hazards

Issue: *The adequacy of existing land use provisions for the management of birdstrike (including bats).*

As in the previous section on mechanical turbulence, wildlife hazards are the responsibility of the airport operator as part of its operating license certified by the UK Civil Aviation Authority. The majority of airports in the UK have mature and effective on-airfield bird control programmes, following CAA guidelines on topics such as habitat management which discourages the congregation of birds in critical flight areas. Unfortunately with such wildlife it is often difficult to control the risk off-airport, and requires the engagement of the local community by the airport to ensure risks to the operation are managed. As part of this, NATS provides consultancy to UK airports to advise on aviation impact assessments to assist with wildlife mitigation investment decisions.

As this topic is not directly in the remit of NATS primary operations, NATS has not provided any direct response to the discussion questions under this topic. However it is clear that national guidelines for the mitigation of bird strike risk would be a distinct benefit to protecting the safety of airport operations.

Discussion Questions

10. Given variable regional circumstances for birds and flying foxes, would a recommended standard zone (e.g. 15km radius) be appropriate?

11. What other planning issues might arise in safeguarding against birdstrike?

3.5 Wind Turbines

Issue: *To reach agreement on the rules and notification procedures for assessing the impact of wind turbines.*

Both aviation and wind energy are crucial to UK national interests, however, both industry sectors have legitimate interests that must be balanced carefully. The UK Government has imposed targets on the amount of electricity produced from renewable energy sources and it is expected that wind energy will form a large part of achieving the target.

An adverse effect of the proliferation of wind turbines on the aviation industry is the effect on surveillance systems. The taller and larger the wind turbine, the greater the likelihood that it will cause unwanted radar returns which appear as clutter on the air traffic controller's radar screen.

As the interests of the respective industries must be protected, a practical approach is essential for resolving any conflicts between the Government's energy and transport policies, the UK CAA therefore devised a set of guidelines for aviation stakeholders to address wind energy related issues.

As with technical Communications, Navigation or Surveillance (CNS) installations, legislative provisions on wind turbine development are set out in the Town and Country Planning Act. The CAA produces safeguarding maps which determine 3D surfaces where obstructions such as wind turbines should not penetrate. The CAA does not, however, have regulatory powers to approve or reject development planning applications alone, rather it is the responsibility of the developer to inform the appropriate consultee (in this case the CNS technical site operator) of the proposal. The technical site operator will then follow UK planning law and raise an objection to a wind turbine development if it is found to impact ATC service provision.

As NATS provides en-route ATC services in the UK, NATS is responsible as a statutory consultee to ensure that wind farm developments do not impact the technical systems that support air traffic management. In addition, NATS acts as a consultant to airport operators when such developments encroach upon airport safeguarding surfaces. NATS is able to effectively evaluate the likely technical impact of a wind turbine development on its service provision and as such assess the feasibility of wind turbine planning applications.

In general, NATS is consulted whenever a wind turbine development is proposed within the operating range of a radar or within the operational zone of the airport, although these criteria are derived from general guidelines on safeguarding criteria such as those used for technical sites.

NATS worked extensively with BAA Scotland to mitigate the anticipated effect on Glasgow airport operations of Scottish Power's proposal for Europe's largest onshore windfarm at Whitelee. As a result of the impact to existing radar services, a new primary radar site was needed to offer the requisite airspace coverage; the data from both existing and new radars was combined to give air traffic controllers a complete surveillance picture whilst allowing the windfarm development to proceed. In late 2008, the windfarm built its 91st turbine, making it officially the largest operational onshore windfarm in Europe, generating enough green energy to power over 117,000 homes.

Discussion Questions

12. What guidance do state, territory and local governments require on the siting of wind farms and the potential impacts on aviation?

There is significant evidence to conclude that wind farms do impact on the ability to deliver an ATC service due to the wind turbines ability to interfere with surveillance systems. NATS, as a requirement of its operating license, has developed specialist assessment techniques to determine the likely impact of wind farm developments on its service; as such it is necessary to have a mechanism within which the interests of the aviation industry and the wind turbine developer can be balanced.

The UK approach utilises existing planning law to facilitate the mediation of parties, with the wind farm developer lodging its intentions (and potentially engaging with NATS before the planning application stage) and then NATS will proceed to evaluate the likely impact and thus object if necessary. This mechanism allows for appropriate representation between key stakeholders, and also allows responsibility for mediation to rest with the Local Planning Authorities (LPAs). Where agreements between the

parties cannot be reached, the UK system allows for national government intervention, in the form of a planning inquiry.

NATS suggests that in considering wind farm issues for the white paper, Australia must ensure a flexible approach, which allows all sides to present arguments towards a wind turbine planning application, including the production of impact assessments, and for such developments to be decided at the local level, with minimal national government involvement.

13. Should developers of wind farms be required to provide CASA with a report on the potential impacts on aviation and aviation infrastructure of the turbines?

Currently the production of a report by the developer on aviation impacts is not carried out in UK practice. This is primarily as the technical systems impacted by wind turbines are often complex electromagnetic systems and impact assessments must therefore be carried out by system specialists.

Whilst a proposal to put the onus on wind farm developers to produce a report on aviation impacts would result in the mandatory submission of relevant considerations with a planning application, the wind farm developer would have a conflict of interest, as showing significant impact would be detrimental to the planning application. In addition, it would require the developer being technically capable in the detailed operation of surveillance and other aviation-related CNS systems, whose expertise clearly lies with the operator.

The establishment of an effective local planning system which used national guidelines to inform aviation safeguarding principles would facilitate a simple mechanism for controlling all types of development, including wind turbines, within areas that may disrupt air transport services.

NATS suggests the formal requirement of the production of an aviation impact report for CASA by wind farm developers would not necessarily be beneficial as it may lead to key stakeholders not being appropriately represented in the planning application process. NATS recommends that a mechanism is used where all stakeholders are fairly represented, and in which independent experts provide the pertinent technical information.

3.6 Technical Facilities

Issue: *The effectiveness of existing planning rules to minimise the impact of new developments on radar and navigation systems.*

In the UK, the responsibility for safeguarding the technical facilities that support air traffic management is dependent on the area of control. For en-route operations, there is legislation which dictates that NATS En-Route Limited (NERL) should be a statutory consultee under the UK Town and Country Planning Act when developments are planned in the proximity of en-route communications, navigation or surveillance (CNS) systems. The specific proximity depends on the technical installation in question; however the criteria for further investigation are set by NATS, cascaded from UK Civil Aviation Authority (CAA) Safeguarding regulatory guidelines. The NERL Safeguarding

department then considers all development applications forwarded by Local Planning Authorities (LPAs) for potential interference with the ATC service.

For Airports, the responsibility for maintaining technical CNS services rests with the airport operator as part of their operating license; as such, they are responsible for the production and distribution of CAA-approved consultation zone maps to LPAs that can extend as far as 50km from the airport. At the 15 UK airports in which NATS provides ATC and engineering services, NATS provides specialist systems engineering consultancy to evaluate relevant planning applications on behalf of the airport operator.

NATS (either via NERL safeguarding or NSL specialist consultancy) will initially assess a planning application for potential conflict against the defined zoning criteria set against certain technical installation sites; for example, Radars, Navigational Beacons, and Airport landing systems all have specified zones within which proposed development would require a detailed engineering impact investigation. The investigation would assess whether the proposed development would erode the operational integrity of the CNS facility, the result thus informing NATS response to the planning application.

In en-route and airport areas, the mechanism for the consideration of planning applications follows UK Planning Law. NATS options for response are simply, no objection to the development, or, to raise an objection and cite the impact on ATC service. In this instance however, NATS is only acting as a consultee, and the LPA may choose to find against NATS' response. In UK planning law, there is a mechanism for appeal, and further, for planning inquiry, should such a development be suitably controversial.

Discussion Questions

14. Should development of technical facilities near aerodromes (say within 5 km) require automatic referral to CASA for assessment of impact on radar and navigation systems?

As Australian CNS systems are owned and operated by Airservices Australia and the Australian Department of Defence, it would be unnecessary to implement a system in which an intermediary is required to carry out technical impact assessments. Whilst such an automatic referral system would centralise the issues, the organisation best placed to carry out the technical assessments would be the site owner/operator.

In the UK, NATS maintains a variety of national CNS installations and as such, is best placed to carry out investigations as a result of planning applications for proposed developments. It carries this function out on behalf of the CAA as part of its en-route operating license, but also on a consultancy basis on behalf of airports, in compliance with the airport's own operating license.

As such, on production of the White Paper, NATS suggests any policy on the safeguarding of Australian technical sites must draw on the expertise of the site operators to carry out impact assessments. However, as in the UK, guidelines for the range and shape of zones around such sites, within which detailed assessments would be necessary, may be set by the regulator CASA, to ensure consistent application. In addition, unless CASA intends on mediating planning decisions instead of LPAs, there may be benefit in allocating the approval of "consultation zones" around airports to CASA, but still devolving the control and administration of planning within such zones to LPAs. This would reflect a similar operation to proposals for Public Safety Zones.

15. What additional guidance do state, territory and local governments require on the siting of technical sites and the potential impacts on radar and navigation systems?

UK guidance on safeguarding criteria for CNS systems has been set by the CAA; in addition, NATS places a more detailed set of evaluation criteria on its own technical sites that enhance those in the guidelines. As the assessment against such criteria falls to NATS, it is unnecessary for such criteria to be issued as guidelines for state, territory and local governments.

However, it is sensible for guidelines in the form of consultation zone maps to be issued to relevant bodies. In the UK, consultation zone maps for airports are issued to LPAs at the discretion of the airport, and for en-route technical installations, consultation zones are determined by the CAA and cascaded to LPAs.

NATS therefore suggests that any governmental guidelines on technical site safeguarding would be most beneficial for defining consultation zones for LPAs, within which specialist impact assessments should be considered. The assessments themselves must be completed by system experts to ensure planning decisions can be made upon detailed information.

3.7 Lighting and Pilot Distractions

Issue: *The adequacy of existing laws to restrict the use of lasers, high intensity lighting and other potential pilot distractions in the vicinity of airports.*

In the UK, the CAA has developed guidelines for the use of lasers, searchlights and fireworks in and around UK airports. The control of such pilot distractions and the enforcement of policy is their remit as aviation safety regulator and therefore the CAA has established a notification zone around airports, within which airports must be notified of light or firework displays that may distract pilots. A more recent trend is pilot distractions arising from handheld lasers used by individuals that are intent on disturbing aviation operations; if it is proven that such action has caused unnecessary danger to aircraft operations, there exists powers to prosecute such individuals.

As this topic is the remit of the aviation safety regulator, NATS has not provided any further response to the discussion questions under this topic.

16. Are CASA's current requirements sufficient, and what additional guidance might state, territory and local governments require regarding lighting and pilot distractions?

3.8 Public Safety Zones and Third Party Risk

Issue: *To work with planning authorities to identify zones adjacent to the end of a runway where special considerations might be applied to new developments to maximise safety.*

Public exposure to the risks associated with airport operations are controlled in the UK by the application of Public Safety Zones (PSZs). As UK PSZ policy, led by NATS, is the only worldwide policy used nationally to safeguard the public from the risk of airport operations, a detailed background in the field is given to provide context to NATS' response on the issues surrounding development of PSZ policy for use in Australia.

Background

The use of PSZs in the UK has existed since 1958 following recommendations from the Committee on Safeguarding Policy. The sole purpose of the establishment of PSZs was to minimise the exposure of the public to the risks associated with airport operations; this is achieved via control of development within a PSZ.

Inspired by ICAO safety areas, PSZs originally were designed to fan out from the runway end in a trapezium shape to contain more than half of accidents (Figure 1); as such the length of the standard PSZ was set at 4,500ft for large airports, based on the analysis of accidents.

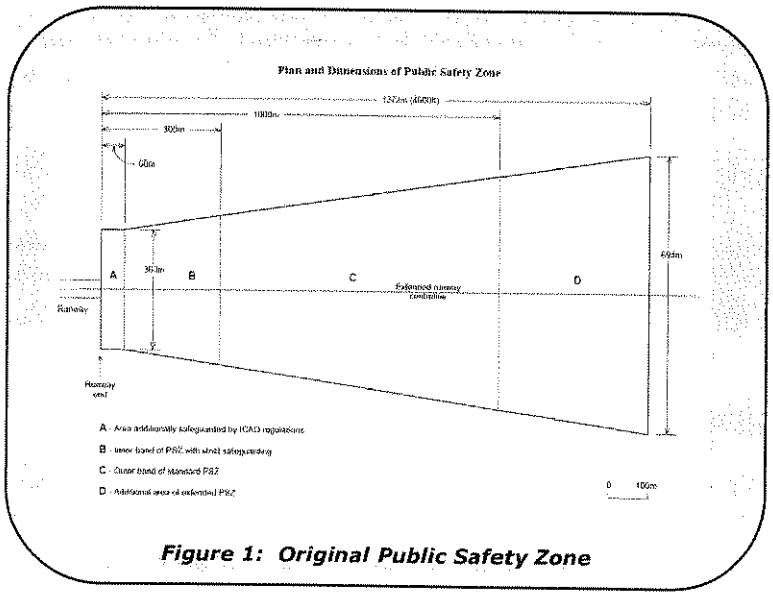


Figure 1: Original Public Safety Zone

In 1981, PSZ policy was refined to implement reduced length PSZs at aerodromes with smaller numbers of annual air transport movements and at airports with different operating characteristics; the largest size PSZ at 4,500ft was therefore only implemented at the largest UK airports. The risks from aircraft operations, and as such the size of PSZs in place, were only correlated with the number of annual traffic movements, which led to many airports having the same size and shape PSZs despite large variations in the way they operated.

In 1994, due largely to the interest in airport risk during the Manchester Airport Second Runway public inquiry, the Department for Transport (DfT), known then as the Department of Transport (DoT), commissioned a review of PSZ policy and administration. The objective of the review was to ascertain whether the policy could be strengthened with scientific basis by taking into account advanced risk assessment techniques. The review was led by a consultancy team in NATS who advised on:

- whether there was sufficient evidence, of reliable quality, to make risk contour modelling feasible
- what levels of third party risk near airports were tolerable, or intolerable

Since then, NATS has continued to drive development of PSZ methodology by acting as the DfT's technical consultant on PSZ policy.

The DfT, (at the time titled the Department for Environment, Transport and the Regions – DETR), published a document in 1997 outlining the review findings (available from www.dft.gov.uk/aviation). That document reached the following conclusions:

- Individual Risk (IR) was found to be the most useful measure of Third Party Risk, since it allows the production of risk contours which can be mapped using Geographic Information System (GIS) Software and used to identify areas exposed to given risk levels.
- The bespoke NATS TPR empirical models, compared with others, used larger data sets, giving greater confidence in the accuracy of results.
- Cost-benefit analysis was chosen as the most appropriate method for defining PSZ policy. The DoT has used a similar approach for a number of years in road safety investments and both surface rail and London underground work.
- The UK Health and Safety Executive (HSE) recommends an upper tolerable risk level of 10^{-4} per year for members of the public, this is used in other safety critical industries such as the nuclear and petrochemical industries.
- The cost-benefit study reached the following conclusions regarding land use:

Individual Risk Level[1]	Conclusion
IR $\geq 10^{-4}$	Strong case for the removal of housing and other development occupied by third parties for a high proportion of the day.
IR $< 10^{-4}$	No case for removing existing housing/non-housing.
$10^{-4} >$ IR $\geq 10^{-5}$	There is a case for inhibiting new housing, and non-housing development (unless it has a low density of human occupation averaged throughout the day). There is a case for permitting extensions to housing.

In addition to an appraisal of third party risk assessment techniques and a recommendation of public safety zone policy to be used in the UK, the document included full details on the NATS methodology developed for airport risk assessments. The NATS methodology showed that the old-style PSZ shape, whilst appearing intuitive in fanning out from the runway end to follow departure routes, did not reflect the real distribution of risk. The NATS third party risk methodology was applied to a selection of major UK airports to assess the risk from operations and determine how the proposed revised PSZ policy might affect them.

[1] 10^{-4} is short form notation of a risk relating to 1 in 10,000. Similarly, $10^{\wedge-5}$ is equal to a risk of 1 in 100,000

The NATS Methodology

Modern geographical risk assessment techniques measure Individual Risk – i.e. the risk arising from a certain event to an individual occupying a specific location. In the context of airport third party risk, the event to be assessed is an aircraft crash. The NATS Third Party Risk methodology comprises 3 model components which together determine the individual risk profile of an airport:

- Crash frequency model - the statistical expectation that an aircraft crash occurs in the vicinity of the airport
- Crash location model - the probability, given that a crash has occurred, that it affects a particular location
- Crash consequence model - the size of the area likely to be affected as a result of a crash and the probability of fatality for people on the ground within that area

All components utilise historical crash and movement data from a variety of sources to form a core risk methodology applicable to all airports. Parameters associated with the airport that is to be assessed are then fed into the model components to tailor the risk profile results to make them airport scenario specific. Parameters include: the location of runway landing thresholds, the number of annual movements, the mix of aircraft, and also the method of operation of the flight (e.g. passenger, cargo). The datasets that lie behind the core model components are updated periodically to ensure risk assessments appropriately reflect actual risk trends.

The model components use data appropriate to their individual aims; the data has been filtered for each component to maximise model robustness, ensure consistency and improve the accuracy of the risk methodology. The components combine to give individual risk values surrounding an airport, these values are turned into isoline risk contours from which PSZs can be derived. Further details on how these risk contours are used in UK PSZ policy are outlined later.

The original risk methodology developed by NATS undergoes continuous improvement to improve the accuracy of the Individual Risk assessments. This has largely been achieved by analysing data on recent crashes and updating the core model parameters that are used in the modelling process; this ensures aircraft accident trends are taken into account in any risk modelling and that PSZ assessments accurately reflect the risk present from an airport's specific operation.

In 2000 the DfT began a full public consultation on PSZ policy and the NATS methodology that was being used to inform the risk assessments. This process engaged the public who would be affected by the implementation of such a national policy.

It was decided that PSZ policy should be based on traffic forecasts at 15 years in advance of the year of assessment. This allows the establishment of PSZs which would encompass the areas at risk not just from current operations but also those that may be at risk from anticipated traffic growth. As a result, all risk assessments model forecast traffic for the chosen airports and risk contours reflect the potential risk that may be present in the lifetime of a PSZ.

The approach developed from modern risk assessment techniques was sufficiently strong to form the basis of new airport TPR assessment techniques and statistically-informed PSZ policies. In 2002, after extensive consultation on PSZ policy and the

supporting NATS methodology, it was formally determined that the PSZ policy based on qualitative risk assessment techniques would be implemented at major airports. NATS then modelled the risk profiles of 29 major UK airports and the resulting PSZs were delivered to the DfT for implementation.

NATS and the DfT are committed to continually reviewing PSZ methodology to ensure that the risk to third parties from airport operations is appropriately assessed. As such, PSZs are reviewed on 7-year cycles to ensure they appropriately reflect trends in airport traffic. In order to ensure the methodology was as robust as possible for the first round of revised PSZ assessments, NATS performed another refresh of the data behind the risk methodology in 2007.

The model outlined above has been used to derive all UK airport PSZs on behalf of the DfT, as well as the evaluation of risk zones at international airports. The model has also been used to evaluate the risk to third parties at specific developments in the vicinity of airports.

Policy

UK PSZ Policy was developed on the basis of NATS' TPR methodology in 1997; it is administered by the UK Department for Transport, which liaises with airport operators to define their PSZs. NATS used constrained cost-benefit analysis to evaluate whether the benefit gained from reducing individual risk outweighs the cost of restricting development in the 10^{-4} and 10^{-5} individual risk contours. The study proposed the following land use planning restrictions:

Tolerability Criteria	Land Use Restrictions
$IR \geq 10^{-4}$	Removal of housing
$10^{-4} > IR \geq 10^{-5}$	Prevent new housing and non-housing development but there is no need to remove existing development. (Existing house extensions allowed). Non-housing development with low density of human occupation may be allowed (e.g. long stay car parking).

PSZ policy has not changed since the individual risk-tolerability criteria were derived circa 1996 using cost-benefit analysis, the results of which will not change over such a relatively short time period. Parts of the cost-benefit analysis were repeated by the Health and Safety Executive in 2007, to re-assess the tolerance towards risk in order to support the analysis of recent events. Those studies confirmed that, even a decade after the original PSZ work, the PSZ tolerability criteria originally derived are still valid.

Due to the complexity of enforcing land restrictions within exact individual risk contours, NATS proposed the use of Public Safety Zones at UK airports that are based on the contours and are also a simple geometric shape which would be easier to implement by local planning authorities. After public consultation, NATS proposed a 'pinched' isosceles triangle shape whose dimensions would be directly related to the airport's specific operation and which would encapsulate the entire 10^{-5} risk contour whilst minimizing unnecessary land restriction. This method requires only 5 co-ordinates to define the vertices of the pinched triangle, making implementation and identification in

practice far easier for local planning authorities; this is the shape that was approved for use by the DfT and is used at most airports in the UK today (Figure 2).

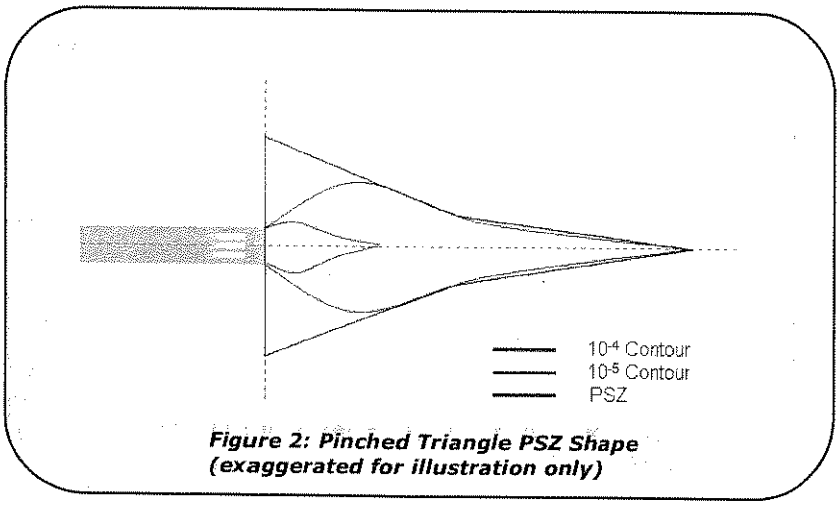


Figure 2: Pinched Triangle PSZ Shape (exaggerated for illustration only)

PSZ policy only applies to existing airports where the level of traffic warrants the creation of safety zones; this level is where Air Transport Movements exceed 1500 per month. Proposed airport developments which may change the level of risk need not necessarily be constrained by PSZ policy, but any planned developments that do affect the size, shape, number or location of Public Safety Zones will result in the PSZs being reviewed once development is approved and in place. All PSZs are reviewed at approximately 7-year intervals to ensure that they accurately reflect changing airport activity and that any changes to the predicted risk profile of the airport are taken into account.

Societal risk analysis gauges the impact on society from the realisation of an accident; studies have shown that public reaction is far more adverse to infrequent incidents that claim large numbers of victims than to frequent incidents that claim a small number of victims. It is a subjective measure of risk, and as such, it was acknowledged during the development of PSZ policy that determining tolerability criteria for societal risk would be open to differing views. Additionally, the cost-benefit analysis performed at the time has inherent societal risk considerations and as such, no dedicated societal risk methodology has been developed.

UK PSZ policy is an example of best practice airport safety zone policy, having benefited from almost a decade of development and implementation at airports across the UK. The combination of empirical third-party risk assessment and optimised PSZ policy have created a robust system for the control of exposure to risk, and one that can be applied nationally with confidence.

Discussion Questions

17. Should an approach based on the identification of public safety zones be introduced to help ensure that new developments around the ends of runways do not lead to undue levels of risk?

NATS has carried out significant research into the location and consequences of aircraft accidents in the vicinity of airports. This statistical research found that accidents are more than twice as likely to occur during the takeoff and approach phases of flight in airport areas as during normal en-route operations; as such NATS fully advocates the implementation of a national policy that would limit the exposure of risk to people in the vicinity of airports.

In the UK, NATS has fully supported HM Department for Transport in the establishment of PSZs at major UK airports, ensuring the public's exposure to the risk from airport operations is controlled via restrictions on the number of people living, working and congregating in PSZs. It achieves this result by implementing guidelines on PSZ policy at a governmental level, under which Local Planning Authorities must follow. This ensures national interests in public safety are followed consistently, but devolves administration to lower tiers of government for day-to-day administration and enforcement.

The UK example demonstrates a process that NATS developed in partnership with the DfT. This exemplifies how scientifically-derived risk models can be used to effectively determine the areas at most risk, and use these to inform the often emotive issue of public safety.

It is recognised that the state of Queensland, Australia includes considerations toward public safety in their state-planning policy guidelines, however the public safety area guidelines it contains are based on research completed some time ago, and since then, PSZ policy has matured greatly, influencing the shape of PSZ commonly used.

It should be noted that PSZs are not a mechanism for restricting airport growth nor imposing unnecessary land-use restrictions on developments in the vicinity of airports, they are merely a way of controlling public exposure to risk from airport operations. As such, UK PSZ policy is a successful example of how competing development ambitions, those of the airport and the local public, can be coordinated by local planning authorities to ensure safety is not compromised.

NATS fully encourages the Australian Government to take a proactive approach to airport third party risk management. The implementation of such a policy in the UK has proved successful in limiting the number of people exposed to airport risk, and allows for potentially conflicting aims to be coordinated based solely on safety grounds. A national policy would ensure safety is considered fairly and consistently across all states, which is a crucial factor in enabling engagement of a policy which may affect sizeable urban populations.

18. For which airports might such public safety zones be identified – all airports or only major airports with regular airline traffic?

In the UK, PSZs have been established at all major airports; the DfT recommends that PSZs should be established at airports which are shown to average 1500 Air Transport Movements (ATMs) per month at the time of implementation and in due course are likely to exceed 2500 ATMs per month.

Whilst there is a risk present from smaller airports/airfields that may have sizeable private flying clubs, the risk from such operations is usually too small to establish functional PSZs.

It should be noted that a methodology to assess risk at airports should be flexible to effectively analyse risk at all airports, however the results would be specific to their methods of operation. As such, there would be no need to have a policy in which smaller airfields were given a standard 'one size fits all' zone. In the UK, NATS developed a core risk model which is customised by an airport's method of operation, this ensures a consistent risk assessment technique between all airports, however it also allows for assessments at airports of varying characteristics.

NATS therefore recommends that any PSZ policy must cover the major airports in Australia that exceed 1500 ATMs per month. PSZs may also be applied to smaller airports at the discretion of the government where it is believed they would be of benefit (e.g. locations where there is sizeable development in close proximity to an airfield). Such a policy should be consistent across all airports, with small airfields having the same customised analysis approach as for larger airports.

19. What methodology and criteria should be applied in defining the boundaries of a PSZ?

It is clear from the public consultation on PSZs carried out in the UK that a transparent policy and risk methodology is necessary to ensure engagement of the policy by the public.

NATS methodology developed for use in the UK has previously been published to detail the core model components and how the process works. This openness to scrutiny allows the methodology to be more robust, taking into account suggested improvements or refinements as appropriate. The methodology has been used as part of national PSZ policy to establish PSZs at all major UK airports and also to inform airports worldwide of their risk profile. Any implemented methodology must benefit from investment to keep it up to date, reflecting current aircraft safety trends, to ensure PSZs are accurate. NATS also maintains regular links with academic field experts to ensure that best practice is maintained and therefore, NATS would recommend that any developed policy in use in Australia should utilise academic expertise.

A key issue regarding the aircraft accident data within the methodology is what specific historical crashes should be considered. The NATS model was designed to assess risk at airports in the UK and in first world[2] countries; as such, the accident data and resulting model parameters contained within the methodology reflect this. In developing a national methodology for use at Australian airports, NATS recommends research is carried out into whether sufficient accident data exists to create a methodology based solely on Australian accident data. However, if, as is the case in the UK, sufficient country-specific data does not exist due to its high safety record, it would be likely that a first-world type methodology would also fit appropriately.

Whilst it is important for a national methodology to be developed that allows for a consistent PSZ policy, it is necessary that a risk methodology takes into account the differences in airports' individual operating procedures. For example, in the UK, the forecast traffic using an airport tailors the results of the risk assessment, which directly determine the size and dimensions of a PSZ. This is crucial as it allows airports with safer traffic mixes to have less land-use restrictions than those airports operating an older, less safe, traffic mix.

It should be noted that PSZs are based on an airport's forecast traffic data to ensure that recent local developments that lie within a new PSZ area may remain with a reasonable lifespan; therefore, UK PSZs are refreshed on approximately 7-year cycles.

[2] First world countries include: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong, Iceland, Ireland, Italy, Japan, Luxembourg, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, The Netherlands, UK, USA.

The criteria used in the UK to determine the boundary of a PSZ was determined during development of the policy. Constrained cost-benefit analysis was carried out by the Centre for Transport Studies, University College and Imperial College London, to determine the threshold level of risk, above which land use restrictions would be beneficial to controlling risk exposure. Work carried out by the UK Heath and Safety Executive (HSE) in 2007 demonstrated the results found from the original cost-benefit analysis still hold, in that the current 1 in 100,000 risk contour should remain the risk level that defines a PSZ.

In addition, PSZ policy defines a high-risk contour area within which the risk exceeds 1 in 10,000. This unacceptable risk threshold is consistent with those the HSE applies to other industries such as the petrochemical industry; as such, measures must be taken to reduce the number of people exposed to this risk.

NATS does recognise that other countries and industries sometimes use larger risk areas to define safety zones, however such zones can extend far further than the reasonable range of "airport operations" and have little cost-benefit basis for any PSZ policy. In addition, the PSZ boundary representing risk equal to 1 in 100,000 is actually much lower than risks experienced in everyday life, for example in 2008 the risk of death from a road accident in the UK was 1 in 18,500.

Other methods of airport risk assessment have been considered for use in the UK, however many lack the required resolution to allow geographic regions of most risk to be determined, or introduce subjective risk indicators into the methodology; such risk assessment techniques have therefore been discounted for use in UK risk assessments in favour of a more robust and practical methodology.

NATS therefore recommends that a transparent methodology is used to deliver scientifically robust risk assessments, based upon historical data that accurately reflects the risk present from Australian airport operations. In addition, the risk assessment methodology must be partnered with a PSZ policy that controls the risks fairly between all airports but allows for individual airports to improve their risk profile. Such a methodology must take into account future airport operations appropriately, to give stability to the PSZ policy.

20. What sort of additional controls might be imposed for new developments in identified PSZs?

As part of UK PSZ policy, constrained cost-benefit analysis was used to ascertain the threshold level of risk, above which a PSZ should be based. In addition, analysis was carried out to determine precisely what land use controls would be appropriate within a PSZ to control the exposure to airport risk.

The research found that inside a PSZ, there was a case for limiting new development. However, there was no case for removing existing development that was determined to be inside a new PSZ region. This work formed the basis of PSZ policy when it was revised in 2002 and it currently underpins all land-use decisions around airports in the UK.

In addition, PSZ policy also includes land-use restrictions for the high risk contour area within which the risk exceeds 1 in 10,000. In this region, no residential or work development is allowed as such levels of risk have been determined to be

unacceptable for the public by the HSE, consequently, measures must be taken to this reduce risk.

As these are guidelines, there are minor exceptions which are considered on a case-by-case basis. For example, new transport developments may be built within a PSZ where there would be significant benefit and risks could be controlled. Such cases would be subject to Governmental consideration by the department who sets PSZ policy.

Whilst the implementation of such land-use controls within a PSZ fall to local planning authorities, controls for developments that fall within an unacceptable high-risk range must be backed by government legislation that can enable the compulsory purchase of properties. In the UK, PSZ policy enforcement falls to local planning authorities at a council level; however the Secretary of State for Transport has the power to grant compulsory purchase orders on behalf of airport operators where it is necessary to remove developments within unacceptably high areas of risk.

Therefore NATS recommends that any PSZ policy introduced to Australia must be a consistent set of objective guidelines for application at all appropriate airports. This should include necessary details to allow local planning authorities or states to carry out PSZ administration independently. This shall allow for the Government to act as an impartial owner of the policy itself, in order to consider special exceptions and interpretations of the policy.

21. What sort of steps might be taken to ensure the identification of a PSZ does not unduly affect the value and enjoyment of existing properties within the zone?

Existing developments within a PSZ are not required to move as the risk is comparable with everyday risks such as the risk of a car accident; therefore there should be no effect on the value and enjoyment of existing properties given the establishment of a PSZ.

What must be made clear to the public on the adoption of a PSZ policy is that the risk from airport operations already exists, however the identification of a PSZ, and the guidelines for development within it, are a new mechanism to control the ongoing exposure to the risk. Consequently, UK PSZ Policy outlines that no compensation is payable to existing development owners solely as a result of the definition of public safety zones. Under certain circumstances, compensation in the form of a purchase notice is payable where a site is incapable of being put to any alternative beneficial use as a result of it being within a PSZ, such practice however is rare. If compensation was to be payable, it would be the liability of the airport owner and be paid via the local planning authority who would carry out the purchase notice.

In addition, PSZ policy allows for some common redevelopments such as extensions to residential housing and the change of use of business developments, but only where the occupancy of such developments does not increase; again, such practise is rare in the UK.

NATS believes there should be no reason for the identification of a PSZ to unduly affect the value and enjoyment of existing properties as the risks from airport operations were always present. However for completeness, any PSZ policy for use in Australia must include appropriate provisions for special circumstances where compensation may be payable.

tabled by SACF Inc at airservices inquiry in Sydney on 28 may 2010.

COMMUNITY NOISE REPORT SUMMER HILL (II) 2003 - 2009

By Johann Heinrich[#1] & Philip S. Lingard [#2]

ABSTRACT

This study is part of ongoing community aircraft noise monitoring being carried out by a Summer Hill resident (JH) . The location is opposite a large primary school in Moonbie Street. Aircraft noise levels have been monitored using a computerised data logger since 2002. The previous paper in this series[#3] reported sound level data recorded between mid 2002 and December 2005. This paper reports the maximum recorded sound levels (LA max) for jet aircraft noise events from 2002 to 30 June 2009, inclusive. Three and a half years on we can confirm the continuing high level of average noise , caused by indecently low-flying by large noisy jet aircraft and flight track concentration across this one location.

The data logger captures more than 60% of airport jet departures from Runway 34L at this one address, amounting to more than 14,000 departures per annum from 2004 to 2005. Time-of-departure verification against Airservices Australia data confirmed this percentage concentration. For the entire seven years from 2002-2009 the average maximum noise level (LA max) was 75 $dB(A)_s$ ± 5.6 (Standard Deviation). In 2002-2003 the proportion of departures exceeding 80 dB(A) was between 47 and 55%. However, the proportion exceeding 80 dB(A) declined from 45% in 2004 to 14% of total in the first half of 2009. From 2002 through 2005 more than 80% of noise events exceeded 75 dB(A). This percentage declined to around 46% in the three years from 2007 to 2009 . The computed Australian Noise Exposure Index (***ANEI*** -365 days) for the entire period averaged 20 dB(A) ± 0.9 and over 22 ± 1 dB(A) by operational period . The Energy and Time Averaged Equivalent noise level LA_{eq} was 53 dB(A) ± 15 on a whole of year basis, and over 55 dB(A) by operational period. Such values were not predicted for the Summer Hill - Ashfield area by Sydney Airport's Master Plans (2023 or 2029) until after 2023.

Such ***ANEI*** are considered only ***"conditionally acceptable"*** for home building approvals near an airport by Australian Standard AS 2021-2000; and the LA_{eq} unsuitable for residences adjacent to noisy industrial sites according to NSW EPA ***"Industrial Noise Policy Guidelines (2000)"*** for suburban areas. Such noise averages are considered excessive and potentially harmful to important aspects of human health and welfare according to World Health Organisation-commissioned report in 1995. The herein reported maximum decibel (LA_{max}) results confirm the general event noise levels obtained by Airservices Australia in their Environment Branch [EB] Summer Hill Report No. 1360 (2003), excepting that our LA_{eq} and ANEI are greater.

For clarity we mention that reported sound levels (LAmax) are in A-weighted "Slow" -averaged decibels [$dB(A)_s$] as required for aircraft monitoring by Australian Standard (AS2021). This measure for aircraft peak noise is about 3 -4 dB *less* than common for both peak and continuous monitoring of general environmental noise. On paper this makes a typical recorded aircraft noise appear *much quieter* than it really is. It is also noted that the A-weighting significantly attenuates low sound frequencies (< 160 Hz). It is such lower frequencies that can cause significant disturbance for people with hearing disorders such as Tinnitus and Menier's condition, and is also implicated in building vibration-induced damage.

Whilst we can report marginal gains since 2005 , the outcomes are not overly commendable. The onus for further improvement is on Airservices Australia, whose refusal to implement the promised ***LTOP***[#4] appears behind the problem. Remedial action is needed through both intelligent air traffic control , and the full ***LTOP*** implementation promised in 1996. In particular Airservices must devise better noise abatement departure protocols (NADPs) than the minimalist ICAO-"A" (now NADP 2) and low-level minimum fuel consumption (MFCDP)[#5] takeoffs practised now. There should also be significantly increased use of over-water modes.

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2 P. S. Lingard has been a resident of Ashfield for 39 years

3 Community Noise Report Summer Hill , Preliminary , Dec. 2005 [SACF Doc. 2006/028]

4 *Long Term Operating Plan for Sydney (Kingsford Smith) Airport*, Airservices Australia Dec. 1996 .

5 MFCDP = "Minimum Fuel Consumption Departure Protocol"

In 2006 one of us (PSL) demonstrated proposed departure procedures using steeper initial climbs to potentially reduce ground noise at Summer Hill by from 10-20 dB(A) for B747's (IMC)[#6] . The US FAA's INM[#7] computer model was used for this. Such steep takeoffs from Runway 34L are presently inhibited by a potentially dangerous ceiling of overflying arrivals (heading south at 6000 ft across Summer Hill) which would not exist had LTOP been implemented with its original offshore ("high & wide") arrivals component. Figures 1 [(a) & (b)] illustrate the inherently dangerous arrival ceiling (square data points) over Ashfield and Summer Hill.

FIGURE 1 (a) THE ARRIVAL CEILING OVER SUMMER HILL:

Image by P. Lingard by digital reconstruction. Airservices Data of Figs 7 & 10 of EB Report 1360 2003 [ibid. 9] .

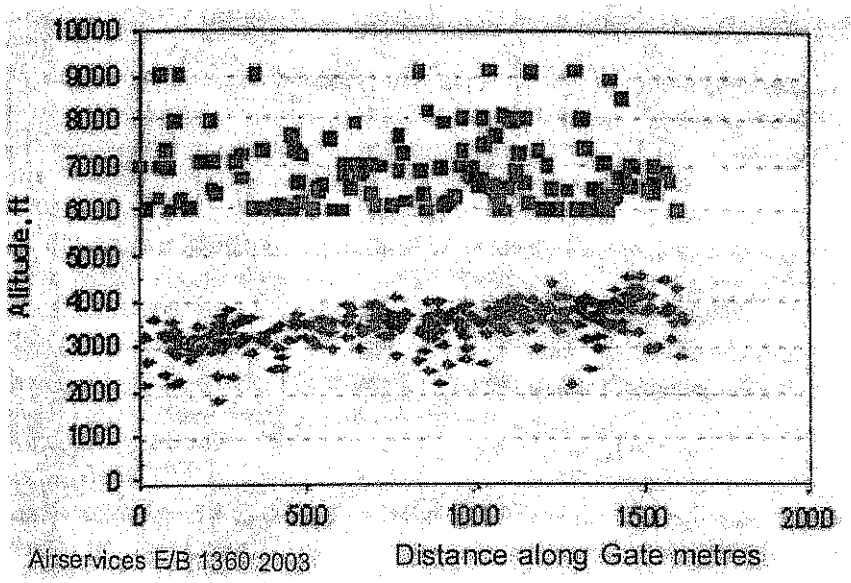
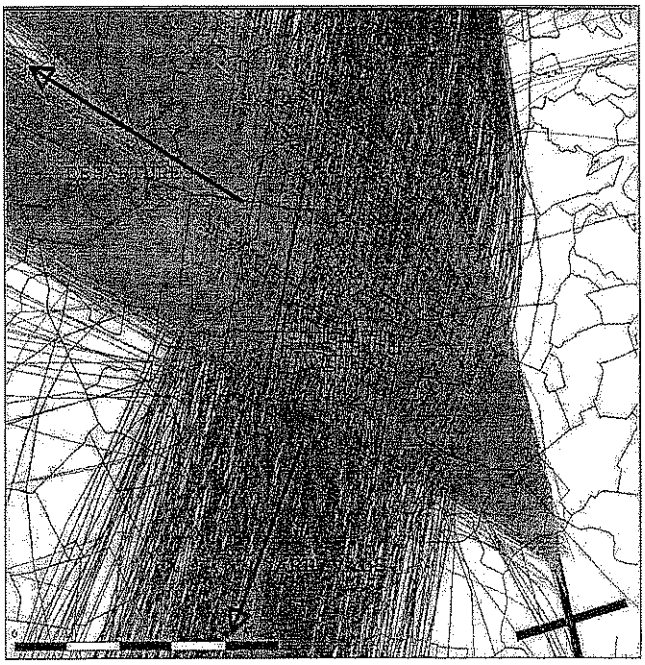


FIGURE 1 (b) PLAN VIEW OF CROSSING FLIGHT PATHS IN (a) :

Image annotated by P. Lingard from Airservices Flight Track Data 13/2/2003 to 17/5/2003 06:00 - 23:00. Supplied for Research and Private Study by NEU by M. Chipman resulting from TNIP enquiry to D. Southgate of DOTRS . 1 August 2005 .



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6 *SUPPORTING DATA FOR SACF NOISE ABATEMENT DEPARTURE PROTOCOL [NADP] DISCUSSION By P.S. Lingard [SACF Doc 2007- 022].* - presented to SACF and LTOP's Implementation & Monitoring Committee

7 INM = Integrated Noise Model (Computer Software produced by the US FAA).

1. INTRODUCTION

Since 4 December 1997 the Summer Hill and Ashfield communities have borne the brunt of northerly directed takeoffs, mainly jet departures, from Runway 34L at Sydney Airport. The frequency of noise complaints from Summer Hill was early denounced by former Transport Minister Mark Vaile MP as the community"rorting the complaints line" [#8]. In the late '90's it was also viewed somewhat sceptically by the government's Sydney Airport Community Forum (SACF), which more recently expressed consternation that several hundred complaints per fortnight could emanate from as few as , apparently, sometimes only 3-4 telephones. Led by a former IMC Chairman (an Airservices employee) a witch-hunt atmosphere prevailed at SACF through 2003-2005 whereby complainants became suspected of something almost akin to a criminal conspiracy, and Federal magistrate court prosecutions were commenced if certain injudicious words were used when addressing staff of the noise complaints line (NEU).

During early 2003 Airservices Australia Environment Branch conducted a 3 month aircraft noise monitoring study at a home in Henson Street, Summer Hill (ASA EB Report No. 1360, Sept. 2003[#9]). That study was the very first extended noise monitoring exercise carried out in the Ashfield area beyond the continuous monitoring by Airservices Australia Noise Monitoring Terminal at Croydon's PLC[#10] (NMT 15 , as to which see later) after five years of Pseudo - LTOP operation.

The Airservices study reported Boeing 747 jet aircraft noise levels averaging 80 dB(A) +/- 4 (SD) at the Henson Street residence. Importantly it also confirmed resident observations that the reason for the high noise levels was the very depressed altitude flying being undertaken by jet aircraft across the subject area, the heaviest departing jets being observed as low as 1200 -1600 ft at 7 - 10 km from take-off roll. This is caused by the arrival ceiling,

The validity of the high noise levels documented in the 2003 Airservices Study were at first considered sceptically by the government SACF. The reported noise levels seemed more like those previously found at Sydenham and Tempe than for points 7-10km from takeoff roll, leading to the question why?

Airservices Australia environment branch staff duly assured the government SACF that the data were reliable and sound. Late in 2003 Airservices own data from EB Report No. 1360 were successfully used to convince one federal magistrate that an admittedly abusive complainant , was himself responding to abuse from Airservices Australia. Before the 1996 election , the people of Lowe (which includes parts of Ashfield) were promised by former Prime Minister John Howard that they would receive *no more* aircraft noise with the then proposed LTOP[#11] than they received before . The latter was in fact precisely nil! Yet even today , after 12 years and ever rising impacts , this paper shows that matters have been made worse , not merely held in status quo, by the LTOP implementation.

Only two official noise monitoring exercises had been conducted in Ashfield at Henson and Alt Streets (Airservices EB Reports No. 1360 and 1485) . However, monitoring requested by a Unit Block in Chandos Street , through former Ashfield Mayor [Rae Jones] was aborted in 2006 for unsubstantiated reasons. Yet further afield monitoring was being regularly carried out in areas more traditionally exposed to aircraft noise along the old pre- 1997 flightpaths (eg. Lane Cove, Kurnell) , whilst newly LTOP-noise-affected areas (such as Ashfield) were being ignored, despite the Environment Minister's 1996 instruction for such monitoring to occur[#12] .

Noise Monitoring at Presbyterian Ladies' College, Croydon (NMT No. 15) , showed that the main flight tracks bifurcate predominantly to either side of the Croydon monitor , rather than directly over it: See Appendix "D". Hence one may reasonably conclude that the data from NMT 15 is atypical and understates the aircraft noise impact for PLC and surrounding neighbourhoods.

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8 Vaile Press Release, April 1998

9 Airservices Australia Environment Branch report No. 1360 , ***"Short Term Study into Aircraft Noise and Flightpaths"***, February to May 2003, Summer Hill.

10 Presbyterian Ladies College.

11 SMH 9/2/1996

12 Minister Robert Hill - Media Release 88/97, 24 July 1997.

Apart from the above-mentioned studies, this Community Noise Report and the preceding Preliminary Report of December 2005, are the only community attempts , to the authors knowledge , to quantify "LTOP" - related aircraft noise at specific homes in the inner north west.

Those responsible in both government and Airservices Australia must understand that for many people annoyance from aircraft noise results not from mere dislike. It occurs because when exposed with regularity at the sound levels reported in the present report and Environment Branch Report No. 1360, some people can actually feel pain, with resulting physiological and psychological harm [#13]. Far from such complainants being "nutters" , as contemptuously described by one former Airservices employee at the Government's SACF, they may in fact be being harmed by Airservices continued pursuit of its more -than half-aborted LTOP. It will be submitted that continuation of abusive noise without proper environmental controls amounts to a form of bureaucratic persecution.

This paper reports ongoing noise monitoring being carried by one such resident (JH) , both by way of community service, and as a means of substantiating the tinnitus-related pain , Menier's dizziness and progressive hearing loss being incurred through remaining in the home his family love and bought well before it became affected by aircraft noise. Faxed reports containing his weekly sound level data (LA max) are sent regularly to Airservices Australia, politicians and the SACF Chair , but without response.

Co-author (PSL) [#14], a SACF Proxy for the Mayor of Ashfield for the two year period 2006- 2007, has assisted JH in presenting the present data in the interests of hopefully securing more just and equitable aircraft noise outcomes for similarly placed people in Summer Hill and the inner west generally, and to bring to public notice the likely health detriments resulting from continuation of present practices . The fact is that up to 15 % of normal people suffer from conditions like Tinnitus and Meniers without in any way being considered mentally ill, as implied in epithets such as "nutter".

It is suggested that all such affected people should complain loudly both to Airservices Australia and the responsible government Minister, and collectively seek compensation in the form of noise insulation at government expense .

2. METHODS:

The noise monitor employed is an always-on device situated in a Personal Computer with a commercially-available data-logging module (Picotech® [#15], DrDAQ® data acquisition unit) , as frequently used in education. The DrDAQ ® unit records sound pressure changes in A-weighted decibels from an electret microphone at regular intervals onto a computer hard disk (< 1 second between readings , max collection rate 15000/sec). The system is sensitive to changes in sound pressure level of 1 dB(A), and as supplied is accurate to 5 dB(A). The range of sound pressure level to which the unit is sensitive is 55 - 100 dB(A). The frequency bandwidth of the microphone would be typical for an electret, ie. nominally 50 - 15000 Hz Also monitored is ambient temperature, and sound frequency. The computer clock is synchronised with a web-based atomic clock standard. A typical output trace from the recording system is shown as Table 1 in Appendix "A".

The microphone is located outside , in the open, at a height of 930mm above a grassed surface using a shielded extension cable (Soundlink type SHW-1207) . The unit is built into a weather-proof PVC housing, with a foam plug to prevent water penetration and wind effects. It is situated behind the subject residence at Moonbie Street in Summer Hill , which is across the road from a State Primary School . Mostly the machine is attended, and auditory confirmation of the fact of an aircraft noise event is possible. However, such detailed attendance is not mandatory . Although the residence is near to a main road (The Old Canterbury Road) and a residential feeder (Junction Road), the buildings are solid pre-federation-period , stone and double brick bungalows, in a generally quiet residential area.

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13 "Community Noise", Berglund , B. & Lindvall, T. (1995) , Karolinska Institute, Sweden, Archives Centre Sensory Res. 2(1), 1-195, Figure 4, para. 7.1.2.2, Report to WHO.

14 Philip S. Lingard has a professional background in Physics (B.Sc Hons., C.Phys IOP, UK) , Biophysics and Engineering Bio-Fluid Mechanics (Ph.D., MIE Aust), and also possesses legal qualifications. He is Secretary of SACF Inc., & North West Residents Airport Group , P.O. Box 104 Summer Hill, NSW 2130, Tel/Fax: (02) 97989606

15 www.picotech.com; www.drdaq.com; See "Silicon Chip" article July 2000, Peter Smith

It is possible to manually scrutinise the record to determine whether an event sound profile is in fact consistent with that of an aircraft - from its recorded frequency spectrum and the time course of its amplitude characteristic . It is a relatively simple matter , by inspection , to eliminate extraneous noise events such as motor vehicles, dog barks , whistles and the like . At the end of each day , or at some later time, the maximum recorded sound level (LA max) is noted down against the time of the recording, and a day-file for each series of events created.

The noise monitor only operates when the subject family is in residence. Therefore there are intermittant periods of up to 30 days most years when data are unavailable (See Table 5).

Calibration:
The noise monitor is subjected at least once daily to random calibration tones at 1000 Hz using an industrial noise calibrator (Testo® model IEC 942/90 Class 2 ; Farnell Order code 892-889) with an output of 94dB(A). The calibrator is placed a prescribed distance from the microphone, following the manufacturer's instructions for calibration, when the sound pressure level read by the datalogger can be adjusted if necessary (See trace).

A typical day trace showing the manually -extracted LA max [#16] levels is reproduced in Table 2 of Appendix "A". Monitoring occurs continuously throughout the year, excepting for periods when the monitor owner's family takes annual vacation. (See Table 5).

Due to the method of measurement employed in aircraft noise assessment for building siting and construction (AS2021-2000), the maximum absolute - or instantaneous sound level (LA max) accepted for aircraft noise assessment is around 3 dB(A) more than that considered acceptable for Industrial and other environmental noise. This is due to the "Slow" (1 second) - integration constant chosen by the aviation industry for use in aircraft noise analysis, which *"smooths the peaks"* from an aircraft noise trace, in a manner which the human ear does not.

It was not initially known what averaging system (if any) was employed by the "DrDAQ® " for signal processing. However, later research showed that it was performing on the "Fast" side, with a time constant around 0.13 seconds. There is no in-built adjustment for the time constant. It also happens there is a minor issue with the A-scale frequency weighting of the DrDAQ®.

Following the initial report tabled at Government SACF on 16 December 2005 [***"COMMUNITY NOISE REPORT SUMMER HILL 2002-2005" -Preliminary***] Airservices Australia helpfully sent out an Environment Branch technical expert (Dr. Ian McLeod) who spent some time with the authors on 11 April 2006 comparing the output from the Pico-tech DrDAQ® with a Class I Breuhl and Kerr sound level meter for typical flyovers.

The second author made simultaneous comparative measurements with an independent moving coil -type sound level meter (Yu-Fong) which , although uncalibrated , gave remarkably similar readings to the Breuhl and Kerr. The results of this testing are reported from two reports in Appendix "B" .

During testing it appeared that the DrDAQ® was reading in the range from 3 - 8 dB(A) too high. Dr McLeod pointed out that if the DrDAQ® was not averaging the sound level input using a 1 second interval, then peak noise levels would be high compared with Airservices measurements with Class I or II A-weighted instruments set to use a "Slow" (S) - based (1 second) averaging filter. This is the requirement for aircraft noise-based sound level measurement of AS2021-2000. Dr McLeod advised that this would normally produce an error on the high side of around 3 dB(A) were the DrDAQ® meter found to be integrating "Fast" .

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[16] LA max = maximum sound level in dB(A)

On-site comparisons by one of us (PL) revealed an average difference of around 5.5 dB(A). However, the absolute readings for a constant sound level input from the Testo calibrator agreed for both the DrDAQ® , the Bruell and Kerr and Yu Fong instruments.

A correction has therefore since been applied to all the original (2002 through 2005) data, and also to all more recently-collected data reducing the DrDAQ ® -measured values of LA max for aircraft overflights by 5.5 dB(A). The Tables of Results (below) show this as the "corrected" result. Further investigations are continuing which it is hoped will enable this simple sound level monitor to integrate the outputs on-line using an "S" -scaled filter.

Data Verification:
To authenticate that the noise being recorded is actually from aircraft overhead, the frequencies of data collection for each day of recording have been compared with ***Sydney Airport Community Forum's*** (Government SACF) regular fortnightly ***"Sydney Airport Briefing Notes"*** published on the Government SACF website .

The number of monitored noise events at Summer Hill are compared with officially-reported daily north-west departures from Runway 34L and listed as percentages in Table 4 A.

For the period from 2002 to December 2005, the times of the originally measured overflights have also been compared for coincidence with the Airservices-Produced official takeoff times for all aircraft departing northwest, and the results of this appear in Table 4 B.

Data Analysis
The LA max values in A-weighted decibels are tabulated in chronological order according to the format used by the Department of Transport's "TNIP" software for N70 analysis [#17], and processed in spreadsheet format (Using 32 bit Lotus -123) to produce mean, standard deviation, ***Australian Noise Exposure Index*** (ANEI) and the ***Equivalent Energy-Averaged Noise Exposure*** for each year (LAeq).
The methods for achieving this were described in Appendix "K" to **SACF Inc's** ***"The Way Forward for Aircraft Noise Sharing at Sydney (Kingsford-Smith) Airport"*** [#18] , and generally follow standard acoustical practice. The formula for ANEI employed is the one published in Australia Standard AS2021 -2000, "Acoustics - Aircraft noise intrusion- Building siting and construction" , p. 45 for the Australian Noise Exposure Forecast (ANEF).

For a single location subject to noise impacts from a variety of flight paths all of which pass more or less directly overhead, the ANEF formula [used here to obtain ANEI] , can be reduced to :

$$ANEI = 10 \times \log \sum_{i=1}^{N} 10^{\left\{\frac{ANEI_i}{10}\right\}} \qquad \text{.....1.}$$

where i is the i'th event and :

$$ANEI_i = EPNdB_i + 10 \log_{10} [N_d + 4\, N_n] - 88 \qquad \text{.....2.}$$

where N_d and N_n are the number of events observed during "day" and "night" , respectively, and

$EPNdB_i$ is the "effective perceived noise level in decibels" of an individual event.

For practical purposes EPNdB may be obtained from the maximum event noise in A-weighted decibels (LA max) by adding a constant which is around 13 [#19] , ie:

$$EPNdB_i \text{ [in dB(A)]} = LA\ max_i \text{ [in dB(A)]} + 13 \qquad \text{.....3.}$$

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17 Microsoft, csv format , NMT,DATE,TIME,AC_TYPE,OPERATION,LAMAX

18 *"The Way Forward for Aircraft Noise Sharing at Sydney (Kingsford-Smith) Airport"*, P.S. Lingard et al ., SACF Inc, PO Box 104 Summer Hill, NSW 2130, 2003; ISBN 0-9751843-4-2 (pbk); 0-9751843-5-0 (pdf) .

19 See NAL Report 88 , *"Aircraft noise in Australia: A survey of community reaction"* , Feb 1982, National Acoustics Laboratories, Australia, Table 8.1 , p. 128.

The ANEI is thus computed for the entire period of recorded events, and the summation in equation (1) averaged for a single "representative" day.

Thus, for monitoring representative of a whole year (365 days) the summation would be divided by 365. For a lesser period, the lesser number of days would be employed.

The Australian Standard (AS2021-2000) now provides that for Australian Defence Department airports , where aircraft activity typically occurs in bursts of a few days or during weekdays only, then averaging will be carried out for the lesser time than a whole year (AS2021 para A2.4) . This results in a larger effective ANEI (or ANEF) for the reduced period, than if it were to be calculated for a year. It is considered to better reflect the degree of community annoyance than the annually averaged data used for civilian airports.

Although this method is expressed in AS 2021 to apply to Defence Department airports, where usage is subject to the on and off requirements of exercise periods, we submit that it ought also to apply to residential areas of Sydney, not on established ***"Flight Tracks"*** , which are subject to variable , but heavy activity from Sydney Airport. Both methods (whole year and "reduced year") are therefore compared in the results shown here.

3. RESULTS:

Full data files are obtainable on CDROM or similar disc upon request from the authors. These files provide the full raw LA max data from which the results have been calculated (See files 200xnois.txt, where x is the number of the year).

3.1 Average Noise in A-weighted Decibels :

An overall average of 12248 noise events/annum was recorded from 2002 through 30 June 2009 - See Table 1 . The Table provides the average noise and standard deviations for each of the years for which data are available.

TABLE 1 Maximum Average Event noise (LA max) in dB(A):

YEAR	AVE LAmax dB(A) recorded #	AVE LAmax dB(A) corrected	SD	MIN LA max corrected	MAX LA max corrected	NUMBER OF EVENT DATA
2002*	80.4	74.9	6.2	46.5	95.9	9,670
2003	79.8	74.3	4.9	52.3	95.2	11,441
2004	79.1	73.6	4.6	56.4	92.3	14,081
2005	79.9	74.4	5.2	52.1	92.3	14,662
2006	80.8	75.3	5.5	60.3	94.5	13,219
2007	81.0	75.5	5.6	58.9	94.4	12,214
2008	80.0	74.5	5.4	56.5	95.5	11,078
2009*	79.2	73.7	5.6	59.6	92.7	5,810

* Part Year only
# Recorded data

3.2 Australian Noise Exposure Index & LA eq:

Table 2 lists the calculated Australian Noise Exposure Index levels (ANEI) and the Equivalent Energy Averaged Noise Exposure , LA eq (dB(A) , calculated for each partial annual period , first assuming the data represents a full year record, and second for a period limited by the recorded number of days.

TABLE 2 Calculated ANEI and LA_{eq} for stated conditions

YEAR [record days]	ANEI (365days) recorded	ANEI (record days) recorded	ANEI (365days) corrected	ANEI (record days) corrected	LA eq (365 days) recorded	LA eq (record days) recorded	LA eq (365 days) corrected	LA eq (record days) corrected
2002 [158]	25.2	28.8	**19.7**	**23.3**	20.2	23.8	**14.7**	**18.3**
2003 [221]	25.1	27.2	**19.6**	**21.7**	63.4	65.5	**57.9**	**60.0**
2004 [251]	24.3	25.9	**18.8**	**20.4**	63.0	64.6	**57.5**	**59.1**
2005 [248]	25.7	27.5	**20.2**	**22.0**	64.5	66.3	**59.0**	**60.8**
2006 [265]	27.0	28.4	**21.5**	**22.9**	65.5	66.9	**60.0**	**61.4**
2007 [227]	26.9	28.9	**21.4**	**23.4**	65.5	67.5	**60.0**	**62.0**
2008 [201]	25.4	27.9	**19.9**	**22.4**	63.9	66.5	**58.4**	**61.0**
2009 [115]	24.4	26.6	**18.9**	**21.1**	60.2	65.3	**54.7**	**59.9**

3.3 Numbers of Departures Exceeding Given Noise Thresholds:

Table 3 provides the percentage noise levels for each year falling into each of 7 threshold categories according to decibel (dB(A) level. The table also shows the number of flights per "noise-affected day" for the subject site in each year .

3.4 Data Verification:

3.4.1 Verification in Comparison with Airservices SACF Briefing Notes

Table 4A compares the aircraft noise event numbers as a monthly percentage of the *"Sydney Airport Briefing Note"* -provided northwest departures per day from runway 34 Left.

However, as the early "Briefing Note" data was not always found to be reliable[#20] , it seemed wise to verify the data by direct comparison of event times with official departure times for all aircraft detected in the monitored periods. Airservices Australia was initially unwilling to provide this data except at significant cost. However, after publication and discussion of the initial report in Government SACF in 2006 , and representations made in SACF by the then Proxy for the Mayor of Ashfield , the required departure time data was supplied by Airservices Australia . This occurred after behind-the-scenes encouragement from then Senator Marise Payne (Chair of Government SACF from 2002 through Nov. 2007).

3.4.2 Verification by Coincidence Testing of Noise Events against Takeoff Times:

Table 4A (below) compared the recorded data by percentage of takeoffs detected at the sound level meter against reported total and jet aircraft takeoffs from Runway 34L.

As noted above, it seemed wise to compare the times of the DrDAQ ® recorded noise events against the actual departure times for jet aircraft . Table 4B (below) shows the sound level - noise event data for 2002 to 2005 compared with Airservices Australia's listed takeoff times for Runway 34L , obtained from Official Departure Time Statistics, compared on a quarterly basis.

[20] For example, the data for one fortnight in October 2002 were originally those for July 2002

TABLE 3 Numbers , Percentage and Number /day of Events greater than stated dB(A) level:

YEAR	>65	>70	>75	>80	>85	>90 dB(A)
2002 Total 158 DAYS	9,536	9,246	7,871	5,329	1,962	526
Percent 02 >	98.61%	95.62%	81.4%	55.11%	20.29%	5.44%
No. per day-02	60	59	50	34	12	3
2003 Total 221 DAYS	11,425	11,300	9,478	5,418	1,432	339
Percent 03>	99.86%	98.77%	82.84%	47.36%	12.52%	2.96%
No per day-03	52	51	43	25	6	2
2004 Total 251 DAYS	14,051	13,874	11,276	5,704	1,426	75
Percent 04 >	99.79%	98.53%	80.08%	40.51%	10.13%	0.53%
No. per day-04	56	55	45	23	6	0
2005 Total 248 DAYS	14,279	11,565	6,519	2,182	331	8
Percent 05 >	100.00%	80.99%	45.65%	15.28%	2.32%	0.06%
No. per day-05	58	47	26	9	1	0
2006 Total 265 DAYS	13,001	10,747	6,576	2,636	661	65
Percent 06 >	100.00%	82.66%	50.58%	20.28%	5.08%	0.50%
No. per day-06	49	41	25	10	2	0
2007 Total 227 DAYS	10,806	8,684	4,973	1,608	428	34
Percent 07 >	100.00%	80.36%	46.02%	14.88%	3.96%	0.31%
No. per day-07	54	43	25	8	2	0
2008 Total 201 DAYS	10,806	8,684	4,973	1,608	428	34
Percent 08 >	100.00%	80.36%	46.02%	14.88%	3.96%	0.31%
No. per day-08	54	43	25	8	2	0
2009 Total 115 DAYS to end June	5,473	4,188	2,500	730	110	4
Percent 09 >	100.00%	76.52%	45.68%	13.34%	2.01%	0.07%
No. per day-09	49	38	23	7	1	0
YEAR	>65	>70	>75	>80	>85	>90 dB(A)
AVERAGES %>	99.8%	86.7%	59.8%	22.7%	7.5	1.3%
AVERAGES #/Day	54	47	33	15	4	< 1

In Table 4B , for a departure time to be accepted as *"coincident"* for inclusion in the statistics the subject departure must have occurred not more than 90 and not less than 9 seconds before the recorded noise event.

Table 4B confirms the findings reported in Table 4A which were obtained by comparison of numbers of overflights with Runway End takeoffs published in Airservices Sydney Airport Briefing Notes. It shows that 61% of aircraft monitored at this Summer Hill location are jets recorded and verified as having departed Runway 34L at the stated time. It also shows that no "false positive" events were recorded (cf. 3.4.3 below).

TABLE 4A Data Verification by Month showing Percent Detected Flyovers:

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN ALL A/Craft	MEAN JETS ONLY
2002*	29%	26%	NA	5%	NA	NA	63%	61%	60%	70%	63%	71%	65%	108% ##
2003	50%	NA	52%	48%	46%	46%	45%	51%	47%	42%	49%	34%	46%	77%
2004	43%	40%	47%	51%	53%	51%	48%	50%	48%	37%	44%	39%	46%	77%
2005	57%	51%	56%	57%	54%	56%	56%	51%	52%	50%	49%	55%	54%	89%
2,006	82%	78%	83%	68%	75%	76%	78%	82%	79%	84%	77%	79%	49%	82%
2,007	78%	98%	55%	84%	79%	82%	33%	40%	75%	41%	62%	26%	36%	60%
2,008	79%	82%	57%	44%	37%	69%	38%	75%	65%	73%	75%	41%	36%	61%
2,009#	75	68	0	77%	68%	64%							49%	81%

** Note 1 2002 Data Year Incomplete*

 # Note 2 2009 data is for half year to June 30.

Note 3 : Airservices Data shown for Years 2006-9 is for Jets only . For 2002 - 2005 data was originally provided only for total departures - with 60% of them being Jets.

TABLE 4 B Data Verification by Coincidence Testing -Percent of Takeoffs Captured:

YEAR		QTR 1	QTR 2	QTR 3	QTR 4	MEAN
2002	*% COINCIDENCE*				48.86%	
	FALSE POSITIVES				< 0	
2003	*% COINCIDENCE*	28.34%	70.16%	73.58%	65.28%	
	FALSE POSITIVES	< 0	< 0	< 0	< 0	
2004	*% COINCIDENCE*	56.60%	74.39%	70.28%	60.94%	
	FALSE POSITIVES	< 0	< 0	< 0	< 0	
2005	*% COINCIDENCE*	46.33%	78.03%	68.09%	55.85%	
	FALSE POSITIVES	< 0	< 0	< 0	< 0	61%

3.4.3 False Positive Detections:

During the monitor establishment period (2002 -2003) it appeared on a number of occasions that aircraft were being recorded by the monitor on days when aircraft were not taking off from Runway 34 Left, and across the inner west (Table 5).

Table 5 (below) lists the numbers of days and aircraft involved in what appeared to be *false positive* aircraft noise events recorded by the monitor ,when originally compared with the SACF ***Briefing Notes*** from 2002 to 2005.

Subsequent replacement of some earlier "Briefing Notes" by Airservices monthly "Operational Statistics" has eliminated many of these and no false positives were found with the data supplied for departure coincidence analysis . All detected noise events coincided with a jet aircraft departure from Runway 34L.

However, Airservices Australia could assist by conducting more extended professional noise monitoring across the northwest, but attempts to obtain such monitoring for other requested locations have proven subject to bureaucratic interference and obfuscation.

TABLE 5 Apparent "False Positive" Events Statistics:

YEAR	FALSE POSITIVE DAYS (Total days)	"FALSE-POSITIVE" FLIGHT NUMBERS VS. (TOTAL OPS) & as %	NON-OPERATIONAL DAYS (commissioning or vacation related)
2002[#1]	18 (158)	1085 (9670) = 11.2%	92
2003	9 (221)	506 (11441) = 4.4%	49
2004	7 (251)	37 (14081) = 0.26%	9
2005	4 (215)	12 (13268) = 0.09%	43
[1] Monitoring Equipment was being commissioned during 2002 & early 2003			

4. CONCLUSIONS FROM RESULTS:

The following should be considered in light of the fact that a sound level of 70 dB(A) [recorded with a "Fast" integration constant of 0.125 seconds] is the commonly accepted maximum sound level [LAmax] permissible for power tools and similar noisy objects used domestically , and that this level is some 3-4 dB(A) more than any 70 dB(A) maximum recorded with the "Slow" [1 second integration] by the Standard (AS2021) used in aircraft monitoring work . All the following refers to sound level data obtained by a measure appropriate for aircraft noise measurement, i.e. Equivalent to a "Slow" -integrated measure.

4.1. Between 2002 and 2004 in excess of 40% of all jet aircraft crossing over the subject location exceeded an LA max of 80 dB(A).

4.2. Between 2005 and 2007 between 15% and 21% of all jet aircraft passing over the subject location exceeded an LA max of 80 dB(A)

4.3. Between 2002 and the end of 2004 more than 80% of all jet aircraft produced a maximum sound level over 75 dB(A) and over 90% exceeded 70 dB(A). From 2005 to-date over 45% of all jet aircraft produced maximum sound levels over 75 dB(A); and over 75% of jet aircraft in the first half of 2009 generated more than 70 dB(A) .

4.4. The number of jet aircraft noise events per operational day exceeding 70 dB(A) [N(70)] has fallen from nearly 60 in 2002 to around 40 per day in the first half of 2009.

4.5. The number of jet aircraft noise events per day exceeding 80 dB(A) has declined from 34 in 2002 to under 10 in the last two years

4.6. The calculated ANEI , whether based on a 365 day year, or the number of record days, is often in the only "*Conditionally Acceptable*" band for residential building construction according to the Australian Standard AS2021-2000 , Table 2.1 . This home should therefore be provided with substantial Noise Insulation at the industry's expense.

4.7 Comparison with Airservices Australia Sydney Airport Operational Statistics / Briefing Notes for all years shows that from 60 to 90 % of jet aircraft and /or 50% of all aircraft departing Runway 34L overflew the subject location in Summer Hill. For the entire period 61% of aircraft monitored at this Summer Hill location were jets verified as having departed Runway 34L at the stated time. There is thus a significant concentration of departing flight tracks immediately above this property. It is submitted that this is grossly unfair and essentially discriminatory. It is also largely avoidable, and continues to reflect the apparent disregard shown by ***Airservices Australia*** and the airlines for the residential interests overflown.

4.8 Detailed Departure Coincidence testing confirmed the previously reported flight track concentration findings in Table 4.

4.9 Although there was some reduction of flight-track concentration from 2003 to 2007, further increases in concentration have occurred during 2009 to-date, capturings rising from ~60% in 2008 to around 80% in the first half of 2009 .

5. DISCUSSION OF RESULTS:

The data recorded varied from 9670 overflights in 2002 (a partial year) climbing to over 14000 in 2004 and 2005. The annualised average from 2002 - 2009 (1st half) is 12248. Despite some flight path spreading across the inner north west , an average of 61% of reported jet takeoff events are captured by this single monitor . Since publication of the Preliminary report in 2005 this concentration was confirmed by Takeoff-Time Coincidence testing carried out for the period from 2003 to 2005 [See Table 4B]. Due to essential operator absences for leave etc., the resulting energy and time-averaged values are likely underestimate the maximum exposure.

5.1 Maximum Sound Level in dB(A) (LA max)

Average LA max data in dB(A) were listed in Table 1 and the percentages exceeding given decibel thresholds are shown in Table 3.

Table 1 shows that the annual average LA max values for each monitored period are 80 dB(A) [uncorrected] , and 75dB(A) [corrected] . This figure is the average for all jet aircraft , including the B747, which was the noisiest aircraft for the period. The range of variation was 46 -96 dB(A) -corrected. The very high average sound level value of 75 dB(A) is 8 decibels above the operating level permissible for power tools under State regulations using "Fast" integrated monitoring . It is an approximately 17-fold greater intensity than the 63 dB(A) - level which just allows intelligible speech communication between persons standing a "decent distance" apart of around 500 mm.

Similar high average levels were reported for B747 class jet aircraft in the Airservices Australia Henson Street Environment Branch (EB) report No. 1360 of July 2003 (EBR 1360). EBR 1360 reported a 93 day monitoring exercise at a point 0.5 km from the present location on Henson Street, Summer Hill. That report showed that B747 class jets were flying in a configuration such that the resulting ground noise level was 80 +/- 4 (SD) dB(A) .

The present data thus confirm and extend the data found by Airservices Australia showing that unacceptable levels occur throughout the year with Runway 34L in use for departures [i.e. LTOP Mode 9]. From 2002 - 2004 more than 40% of all measured events were over 80dB(A) , being 55%, 47% and 41%, respectively .

Table 3 shows that more than 80% of noise events were greater than 75 dB(A) in those years. While between 2005 and 2009 the above percentages have reduced to 16% and 47% , for 80 dB(A) and 75 dB(A) , respectively, there is still much room for improvement .

Actual Indoor Design Level values recommended in Australian Standard AS2021 -2000 for houses, home units and flats are listed in Table 6, below :

TABLE 6: Australian Standard AS 2021-2000 Indoor Design Levels:

INDOOR DESIGN SOUND LEVELS -Houses, home units, flats [#1]	Level dB(A)
Sleeping areas, dedicated lounges	50
Other habitable spaces	55
Bathrooms, toilets, laundries	60
DOTRS Government Designated maxima [#2]	60

[1] AS 2021-2000 Table 3.3

[1] Southgate et al , Expanding Ways to Describe and Assess Aircraft Noise, March 2000

The data reveal a high proportion noise events which would exceed by 25 dB(A) the indoor design level of 50 dB(A) recommended by AS2021 for sleeping areas in houses, home units and flats[#21] . For the case of *"other habitable spaces"* , where people might be expected to be in conversation, speaking on the phone to conduct business, or perhaps watching television or listening to the radio, the recommended level is 55 dB(A), a large 20 dB(A) below the average for the aircraft noise events in this residential area. If outside levels exceed those which , given the insulation standard of a building , would produce indoor levels greater than the Table 6 recommendations, then by AS2021 the home should be provided with additional insulation.

The average dwelling construction standard in Summer Hill is historically sturdy, ie double and/or cavity brick. But even with such insulation a maximum of 20 dB(A) would be taken off the outdoor level of 75 dB(A) , with all the windows and doors fast shut . Whilst reducing the indoor level to 55 dB(A), this is still unacceptable for sleeping areas . In homes of less substantial construction (e.g. weatherboard) the reduction would be much less.

With windows open (normal for summer in Sydney) , the *indoor average* level for homes below this flight path would be 65 dB(A) or more. This does not satisfy the requirements of the AS2021, and here we only consider the "average" aircraft noise event of 75dB(A). With 50% of events producing more than 75 dB(A) (up to at least 96dB(A)) , a resident in this position has just cause to complain, and feel discriminated against by Airservices Australia.

Both 1996 LTOP Reports[#22] (in which the ***"fair share noise plan"*** was proposed after construction of the "third runway") , and a more recent Department of Transport document [#23], emphasise the desirability of restricting external aircraft noise to at most 70 dB(A) at ground level. This was ostensibly because it is the outside sound level , with doors and windows open, that "normal" home insulation will reduce to *"the indoor design sound level"* . The latter document (Expanding Ways) wrongly states the "design level" is 60 dB(A). Table 6 shows in fact that for sleeping areas the design level is 50 dB(A), with "other habitable spaces" set at 55 dB(A).

In Table 3 it was shown that at this location 87% of values are above or equal to 70 dB(A) , with 28% of values more than 80 dB(A) . Anyone interested in providing ***"real solutions"*** , must therefore ask why insufficient has been done by Airservices Australia to address this problem, given the 2003 Airservices Report at Henson Street (EBR 1360) , and the Preliminary edition of this report tabled in 2006. These Summer Hill locations are at least 7 km from the most distant takeoff roll position for Northwest departures from Runway 34L. Why then is the distribution of noise Summer Hill more like that expected near a location only 1-2 km from takeoff roll , such as Sydenham?

5.2 AS2021 Standard for "Light General Aviation Airports"

For each decibel grouping Table 3 lists the number of flights per day above given decibel thresholds . For example , in 2009 to 30 June (there were an average of 23 departures per operational day exceeding 75 dB(A)). AS2021-2000, in Appendix D , deals with building site acceptability for *"light general aviation aerodromes"* without an ANEF chart [#24] . It states that more than 20 flights per day of 75 dB(A) or greater is only *"conditionally acceptable"*, and that the same number at the level of 85dB(A) is deemed *"unacceptable,"* for a building site without aircraft noise insulation (AS 2021 Table D1).

Whilst it may be provocative to moot the "general aviation standard" for an area close to Sydney Airport, the intermittent nature of flight track usage suggests such treatment is apt. Also the fact that there was no ANEF for the LTOP at Sydney Airport until March 2004 fits the Appendix D designation. Surely what is good enough for people around a light GA airport should be good enough for the citizens of Sydney , provided the curfew is retained?

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21 AS2021 Table 3.3

22 "The Long Term Operating Plan for Sydney (Kingsford-Smith) Airport, Airservices Australia & SACF, Dec. 1996.

23 *"Expanding Ways to Describe and Assess Aircraft Noise"* D. Southgate et al ., March 2000.

24 Sydney had no ANEF for 5 years from the implementation of LTOP in 1997!

5.3 Calculated ANEI for the Summer Hill Residential Location (Table 2)

The ANEI parameter (the "Australian Noise Exposure Index") is employed for monitoring progress towards the achievement of forecast noise impact *"targets"* predicted by an "Australian Noise Exposure Forecast" (ANEF) for an airport. One method used by Airservices Australia is to compute data using the Integrated Noise (computer) Model (INM) developed by the US Federal Aviation Administration (US FAA). This model starts by assuming flight track profiles (distance , altitude etc) for each aircraft . It presumes that Airservices Australia knows exactly where each aircraft is in three dimensions at all points along its path , and especially its local altitude .

During the 2001 PRM trial[#25] an Airservices consultant (Ambidji) showed that Airservices did not then know , to within better than 0.5 - 1 km , where aircraft under its control were headed. This was especially problematic if the flight path was curvilinear. The Ambidji findings confirmed the oft-experienced consternation of residents who , upon requesting information for a low-flying aircraft seen flying right above their roof, received a track asserting that it was actually several blocks away! Naturally the responsible officer at the NEU [#26], if challenged would claim that it was the resident who was hallucinating, not the reverse! This situation can still arise, even after implementation of Web-Track [#27], for which lateral positioning errors have been observed .

ANEI can be obtained most directly from actual measurement of repeated aircraft noise impacts on the ground. AS2021-2000 (See Methods, Section 2) provides the means to calculate ANEI from ground measurements of the maximum aircraft noise. It uses the actual sound levels which , after all, is what people experience from day to day . It avoids assumptions about aircraft location , because the aircraft noise is actually measured. Table 2 compares both calendar year averaged and operational day based ANEI for each monitored year using the in Equations 1 to 3, above (Section 2) .

Reference to AS2021 (See Table 7, below) then shows whether the aircraft noise at the location is satisfactory. One finds that above 20 ANEF represents a site which is only ***"conditionally acceptable"*** for

TABLE 7 BUILDING SITE ACCEPTABILITY ACCORDING TO AS2021-2000

BUILDING TYPE /ANEF-ANEI	ACCEPTABLE	CONDITIONAL	UNACCEPTABLE
House, home unit or flat	< 20 ANEF	20-25 ANEF	> 25 ANEF
School, University	< 20 ANEF	20-25 ANEF	> 25 ANEF
Hospital , Nursing Home	< 20 ANEF	20-25 ANEF	> 25 ANEF
Hotel, motel, hostel	< 25 ANEF	25-30 ANEF	> 30 ANEF
Public Building	< 20 ANEF	20-30 ANEF	> 30 ANEF

a house, home unit or flat[#28] . The now corrected ANEI values for this Moonbie Street address (assuming a 365 day year) appear to be borderline "conditionally acceptable" but slightly over 20 dB(A).

This finding must be viewed in light of recent Sydney Airport Master Plan (2024 & 2029) noise level forecasts, which predicted the 20 ANEF contour would not come closer than Lewisham by year 2023! Representing the ANEI in terms of the actual number of days of affectation , as recommended by the Defence Department , which uses the Standard (see AS2021, para. A2.4) for its airports where overflying is only intermittent , the ANEI average is 22 dB(A) [#29] , no longer borderline and only "conditionally acceptable" . This approach is consistent with the intermittent use of the various LTOP Modes , which overfly different areas dependent on the prevailing wind.

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25 "Sydney (Precision Runway Monitor) PRM Trial Aviation Report", The Ambidji Group Pty Ltd , April 2001.

26 NEU- Noise Enquiry Unit

27 Web-Track - The Lochard on-line aircraft tracking system implemented in 2008 by Airservices Australia to allow resident monitoring of flights around Sydney Airport - Unreported personal observations.

28 The range of options is "acceptable" , "unacceptable" or "conditionally acceptable".

29 The value reported for the Airservices tested site in 2003 (BE Report No. 1360) was ANEI = 17dB(A), which was stated to be "acceptable" for the residential useas being reported as being less than 20.

Were the ANEI to reach 25 dB(A) the Standard would rate the location as unacceptable. It would then require home noise insulation. For ANEI's above 30 dB(A) (about 1600 70 dB overflight per day) , then a home might qualify for the formerly available Commonwealth subsidised noise insulation, but not otherwise . This is despite the fact that both the Commonwealth Environment Department and the NSW EPA, once recommended noise insulation (or cessation of the noise) for values of ANEI above 20 dB(A). We must also bear in mind that just across the road, is a large State primary school, where children's classes are reported to suffer from interruption at frequent intervals.

The above ANEI are greater than those in Airservices Australia official Summer Hill study of early 2003 (EB Report No. 1360) which quoted an ANEI = 16.7 over 93 days . The first fifteen days of the period (13/2/2003 - 17/5/2003) then monitored by Airservices Australia are missing from our study. However the ANEI computed from our data at Moonbie Street for the 78 remaining days of the same period is 23.04 dB(A). Airservices apparently use a "rule of thumb" for deriving ANEI from LA max (subtracting 35 from the LA eq [#30]) . The reason for the different ANEI is unclear as the average maximum sound levels were similar. However, the difference might be explained by the ca. 0.5 km separation of the two locations in Summer Hill, or if Airservices data were mistakenly computed assuming a full year's data was available (i.e. 365 instead of 93 days), then our ANEI estimate (16.3) agrees with theirs (16.7), though the mathematics makes no sense.

5.4 Energy Averaged Equivalent Noise Level , LA eq

Table 2 also listed the calculated LA eq for (a) a full year and (b) the recorded operational days. The calculated values for the now corrected data are between (a) 53 and (b) 55 dB(A). For perspective, these data the New South Wales Government , EPA- prescribed noise guidelines for Suburban areas near industrial sites [#31](See Table 8 , below) recommend that an industrial activity should not be permitted at a site adjacent or within earshot of a suburban residential area if the LA eq levels exceed the following:

TABLE 8 NSW INDUSTRIAL NOISE GUIDELINES:

NSW EPA Table 2.1	LA eq ACCEPTABLE	LA eq MAXIMUM
DAY	55	60
EVENING	45	50
NIGHT	40	45

Evidently the impact of aircraft activity at the subject site produces energy averaged noise levels exceeding these acceptability guidelines for evening and night , were the flying machine replaced by noisy machinery in a hypothetical overhead industrial site. If the practice of flying aircraft overhead is not a State *"industrial"* type of activity (airlines are proud to belong to "the aviation industry") , making it notionally subject to the Table 8 (State) restrictions, then perhaps Legislative consideration should be given to making it so.

5.5 Data Verification:

To support our contention that the recorded data were aircraft related, the noise event numbers were compared with the total Runway 34L departure numbers reported in the SACF bimonthly ***"Sydney Airport Briefing Notes"*** for the recording periods (Table 4A) . This was to avoid the accusation of extraneous noise inclusion. Were extraneous data included , recorded events would likely exceed the official departure numbers. Table 4A showed that in all cases the total numbers of events per month are significantly fewer than the total officially notified departures from Runway 34L.

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30 Statement of Mr. Leigh Kenna, SACF 10/3/2006 . No technical justification was provided for this "rule of thumb".

31 New South Wales Industrial Noise Policy, ISBN 0 7313 2715 2, January 2000, Table 2.1 Amenity Criteria.

The annual average of Airservices Operational Statistics for all aircraft in the second last column show that between 36 and 60% of total departures operations were "captured" by the noise monitor. This represents between 60 and 90% of jet aircraft operations from 2003 - 2009 . This is not an excessive proportion, as any local observer on a busy day could attest.

Whilst there is some track spreading , as recommended by the LTOP Reports [#32], there is a marked local concentration of jet flight tracks over the monitored property . This must be investigated and eliminated . One may also ask why these aircraft , this far from take-off roll, are flying so low , as low flying is the only explanation for the very high noise levels being produced [See also later -***Suggestions for Improved Operations***] .

Table 5 showed that initially there were some apparently "false-positive" recordings, when it appears from the SACF ***Briefing Notes*** [#33] no aircraft flew, yet were recorded by the Summer Hill monitor . Checking the data against the Airservices-supplied actual takeoff times, using time coincidence analysis, it was found that the apparent "false positives" were entirely due to errors in the early versions of the airport Briefing Notes . Also in some wind conditions it was observed that aircraft flying close to the subject property on one side were not detected by the microphone. Thus while there were originally a few false-positives there were also missing values.

Fuller verification of the 2002-2005 data using the time-coincidence analysis (Table 4B) showed that there were actually no false positive records at all times and that the aircraft responsible for the recorded noise events constituted an average 61% of actual takeoffs from Sydney Airport's Runway 34L. Use of Airservices later , revised "Operational Statistics" , has eliminated the false positive phenomenon.

It is submitted that the combined incident verification process carried out by the authors firmly establishes there is a significant case to answer for Airservices Australia in terms of addressing the cause of aircraft noise concentration in this sector of Summer Hill.

6 SUGGESTIONS FOR ENVIRONMENT IMPROVEMENT OVER THE NORTHWEST:

The following suggestions are submitted to aid reduction of aircraft noise and flight track concentration across all suburbs, not only Summer Hill:

6.1 Eliminate The Departure Ceiling:

The Departure Ceiling was earlier referred to (see Abstract) as a key problem and shown in Figure 1 (Page 2). A key improvement would be to eliminate this simultaneous overflying of departures by arrivals across the north west , west and east. This would enable raising the takeoff ceiling permitting normal progression to cruising altitude with consequent long-range fuel savings for the airlines. Possibly the single major cause of the above problem is that the ***original 1996 LTOP*** was never fully implemented as designed.

The overflight problem is amply illustrated from the Environment Branch Henson Street report No. 1360 for the period from 14/10/2002 - 14/4/2003, referred to earlier. The relevant figures are reproduced herewith as Appendix "C". Figure 7 shows all jet arrivals onto 34 Left, while Figure 10 shows all jet departures from 34 Left in the same period.

The effective *altitude ceiling* created by the arrivals overflying the simultaneously departing jets is evident from these figures and Figure 1. The ceiling is roughly 6000 feet, while the departing jets are constrained to fly below the separation requirement (1000 ft below) , ie well under at most 5000ft (See upper right hand panel on both figures). The low-fly zone created in practice extends westward all the way from Summer Hill to Parramatta and beyond.

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32 The Long Term Operating Plan for Sydney (Kingsford Smith) Airport , Dec 1996, Airservices Australia, DOT

33 Now "Operational Statistics.

In order to be absolutely certain of minimising collision risk , pilots will prefer to reduce their takeoff altitude even more to maximise separation and reduced opportunities for collision. This explains why, at Summer Hill, departing jets conduct extremely slow climbs at altitudes of between 1500 and 2500 ft. It is therefore not surprising that they make so much noise .

It is for this reason that jet departures over Ashfield, and for a much greater distances further out (as far as Parramatta and Winston Hills [#34]), must fly so obscenely low. Given clear skies ahead, pilots would naturally attempt to gain altitude fast in order to minimise fuel consumption for the trip.

In contrast, instead of crossing over the inner west, the arrivals from the north and west should now be proceeding out to the east from Barren-joey Head across the upper northwest beyond the northern outskirts of Sydney, then offshore down the coast [See Appendix E] . Only thus can low-altitude cross-overs be avoided in the inner west and beyond.

The originally described mainly offshore ***"High and Wide"*** arrival procedures were abandoned by Airservices Australia , despite these being promised-to-be fully achievable and safe in its 1996 blueprint. This is first admitted in a 2003 document [#35] , not unveiled to SACF until June 2006. The excuse for deleting offshore arrivals was a highly questionable claim that the airline track mileage would , across-the-board, be some 15% greater than for the previously existing (pre-1996, cross-city, low level) crossing arrival tracks.

Even if only partly true, the elevation of "track mileage" , to a decision criterion , above Sydney's human environment made a highly questionable excuse for abandoning LTOP. This decision has left residents of the North West, West and East impacted by extremely low-flying , noisy departing aircraft with dangerously criss-crossing overhead arriving aircraft, producing a significantly noisier and polluted environment closest to where most people live and work.

The Long Term Operating Plan was designed with much expert input to enable continued airport operation within its environmental limitations following the 1994 Third Runway Debacle. It should never have been so lightly tampered with.

The justification of 15% increased track-miles claimed by Airservices Australia appears to have been based on unlikely extreme scenarios (e.g. 100% arrivals from south and west with 15 knot southerly or easterly winds). Proper time-averaging of arrival mode usage for historic distributions of aircraft approach directions from 1998 to 2005 demonstrates that variable, but much smaller increases , with possible reductions (dependent on air traffic mix) rather apply [# 36] .

Conceding that, it can be easily shown from Airservices own data, that those arrivals having the most environmentally damaging effect on northwesterly and easterly takeoffs (Runways 16L & R approaches from the north) , could be rerouted offshore without ***ANY*** cost in track-mileage [See ibid [35], Table in Para. 3.2, at p. 15]. The Figure in the 1996 LTOP (Summary) Report [Page 62] for Mode 9 operations shows the intended plan , were LTOP implemented by the book [See reproduction in APPENDIX E] .

It thus appears that LTOP implementation appears to have been executed by an organisation not fully committed to the process. Despite the dubiously revolutionary idea of "noise sharing", almost zero practical accommodation was made to minimise noise over the ***newly affected departure areas*** . Certainly the noise was never confined to over-water , industrial and non-residential areas as ordained.

Instead the objective was reduced to minimising aircraft track miles, with deafening consequences for homes under the western , north-western and eastern residential corridors . To mitigate these negative effects the former (pre-1996, pre-LTOP) north-wind arrival routes criss-crossing Sydney Airport must be relocated to create sufficient airspace overhead the departure tracks and enable westerly , north-westerly

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34 Personal Communication by Telco - Ian McLeod (ASA Environment Branch) to Philip Lingard Nov. 2003.

35 *"IMPLEMENTATION OF THE SYDNEY LONG TERM OPERATING PLAN (LTOP H&W) HIGH AND WIDE FLIGHT PATHS (LTOP H&W RECOMMENDATION 2) FIRST REPORT OF TASK FORCE 2"* FEBRUARY 2003 [SACF Doc2006- 046] .

36 P.S. Lingard, unreported calculations submitted to the IMC, Sept. 2007 (Details avilable on request).

and north-easterly takeoffs to reach noise-critical-altitude (ca 6000 ft) quickly after takeoff and minimise noise.

Better still the originally planned "high and wide" offshore arrival paths to runways 16L & R in LTOP Mode 9 should be reinstated, which as shown [Ref. Ibid 35, Para 3.2 , p. 15] DO NOT INCREASE TRACK MILEAGE !

Such tracking was environmentally essential to achieving LTOP in both the 1996 LTOP Reports, and the LTOP Proponent's Statement . The documents clearly project that in northerly winds there would be widely spread offshore jet arrival routes, both up and down the coast , which would clear the airspace over both inner and outer west, and eliminate the overflying of departing jets by arrivals crossing the Inner West (predominantly Summer Hill and Bondi Junction) as seen in Figure 1. This would allow aircraft to maximise height while decreasing ground noise levels for the inner environs such as the north - west, -east and west.

Instead of departing jets from Runway 34L flying at 1500-3000 feet all the way to Parramatta and beyond "The Hills", both the LTOP Reports and the Proponent Statement predicted altitudes (for B747's) of 6500 ft at Wetherill Park and Baulkham Hills in the west and northwest; and that B767's would be at 6000 ft upon reaching Gladesville! Why doesn't Airservices Australia properly implement these promised and essential environmentally significant aspects of the LTOP?

If none of the above is possible then the date for transfer of heavy jet movements from Kingsford Smith Airport to a judiciously chosen out-of-basin airport , suitably linked to multiple cities with 21st Century Very High Speed Rail should be brought forward to a point well before 2020 .

6.2 Implement "ICAO-A" (or Better) Noise Abatement Takeoffs over the North West:

The original LTOP foreshadowed the introduction of the former ICAO [#37] -A-style Noise Abatement Departure Protocols (***NADP***s) where appropriate, with urgent attention to be given to improved abatement takeoff profiles . In due course and, after consultation with SACF, ICAO - A was duly mandated for all takeoffs over residential areas by Transport Minister Vaile in August 1998[#38].

ICAO-A required initial steepest possible ascents to not less than 1500 feet prior to adjusting engine thrust and turning onto course direction. It has since been replaced by ICAO with a new Noise Abatement Departure protocol called NADP 2, but the principles remain the same. Indeed some overseas airports employ much steeper and prolonged initial climb outs in order to gain altitude so as to minimise noise over residential areas. And the principle was actually enshrined in Airservices own ***Noise Abatement Procedures*** (NADPs) in DAP -East[39] , but the standard instrument departure (SID) instructions for Sydney Airport (north) contradict the NADPs , breaching the Minister's August 1998 and subsequent NADP directions. In 1999 and 2007 at the request of Government SACF , first Mr. Anderson and then Mr. Vaile again emphasised the need to improve Noise Abatement Departure Protocols . Airservices Australia should be asked why did it never implement Ministers Anderson and Vaile's three directions to implement and improve NADPs? The currently employed noisy , polluting "Low profile (low altitude) low-fuel consumption takeoff protocols" are conducted for the benefit of airlines only, not for residents, and are unsatisfactory for noise abatement.

6.3 Implement Better-than-ICAO Noise Abatement Departure Protocols (NADPs):

The ICAO - A / NADP-2 protocols were always compromised at Sydney by misconceived airline (mainly Qantas) fuel cost concerns, hence the main , but misconceived , resistance to fuller LTOP implementation.

Unfortunately, ICAO-A itself does not achieve fantastic noise reductions. Better NADPs can be devised, however as demonstrated to SACF by one of us[#40] in 2006-7 . These involve much steeper takeoffs than existing after takeoff roll, with a quick climb to around 4000 feet. To accommodate the above-described

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37 ICAO- International Civil Aviation Organisation

38 Press Release T159/98, 28/8/1998

39 Airservices Departure and Arrival Procedures-East

40 P.S. Lingard

"ceiling effect" (if still present) , it was shown that subsequent levelling out with reduced thrust would reduce ground noise for B747 -type aircraft by 10- 20 dB(A) for distances further than 3 to 5 km from takeoff [#41]. A typical takeoff profile set and noise-distance relationship produced using the US Federal Aviation Administrations "Integrated Noise Model" (INM Version 6.2) is shown in Appendix F (Figures 1 & 2). We submit that the benefits for residents under the flight paths appear self-evident, and at least worth trialling.

6.4 Employ More Effective Aerial Fanning after Takeoff:

This should be self-evident, but there seems to be very little ability in the Airservices establishment to respond innovatively to such suggestions. Perhaps there had been when LTOP was being proposed in 1996. When LTOP was introduced the government mandated that existing flight corridors would be abolished, and concentrations of movements across particular areas should be avoided so that noise could not only be minimised, but also "fairly-shared."

Concentrating nearly 50% of all (and 60% of jet) departures at low altitude over a single residential locus of Summer Hill or anywhere is not "fair sharing". Better Noise Abatement Departure Protocols, with consequently greater vertical latitude for aircraft to manoeuvre , would facilitate implementing Tower-based time-sequenced, computer-directed bearing trajectories with more widely dispersed departure paths.

6.5 Increase The Use of Botany Bay Modes :

Modes such as Simultaneous Opposite Direction Parallel Runways Operations (SODPROPs) can be shown to accommodate as much as 75% of normal Sydney Traffic if artificial restrictions were not placed upon them For example it has been shown that if a "noise abatement" down-wind condition is applied the use of SODPROPs could be increased. This downwind condition must be applied for noise abatement purposes, permitting preferential takeoffs and landings over the Bay in northerly winds, but not in both directions.

With a 5 knot Noise Abatement northerly downwind setting, SODPROPs could be available an average of 82% of the time assuming prevailing Sydney Weather and Traffic conditions over the 50 years to 1996 [See Ref. [17] ibid Chapt 6 Table 6.3.5, p. 83]. With a 10 knot downwind condition applied , SODPROPs availability increases. Takeoffs to the south from Runway 16R or left do not need to pass over Cronulla using the Deena (16R) and the Botany Heads (16L) SIDs. The Deena SID is presently unavailable for night traffic , and airport investment is needed to provide suitable guidance systems to make the DEENA SID available at all hours.

6.6 Mitigate the Human Harm and Medical Implications:

While proposing that the use of the takeoff profiles depicted in Appendix F (See above) may be beneficial for some. For others, it is the very low-frequency sounds (which are not quantified by the A -scale weighting used in aircraft noise monitoring) that may be the biggest nuisance. This appears particularly true in the presence of physiological abnormalities of the human cochlear. It is known that around 10% of people suffer one or both of either Tinnitus or Menier's [#42] condition, which the above improvements may not assist. Whether suitably designed urban noise barriers and /or home insulation can provide a satisfactory remedy for some such people in the face of inexorable airport expansion seems unlikely. Also, some people who have hitherto accepted noise insulation in high ANEF areas , partly through government subsidy, together with the required total air-conditioning , have reported finding living with the consequent restrictions life-style crippling clastrophooic and unsatisfactory. The provision of residential noise insulation by the airport owners and profit centres should be at least made available to sufferers at no cost.

6.7 Mandate Provision of Home Noise Barriers and Insulation:

The pre-2008 government abandoned the airport noise levy from 1 July 2007 . Why this occurred is mysterious given forecast increases in residential noise affectation of up to an additional 20,000 people and 5000 dwellings at the greater than 25 dB(A) ANEF level in the 2023 Airport Master Plan [#43] ? The

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41 *SUPPORTING DATA FOR SACF NOISE ABATEMENT DEPARTURE PROTOCOL [NADP] DISCUSSION By P.S. Lingard [SACF Doc 2007- 022].*

42 *"Triumph over Tinnitus"* (2001) , Rafaele Joudry, Sound Therapy International Pty Ltd ISBN 0 957924-60-7, p.4ff

43 ***CRITIQUE OF SYDNEY AIRPORT CORPORATION LTD'S "PRELIMINARY DRAFT MASTER PLAN 2009"***

lack of any legislative provision in the Airports Act for equitably distributing the legal liability for human environment mitigation by providing noise insulation and other compensation with continued airport growth is inexplicable . Even more inexplicable is the government's apparent abrogation of any responsibility for future aircraft noise mitigation!

6.8 Eliminate Loopholes and Contradictions in the Airports Act and Airservices Act:

The Legislative and Regulatory contradictions in the Airports Act which make Airport Corporations liable to explain in their "Master Plans" how they will mitigate harm from aviation operations (Airports Act S. 71) , yet leave the responsibility to Airservices Australia (Airservices Act S. 9(2)) for directing aircraft to fly in a manner so as to "minimise harm to the environment" , without either corporate entity being able to direct the other, beggars belief. This situation is a recipe for a completely unworkable aviation environmental regulatory framework which is open to the ultimate abuse, because both airports and Airservices gain pecuniary benefit from continually increasing airline traffic flow.

A more permanent Regulatory and /or Planning solution is urgently needed to avoid ongoing harm and crippling nuisance for many people. Shifting heavy jet aircraft to out-of city airports in non-sensitive areas, as exemplified by the Dulles Airport for Washington DC and Baltimore Md in the USA appears the best answer both for the airlines (which could then operate 24 hours a day) , and international airport users whose movements to and from the airport are currently crippled by inadequate State roads infrastructure. Coupling an out-of-basin airport with several cities (e.g.. Sydney/Wollongong/Goulburn Canberra) using linking very high speed rail transport would seem a far-sighted way to go.

6.9 Need to Provide for Low Frequency Sound-Induced Damage to Shaking Buildings:

In addition to aircraft noise annoying many residents and harming others , the low frequency sound components of the jet engine noise spectrum are known to cause building vibration and to shake windows and doors. It is not the province of this paper to recite evidence for this but it seems futile to measure aircraft noise impacts using the A-weighted decibel system which ignores low-frequency (LF) sound , when building structures are mainly disturbed by very low frequency noise which travels through or along the ground. It is known, for example that LF noise has been investigated by certain governments interested in its use as a weapon both to cause building damage and induce disorientation in human beings . It is submitted that a future Australian Standard on building siting and construction related to aircraft noise should provide a section dealing with building damage caused by vibration from low-flying jet aircraft.

6.10 Council Liability for Negligent Specification of Dwelling Approvals in Aircraft Noise Areas:

In *Port Stephens Council v Booth & Ors* [2005] NSWCA 323 , the New South Wales Court of Appeal affirmed a judgment finding a local council liable for damages and the retrospective cost of noise insulation in dwellings it approved without forewarning applicants that the area was affected by aircraft noise at the 20 dB(A) and above ANEF -Level . This occurred in connection with dwellings affected by aviation operations from a nearby military airport with intermittent movements. This should make incumbent Councils consider requiring an appropriate level of noise insulation in approvals of *new dwellings* and extensions constructed nearby in the vicinity of airports .

7. CONCLUSIONS :

1. This paper updates a Preliminary Report of similar name from December 2005 and presents corrected , continuing and expanded data from 2006 to end-June 2009 . It describes a significant , but only a small part , of the aviation noise problem across the inner north.

2. The Report demonstrates there is a focussed concentration of around 60% of all low-flying jet departures from Runway 34L across one residence in Summer Hill. The resulting noise impacts on this (formerly quiet) location and a primary school amounting to an average maximum sound level of 75 dB(A - "S" -averaged) +/- 4-6 (SD) [Range 53 - 93 dB(A)] are unacceptable, and must be rectified forthwith. The ANEI associated with these impacts are above 20 dB(A) in the AS 2021 -specified only "conditionally acceptable" band.

3. That the same problem was reported 6 Years ago by Airservices Environment Branch (Report 1360) for nearby Henson Street, but nothing done, is an indictment of Airservices Australia and its Government SACF /IMC Committees, not to mention the new (post-December 2007) Government and its officers, who should know the problem well. Both Prime Minister Rudd and Transport Minister Albanese have made a political issue of aircraft noise for the attention of their electorates in Brisbane and Sydney , respectively .

4. At this location, both the calculated Australian Noise Exposure Index (ANEI) at around 22; and the Time and Energy Averaged Equivalent Sound Pressure Level (LA eq) form 53 to 55 , are in the only ***"conditionally acceptable"*** range for houses, home units and flats by the criteria of Australian Standard AS2021-2000 and are considered ***unacceptable*** for locations near industrial sites according to NSW Government Industrial Noise Guidelines (2000) , respectively.

   This finding contradicts the ANEFs produced by Sydney Airport Corporation in its "Master Plans 2024 & 2029" for Sydney Airport that the 20 ANEI level will not be reached at Ashfield until either 2023 or 2028 (They cannot decide which) !

5. The above should make the incumbent Ashfield Council consider requiring an appropriate level of noise insulation for *new dwellings and modificatioins* constructed in the vicinity of the referenced and similar homes on pain of being required to compensate relevant future owners for failing to warn of adverse environmental impacts with ANEF greater than 20 dB(A) : Port Stephens Council v Booth & Ors [2005] NSWCA 323 . Existing exposed homes should be provided with necessary insulation either voluntarily by Government, the Airport Corporation or Airservices Australia so as to mitigate the involuntarily-suffered public harm already in progress.

6. Local Councils need to be more cautious in approving new or additional building specifications without taking account of the likelihood of existing or future aircraft noise impacts at the 20 ANEF level.

7. Without such insulation treatment both the maximum and the range of exposure in (2) and (4) above are likely to cause foreseeable harm (sometimes lasting) to regularly exposed susceptible individuals whether directly or at the initially subliminal level.

8. The resulting proportion of noise events exceeding 80 dB(A) of close to 22% is manifestly unacceptable and breaches Airservices own environment guidelines for all areas but those very close to runway threshold immediately following takeoff. More than 60% of actual noise events are greater than 75 dB(A).

9. The number of noise events per day greater than 75 dB(A) (ie 23/day) fails even the test for ***"conditional acceptability"*** for building construction requirement of AS2021 -2000 for even a *light general aviation* aerodrome without ANEF. This means that new homes in this area would require some noise insulation, whilst existing homes continue without.

10. Nearly all noise events at this location produce conditions in adjacent homes which would be

likely to prevent conversation (i.e. > 63 dB(A)) around three times per hour on an annual averaged basis. During actual operational days the peak impact is between 3-4 times per hour on average, and can be much higher at particular times of day.

11. For those with normal hearing and sensitivity, the frequency of interruption by such noise levels can be an annoyance which is disturbing , but for people with certain auditory abnormalities such as hyper-acusis (including Tinnitus and Meniers Syndrome) they can be either painful or physically and/or psychologically harmful. This is an environmentally induced public health issue that needs urgent addressing because the issue is wider than hearing defects and includes learning disorders for children, productivity losses for working adults , with psychological and cardiovascular implications for all [#44] .

12. Why since the tabling of Airservices Australia, Environment Branch Report No. 1360 late in 2003, and the Preliminary version of this Community Noise Report in 2006 has insufficient been done to address these issues?

13. It is submitted that there is a significant case for Airservices Australia to be ordered to remove the cause of aircraft noise concentration and the frequency of high noise levels in this sector of Summer Hill and the wider north west . The onus is now on Airservices Australia, the author of the "***Long Term Operating Plan for Sydney (Kingsford Smith) Airport***" - ie LTOP (aka ***"The Fair Share Noise Plan"***) to effectively begin monitoring actual noise levels in the inner west. Prediction from assumed flight trajectories is not monitoring.

14. Airservices Australia should also take meaningful remedial action through intelligent air traffic control and to properly implement the LTOP with offshore arrival routes as promised. In particular it should implement noise abatement departure protocols which are preferably better than the former ICAO-"A" (now NADP2) as directed twice by the Transport Minister in 1998 and 2007, as shown to be possible by Lingard[#45] .

15. Standards Australia needs encouraging to revise the Standard AS 2021-2000 (Aircraft Noise and Building Siting and Construction) to (1) Bring it into line with State Noise Regulatory Systems which employ the "Fast" -time averaged maximum sound level metric (LA max) which is known to register high levels sound than the "Slow" -time averaged system used in Aircraft Noise monitoring in Australia; and (2) Consider creating a Standard also covering Building Damage cause by low frequency aircraft noise components not covered by AS 2021 due its adoption of the A-weighted decibel system.

16. Citizens , Governments and Councils need to be aware that the system of sound level measurement used in Aircraft Noise monitoring involves the "Slow"- integrated A-weighted decibel methodology which makes the maximum monitored impact some 3 - 4 dB(A) less than the standard used in general environmental monitoring which records the "Fast" - integrated signal.

17. It is submitted that continuation of abusive noise without proper environmental controls amounts to a form of bureaucratic persecution. It is suggested that all similarly affected people , especially those with relevant hearing difficulties , should complain loudly both to Airservices Australia and the responsible government Minister, and collectively seek compensation in the form of noise insulation at government or aviation industry expense.

18. A more permanent Regulatory solution is urgently needed to avoid ongoing harm and crippling nuisance for many people. Shifting heavy jet aircraft to an out-of-city airport outside the Sydney Basin area seems the best answer both for the airlines and international airport users (whether passenger or freight) whose movements to and from

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44 See WHO report, Berglund et al. ibid

45 *"SUPPORTING DATA FOR SACF NOISE ABATEMENT DEPARTURE PROTOCOL [NADP] DISCUSSION* By P.S. Lingard [SACF Doc 2007- 022].

the airport are currently crippled by inadequate State roads infrastructure. Coupling such an airport with several cities (e.g.. Sydney/Wollongong/Goulburn Canberra) linked by very high speed rail seems a far-sighted path to take.

19. Finally the data collection work described was accomplished mainly by one hard-working and public -spirited citizen trying to protect both his own and his neighbours rights to quiet enjoyment, ie. Mr. Johann Heinrich . The onus now rests on Airservices Australia to find an effective noise minimisation solution for the evident problem - no buts! Airservices Australia , as beneficiaries of the current noise regime together with Sydney Airport and the Airlines should therefore offer noise insulation to all homes and individuals similarly affected. The promise of John Howard in his 1996 pre-election statements prior to the introduction of LTOP that no would one would receive more aircraft noise than they had before LTOP (which was nil) should be honoured by those charged with implementation of the now aborted LTOP plan.

EXPLANATORY NOTE:
The instrumentation and data collection work for this paper was carried out by Johann Heinrich. The data processing and written organisation were the responsibility of Philip Lingard.

ACKNOWLEDGMENT :
The use of illustrations provided by Airservices Australia in its 1996 LTOP proposal Reports and images by distribution from its Noise Enquiry Unit and Environment Branch are gratefully acknowledged. The assistance of former Senator Marise Payne (Chair of SACF from 2002 - 2007) in procuring Airservices cooperation with the provision of jet departure time data for the coincidence testing was appreciated.

E

APPENDIX "A"

Table 1 - Typical partial output trace from the recording system

Date	Time	Sound	Frequency	Int Temp	Light	Ext Temp	
m/dd/yy		dBA	Hz	°C	Level	°C	
8/12/02	07:29:58	55.0	150	19.0	0.8	18.4	
8/12/02	07:29:59	55.0	86	19.0	0.8	18.4	
8/12/02	07:30:00	55.0	86	19.0	0.8	18.4	
8/12/02	07:30:01	55.0	155	19.0	0.8	18.4	
8/12/02	07:30:02	62.0	155	19.0	0.8	18.4	
8/12/02	07:30:03	62.0	83	19.0	0.8	18.4	
8/12/02	07:30:04	63.0	83	19.0	0.8	18.4	
8/12/02	07:30:05	63.0	243	19.0	0.8	18.4	
8/12/02	07:30:06	62.0	243	19.0	0.8	18.4	
8/12/02	07:30:07	62.0	255	19.0	0.8	18.4	
8/12/02	07:30:08	62.0	255	19.0	0.8	18.4	
8/12/02	07:30:09	62.0	284	19.0	0.8	18.4	
8/12/02	07:30:10	64.5	284	19.0	0.8	18.4	
8/12/02	07:30:11	64.5	163	19.0	0.8	18.4	
8/12/02	07:30:12	67.0	163	19.0	0.8	18.4	
8/12/02	07:30:13	67.0	109	19.0	0.8	18.4	
8/12/02	07:30:14	75.0	109	19.0	0.8	18.4	
8/12/02	07:30:15	75.0	230	19.0	0.8	18.4	
8/12/02	07:30:16	76.6	230	19.0	0.8	18.4	
8/12/02	07:30:17	76.6	265	19.0	0.8	18.4	
8/12/02	07:30:18	79.8	265	19.0	0.8	18.4	
8/12/02	07:30:19	79.8	302	19.0	0.8	18.4	
8/12/02	**07:30:20**	**89.0**	**302**	**19.0**	**0.8**	**18.4**	**LA max**
8/12/02	**07:30:21**	**89.0**	**276**	**19.0**	**0.8**	**18.4**	**LA max**
8/12/02	07:30:22	86.3	276	19.0	0.8	18.4	
8/12/02	07:30:23	86.3	311	19.0	0.8	18.4	
8/12/02	07:30:24	85.0	311	19.0	0.8	18.4	
8/12/02	07:30:25	85.0	209	19.0	0.8	18.4	
8/12/02	07:30:26	88.0	209	19.0	0.8	18.4	
8/12/02	07:30:27	88.0	168	19.0	0.8	18.4	
8/12/02	07:30:28	76.6	168	19.0	0.8	18.4	
8/12/02	07:30:29	76.6	263	19.0	0.8	18.4	
8/12/02	07:30:30	81.0	263	19.0	0.8	18.4	
8/12/02	07:30:31	81.0	184	19.0	0.8	18.4	
8/12/02	07:30:32	83.9	184	19.0	0.8	18.4	
8/12/02	07:30:33	83.9	157	19.0	0.8	18.4	
8/12/02	07:30:34	78.7	157	19.0	0.8	18.4	
8/12/02	07:30:35	78.7	51	19.0	0.8	18.4	
8/12/02	07:30:36	79.2	51	19.0	0.8	18.4	
8/12/02	07:30:37	79.2	75	19.0	0.8	18.4	
8/12/02	07:30:38	74.7	75	19.0	0.8	18.4	
8/12/02	07:30:39	74.7	107	19.0	0.8	18.4	
8/12/02	07:30:40	74.1	107	19.0	0.8	18.4	
8/12/02	07:30:41	74.1	70	19.0	0.8	18.4	
8/12/02	07:30:42	73.2	70	19.0	0.8	18.4	
8/12/02	07:30:43	73.2	112	19.0	0.8	18.4	
8/12/02	07:30:44	64.9	112	19.0	0.8	18.4	
8/12/02	07:30:45	64.9	67	19.0	0.8	18.4	
8/12/02	07:30:46	71.2	67	19.0	0.8	18.4	
8/12/02	07:30:47	71.2	86	19.0	0.8	18.4	
8/12/02	07:30:48	73.3	86	19.0	0.8	18.4	
8/12/02	07:30:49	73.3	58	19.0	0.8	18.4	
8/12/02	07:30:50	69.5	58	19.0	0.8	18.4	
8/12/02	07:30:51	69.5	62	19.0	0.8	18.4	
8/12/02	07:30:52	66.9	62	19.0	0.8	18.4	
8/12/02	07:30:53	66.9	38	19.0	0.8	18.4	
8/12/02	07:30:54	62.0	38	19.0	0.8	18.4	
8/12/02	07:30:55	62.0	76	19.0	0.8	18.4	
8/12/02	07:30:56	55.0	76	19.0	0.8	18.4	
8/12/02	07:30:57	55.0	0	19.0	0.8	18.4	
8/12/02	07:30:58	55.0	0	19.0	0.8	18.4	
8/12/02	07:30:59	55.0	62	19.0	0.8	18.4	

APPENDIX "A"

Table 2 - Partial typical day trace showing the manually -extracted LA Max in dB(A)

11.11.04

TIME-LA max dBA

6.26.49-93.4
7.11.51-74.0
7.22.24-83.2
7.35.51-77.7
7.45.11-81.0
8.03.33-79.9
8.20.35-76.5
8.21.38-94.0 at 994 Hz CALIBRATION TEST
8.38.03-82.2
9.00.55-88.5
9.03.28-73.8
9.10.07-83.0
9.14.57-82.1
9.25.09-82.3
9.27.05-80.2
9.34.35-79.7
9.36.30-79.6
9.43.21-76.2
9.46.02-79.2
9.48.23-88.4
9.52.08-84.3
9.55.48-69.2
10.01.49-73.3
10.04.16-84.0
10.06.38-76.0
10.08.10-81.3
10.19.36-79.1
10.22.24-78.7
10.32.20-80.8
10.46.19-78.6
11.01.48-85.9
11.07.37-84.8
11.09.24-77.2
11.27.37-85.3
11.53.57-84.7
11.55.54-74.5
11.57.43-87.7
12.01.01-82.1
12.35.47-75.2
12.38.52-85.7
12.48.04-82.1
12.55.00-75.7
12.59.32-76.3
13.03.46-89.5
13.05.51-82.3
13.13.34-71.9
13.19.37-82.0
13.22.12-70.9
13.43.36-75.8
13.54.13-75.4
14.00.47-79.1
14.07.18-76.7
14.36.21-83.7

.....continues . See files 200xnois.txt for details, where x is the year number

APPENDIX "B" Sound Level Output Comparisons with Airservices Breull and Kerr

(a) Cf. Report "TECHNICAL ASSESSMENT OF COMMUNITY NOISE MONITOR AT SUMMER HILL SYDNEY", NSW May 2006 - By Dr. Ian McLeod , Aviation Environment Specialist Airservices Australia

It is noted that this report is marked "DRAFT" and was never given an official Airservies report number.

Metric	**Heinrich-Lingard 2005**	**AA (1360)**
Location	Moonbie Street	Henson Street
LAeq	64 dBA (1-year)	51.7dBA (83days)
N70	51.1 (events/day)	26.4 (events/day)
N80	24.5 (events/day)	4.4 (events/day)
N90	1.5 (events/day)	0.0 (events/day)
MEAN LAmax	79.8 dBA	76.8 dBA
Capture Rate (CNE/D34L)	50%	38% (69% for jets)

Quotation from Airservices Report (P. 3) :

"Test 2. The microphone to the noise logger was placed next to the microphone of the B&K, see Figure 3. This would guarantee both microphones being exposed to the same noise. Individual comparisons of the noise measured by each system from over-flying aircraft showed the logger to be between 5-6 dBA higher than the B&K analyser."

(b) Cf. Report : ***COMMUNITY REPORT ON AIRCRAFT NOISE MONITORING WITH AIRSERVICES AUSTRALIA""*** Date: 11 April 2006 (ACN0411), By Philip S. Lingard (SACF Proxy for Mayor of Ashfield 2005-7)

TABLE 1: SUMMARY RESULTS

(With Data items #7 & #11 removed because of nil comparison)

Item	ASA dB(A) Sampling Frequency 10Hz	ASA dB(A) Sampling Frequency 1 Hz	PSL(dB(A)	JH (dB(A)		
#1		72.90	71.00 (rand)	73.20	*Location A:*	
#2		74.20	75.00 (rand)	77.30	*Location A:*	
#3		71.60	72.00 (rand)	77.70	*Location A:*	
#4		69.40	71.00 (nr wall)	82.00	*Location A:*	
#5		69.50	74.00 (nr. clust)	75.00	*Location B:*	
#6		72.60	76.00 (nr. clust)	78.40	*Location B:*	
#8	80.40	77.80	79.00	82.50	*Location B:*	
#9	73.00	68.00	73.00	73.50	*Location B:*	
#10	75.00	65.00	67.00	70.70	*Location B:*	? Huge difference betw ASA results
#12	78.10	75.00	74.00	80.20	*Location C:*	
AVE #1- #12	76.63	71.60	73.20	77.05		
SD #1 - #12	3.28	3.73	3.26	3.92		
				1 Hz	10 Hz	
DIFF (JH - ASA)				5.45	0.43	
DIFF (JH - PSL)				3.85	na	
DIFF (PSL-ASA)				1.60	-3.43	

Conclusion: It is noted that Airservices comparison results in a similar error margin [5-6 dB(A)] to that of the current author (PL) . Therefore the present paper assumes the error of 5.5 dB(A) for all measurements.

APPENDIX "C" Cont'd:

Figure 10 All jet departures from 34 Left in the same period.

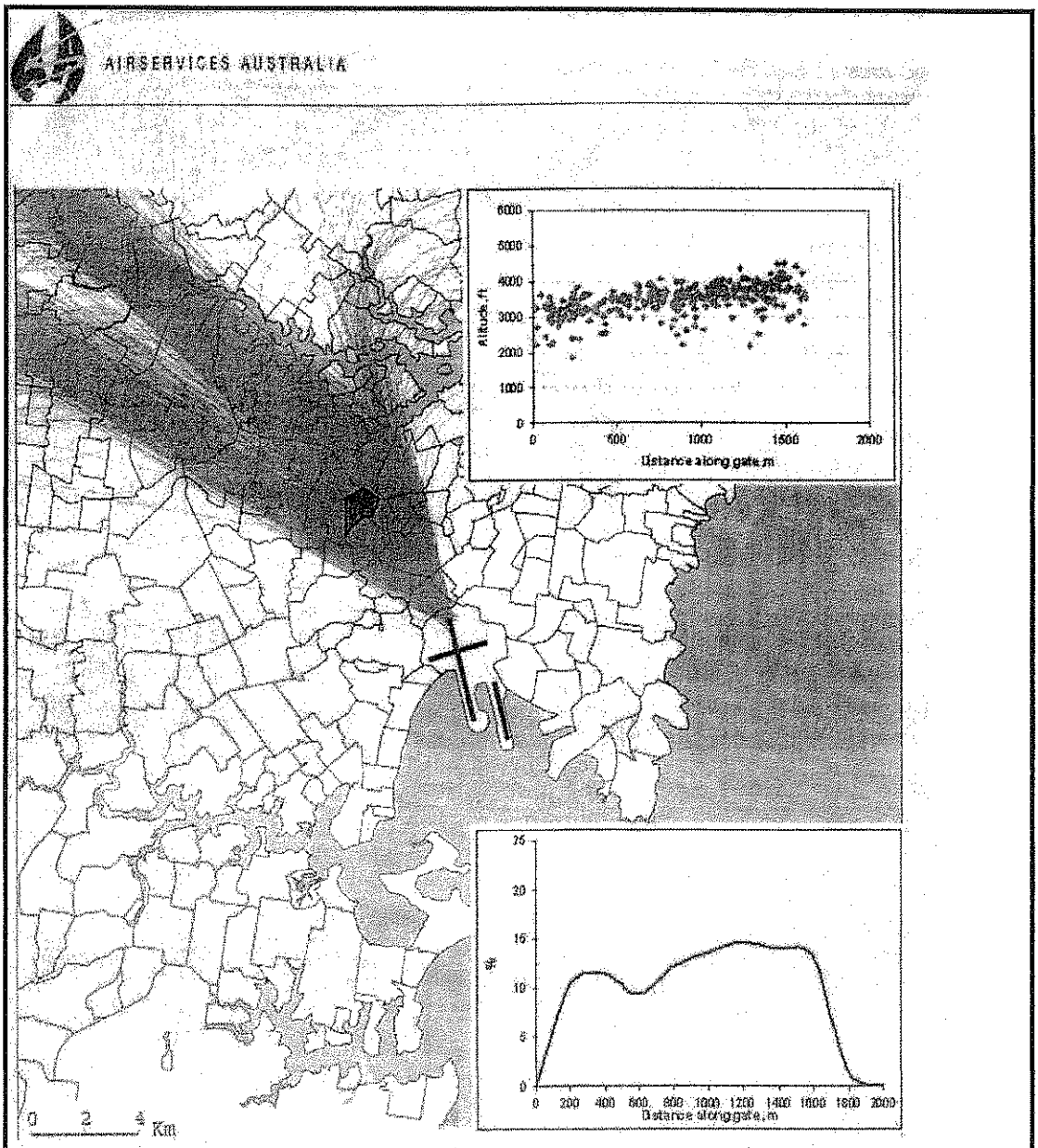


Figure 10 Track plots, height graph and distribution for Jet departures from runway 34L which overfly the suburb of Summer Hill (shaded) for the sample periods 1-14/10/2002 and 1-14/4/2003

APPENDIX "C"

The Departure Ceiling Over Summer Hill

*Figures 7 & 10 reproduced from Airservices Australia Environment Branch Rreport No. 1360 , **"Short Term Study into Aircraft Noise and Flightpaths"**, February to May 2003, Summer Hill*

Figure 7 All jet arrivals onto 34 Left for the period from 14/10/2002 - 14/4/2003.

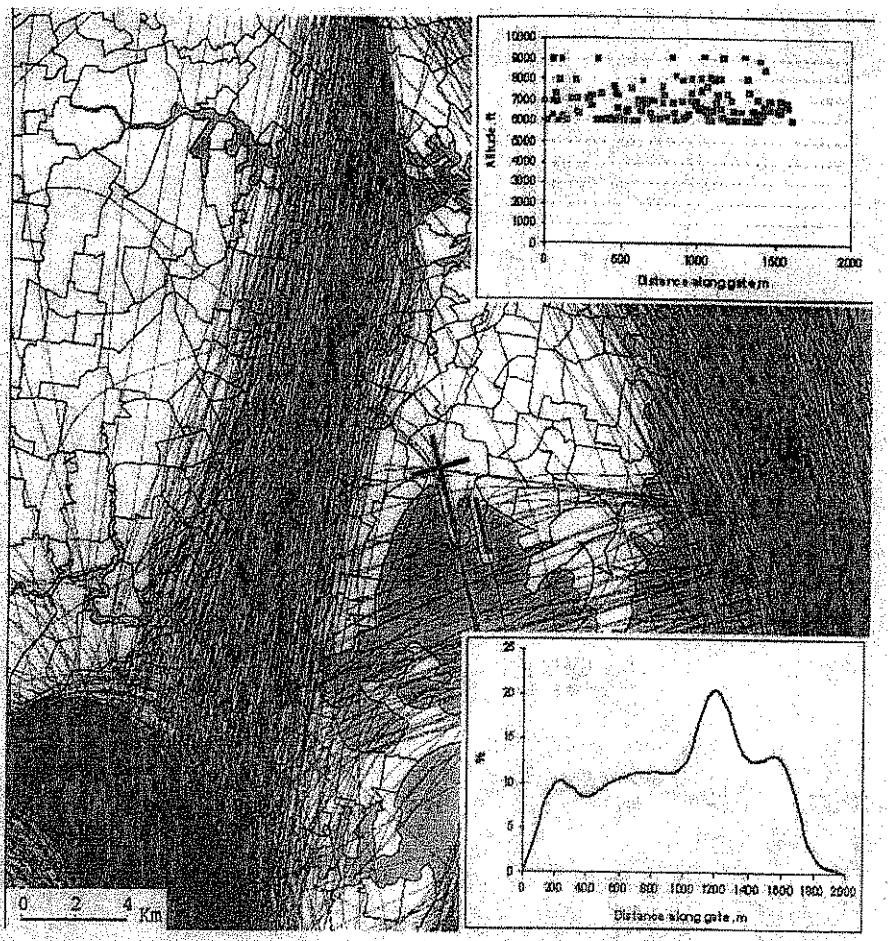
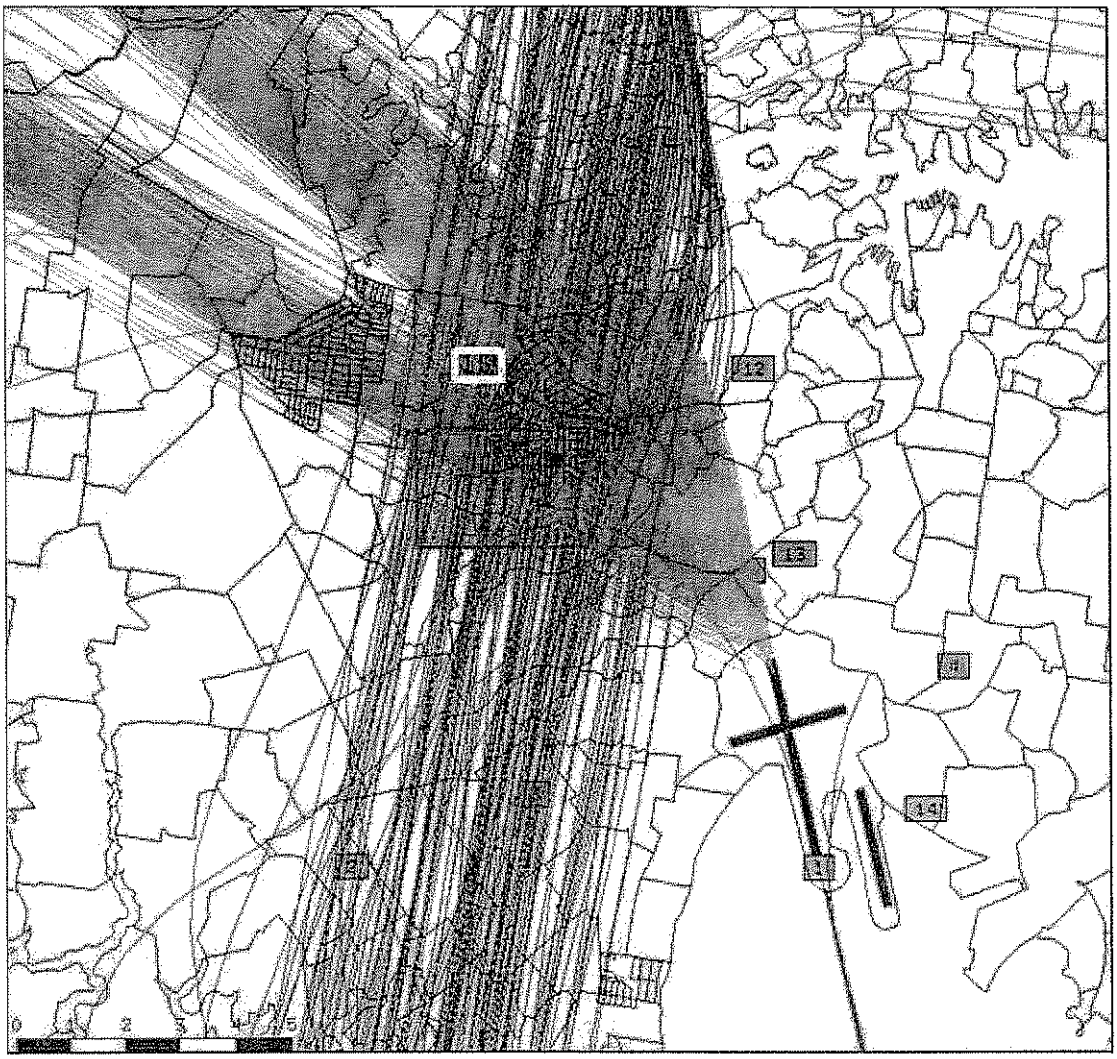


Figure 7 Track plots, height graph and distribution for Jet arrivals onto runway 34L which overfly the suburb of Summer Hill (shaded) for the sample periods 1-14/10/2002 and 1-14/4/2003.

Aircraft noise and flight path study at Summer Hill, Sydney Page 18

APPENDIX D AVOIDANCE OF NOISE MONITOR AT PLC DURING AIRSERVICES EB 1360 MONITORING (Feb. To May 2003) :

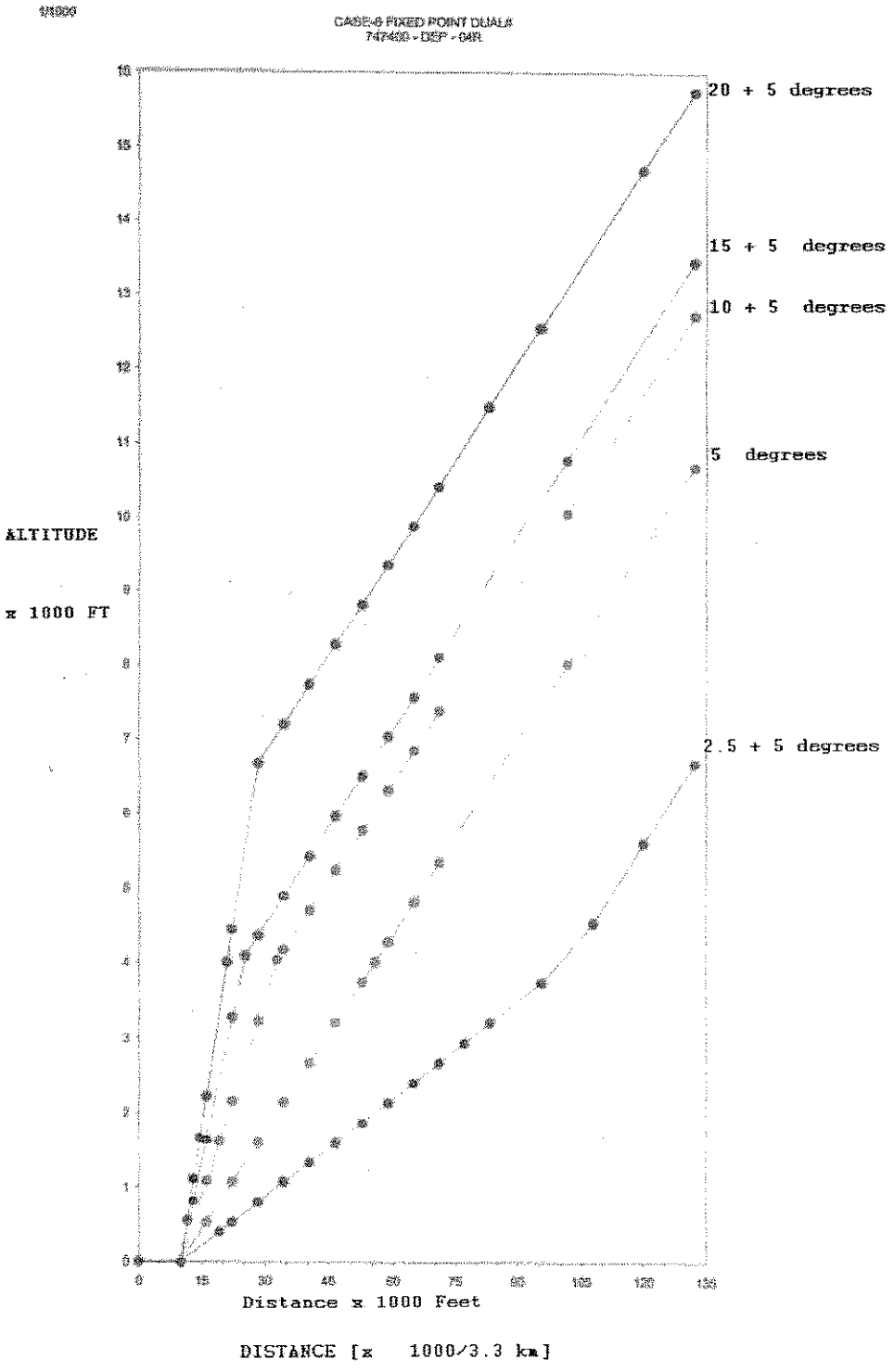
FIGURE 1 *Image modified from Airservices Australia Flight Track Data 3/6/2005 - 10/6/2005 06:00 - 23:00. Supplied by NEU in response to Email correspondence between P. Lingard & M. Chipman resulting from TNIP enquiry to D. Southgate of the then Department of Transport and Regional Services (DOTRS). For Research and Private Study by Community Groups .*



APPENDIX F PROPOSAL FOR STEEPER TAKEOFF PROFILES

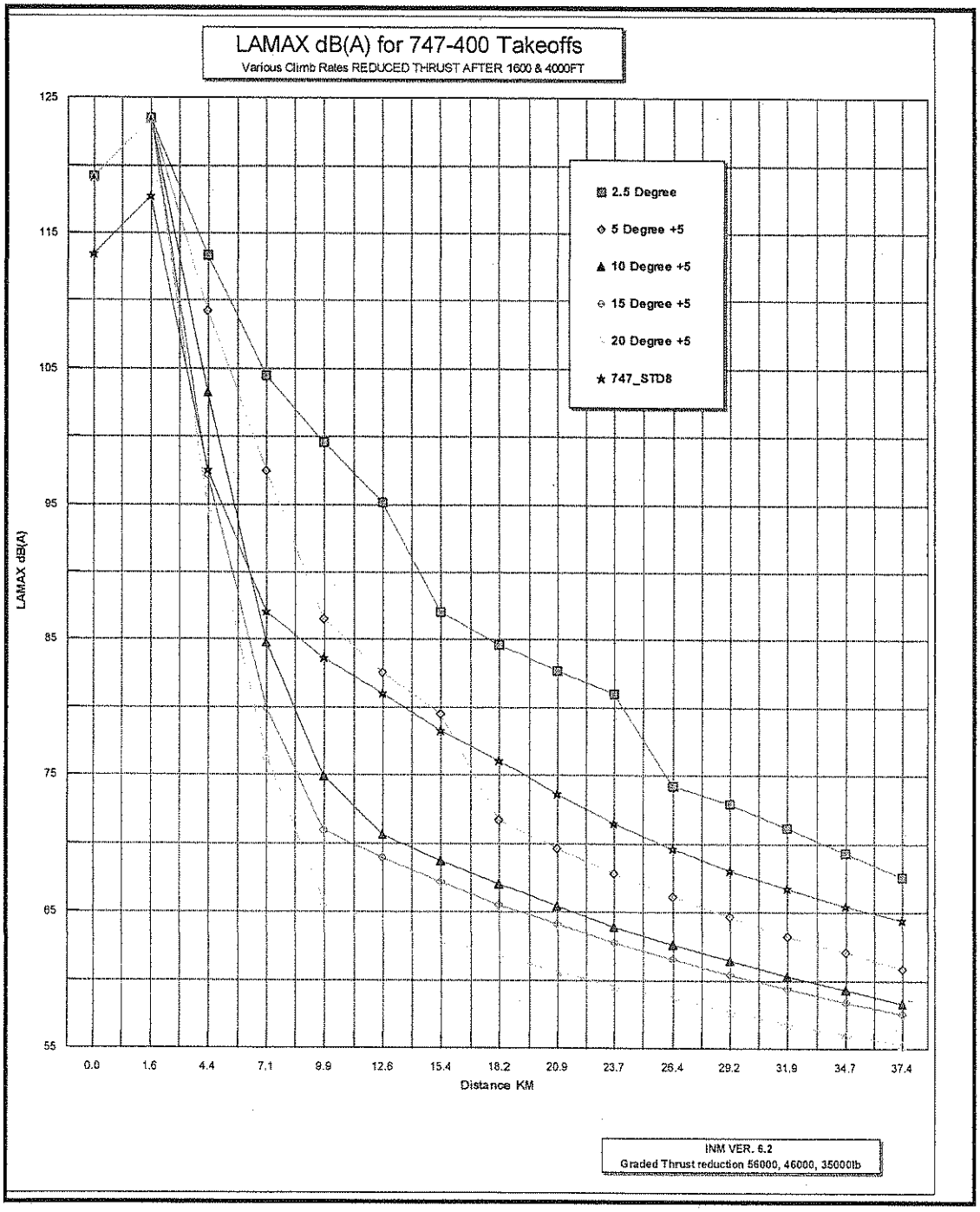
FIGURE 1 SUGGESTED CLIMB PROFILES:

Reproduced from SUPPORTING DATA FOR SACF NOISE ABATEMENT DEPARTURE PROTOCOL [NADP] DISCUSSION By P.S. Lingard, BSc., Ph.D., LLB. , Figure 1, SACF Doc 2007-022, 8/6/2007.



APPENDIX F PROPOSAL FOR STEEPER TAKEOFF PROFILES, cont'd:

FIGURE 2. TYPICAL PROFILE SET SHOWING IMPROVED LA $_{max}$ NOISE LEVELS WITH THE INITIALLY STEEPER TAKEOFFS SHOWN IN FIGURE 1
Reproduced from SUPPORTING DATA FOR SACF NOISE ABATEMENT DEPARTURE PROTOCOL [NADP] DISCUSSION By P.S. Lingard, BSc., Ph.D., LLB. , Figure 2, SACF Doc 2007-022, 8/6/2007.



E

Tabled by SACF Inc at aircraft noise inquiry in Sydney on 28 May 10

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15 December 2008

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SYNOPSIS

The prediction of 427000 aircraft movements per annum to service 79 million passengers and 1 million tonnes of freight is RARELY supported by the present international ratios [See Section 5] . The Year 2007 ratio of 102 passengers per movement would require a hypothetical 774510 aircraft movements to produce 79 million passengers per annum.

This is totally beyond the practical capacity of KSA, given necessary environmental constraints. If the forecast 79 million passengers per year holds up in practice for Sydney Airport , the environmental consequence for Sydney of 774510 movements - a number consistent with current overseas experience - should the assumption of continually rising passengers per movement prove unjustified, will only worsen the current environmental nightmare for the residents of Sydney . Such an achievement would likely be possible only with twenty-four hour operations, or a radical rethink of the traffic mix between international and domestic flows.

The biggest problem with both this and the 2004 master plans is that there is no effective attempt in either plan to communicate to residential neighbours and property owners the magnitude of the likely environmental consequences from either noise or pollution growth . Even the "N70" , ANEF and ANEI charts provided for MP2009 do not possess street outline grids enabling the community to visualise how they will be affected.

This critique reveals that with the ANEF projections for 2029 put forward by this airport lessee company (ALC), approximately an additional 2200 homes involving 5300 residents will become affected at the ANEF 30 level by 2029 compared to that in 2001. In between times, from now until 2023-4 , the 2004 Master Plan continues for which the number of additional homes becoming "transiently " affected at the ANEF 30 level will rise to over 5000 , with up to 14000 newly affected at ANEF 25 and 52000 newly affected at ANEF 20 [See Para 8.6] .

Similarly by 2029 the increased numbers of dwellings affected at the 25 and 20 ANEF levels will range from 7500 to 26000, respectively, making a total of over 51,000 additional "newly affected" homes involving nearly 120,000 residents! On the ANEFs provided , the total additional insulation cost for new homes affected at the 30 ANEF level would be around $300 million. For insulation of all new homes affected above the 25 ANEF level the cost would be in the region of $3.75 billion!

The presented figures for 2029 are close to HALF what they were for the July 2003 Draft Master Plan for the period to 2023. The reductions of ANEF contour coverage, as claimed , are attributable to *"quieter aircraft"* and an unstated but necessary "epiphany" on the part of that well-known supporter of aviation interests, Airservices Australia [ASA] . Perhaps , uncharacteristically, ASA has finally agreed to get its head around and promised to introduce remarkably people-friendly noise abatement departures takeoffs over residents, with a lead time of another 20 years, and despite opposition from well-known airlines. It must be hoped so, or the ANEFs currently cited by the ALC will be blown away. Some of the ANEFs in the figures appear hand-drawn, and appear certainly carefully, yet craftily calculated to produce the promoted 50% -less impact than shown for the 2023 projections in the 2004 Master Plan. Of course this does not reflect the coming to pass of any forelorn hope one may have had that ultimately Airservices Australia had become a kindly , benign partner with the airport's residential neighbours in noise mitigation, more probably it reflects that with increased traffic flows and endless periods at 80 movements per hour the airport will be reverting to ***PARALLEL FLOWS.***

Even so, the environmental harm is massive compared to, say , the impact of the third runway (an additional 2200 homes at ANEF 30 and 75000 at ANEF 25 compared to the 2001 ANEI - and double those figures if the 2023 ANEF is proven to be right). Yet, the airport lessee company presents these significant environmental data (Derived from their own and ASA's ANEFs) without other than "formal" explanation, and without regard to its obligations to ***"assess and plan for"*** the consequences of the projected environmental impacts as required under the planning obligations created by S. 71(2) of the Airports Act. There is no indication of what the airport company is doing ***"to plan for"*** the increased noise exposure of its neighbours other than to rely on the intermittent good offices of the Federal Government for the provision of noise insulation, which in turn can be a mixed blessing for many.

For a Master Plan , the Airports Act requires a statement as to what "the airport lessee company" intends to do about impact amelioration and prevention [S. 71(2)]. Instead we are again presented with SACL's expectation that Sydney Airport will be given a free ride at the flying -public and taxpayer's expense to ride roughshod over the environmental interests of the ground-bound public, whose homes all across Sydney at present lie under the noisiest and lowest departure flight path ceiling of any since Sydney Airport began !

This is a plan for environmental urban vandalism on a scale not seen from Sydney Airport since the opening of the third runway, and publication of Master Plan version 2004. It should not be tolerated by the Minister or Ministers responsible , who in this view would be justified in seeking a full environmental impact statement (EIS) with fully independent specialist review, and full opportunities for community consultation at public venues once the true impacts are made known.

The Minister(s) would be ill-advised to provide a mere perfunctory assessment and kindly nod to this proposal. If either or both fail in this regard, the eventual cost to the affected Sydney Communities will be immense . The Government in turn should make airport lessee corporations and supporting agencies liable in tort for the community harm which will result from the proposed expansion of Kingsford Smith Airport given the minimal environmental assessment which is presented.

The ***"LTOP - noise share" Plan*** behind which this airport lessee company hides for environmental justification has been hijacked and misdirected away from the original goals set by then Minister for Transport Sharp. As evolved the LTOP is not a plan which maximises movements over water as promised. It is a plan which instead maximises aircraft movements, takeoffs, noise and crash-risk over the most heavily populated residential areas of Sydney. Not only does it maximise movements and takeoffs over residential areas, but it maximises the use of low-altitude high noise impact flight path trajectories for both arrivals and departures in the most unconscionable way. Yet this has never been the LTOP plan as promised by Aiservices Australia and approved by Sharp. This is both harmful to Sydney residents and inconvenient for airlines which use more fuel through failure to reach cruising altitude in optimal time.

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1. Re. Disclaimer (p. (i)):

We note with irony that once again SACL *"accepts no liability whatsoever to any person who relies in any way on any information contained in the Master Plan".*

Comment: This is a totally unacceptable introduction for a document prepared by a Public Corporation in response to a regulatory requirement to submit its statement of future plans with statements concerning environmental mitigation . Given that the human environmental impacts of the proposed expansion of airport use are impliedly immense, though inadequately presented in the document, we suggest that this Disclaimer be removed in the final Master Plan for submission to the Minister , otherwise the Minister (s) should seek legal advice as to whether it would be advisable for them to grant approval. If the man-in-the-street cannot "rely" on the information provided, how can a Minister of the Crown be honestly expected to do so?

2 Summary:

2.1 Summary: - Regulatory and Policy Settings (p. 2)

Whilst it is accepted that the corporation comes to its task lumbered with a set of flight path plans which *do not comply* with the Minister for Transport's Directive to Airservices Australia of March 1996 , viz. "to maximise movement over water and non-residential areas" [John Sharp 20 March 1996], this does not absolve it from the responsibility to ensure that its proposed growth does not lead it to breach common-law requirements not to harm its neighbours.

Blindly continuing to consent to use of existing flight paths, when these are known to be causing increasing harm to the health and welfare of its community stakeholders, makes it legally complicit in inflicting the resulting harm, and therefore potentially legally liable for damages. Moreover a serious question arises whether this 2009 Master Plan , with its forecast ANEFs , and ANEF bulge , *could in fact result from continued operation of existing flight paths*. This question arises from the very significant difference between the MP 2004 ANEF projections for 2023-4 and those for 2029 presented here. The promise to continue ***"noise sharing"***, for example , will by 2014 at the latest have been thrown out the window.

2.2 Summary: - Forecasts (p. 2)

These aircraft movement forecasts fall below the ***"whole of Sydney Basin"*** forecasts from the Department of Transport as provided to PPK for the Badgerys Creek EIS , ie 480,000 +/- 60,000 movements and 49m +/- 9m passengers. But see also comments as to uncertainty of predictions at Para 5 below.

2.3. Summary: - Environment Management (p. 3)

This area is perhaps better covered than in the 2004 Master Plan, but it is interesting how the environmental emphasis can be quietly shifted to a semblance of concern for the amelioration of climate change , while the most immediate human environment factor for most surrounding residents is "NOISE", and for some airborne chemical and particulate pollution. This is not to say that invisible effects are not important , and some emphasis on quantifying and reducing "invisible" pollutants such as NOx and Particulates is to be applauded.

3. *Introduction :*

3.1 Section 1.4 Introduction - Vision

It is observed that ***"to be a world-class airport management company"*** [#1] is not necessarily consistent with earlier "Strategy"-stated objectives of ***"acting as a good neighbour and [undertaking] reasonable and practicable actions to prevent or minimise environmental impacts from the Airport"*** and "to become world class in managing airport environmental issues" [#2]. The PDMP does not properly address the essential and probably unresolvable conflict between the goal of *"creating long-term value for SACL and its stakeholders"* [para 1] and *"strike the right balance between the economic and employment benefits of the airport and the environmental impacts of the airport." [dot-point 4]. Notably the latter phraseology has been "distilled" from the more succinct but only quasi-achievable:*

> **"achieving an equitable balance .... between the economic benefits of growth, and the social and environmental impacts of growth."** *[Author's emphasis]*

existing in the 2004 Master Plan.

3.2 Section 1.6 Introduction - Development Objectives

The PDMP does not adequately address the inherent conflict between *"being a business, accepted as a responsible and valued member of the community"* [dot point 2] and *"operating the airport in a an environmentally and responsible manner which addresses climate change and aircraft noise impacts."* [dot point 3].

SACF Inc believes that Sydney Airport ***has not been*** an environmentally responsible airport for at least a decade now, and therefore cannot *"continue to be"* . If the airport cannot, because of government legislation , take ultimate responsibility for the environmental consequences of its growth, then its environmental conscience is shackled, and SACL will fail in achieving these stated objectives.

3.3 Section 1.8 Statutory Requirements Introduction -Airports Act:

The Corporation dutifully recites that the plan must *"include forecasts relating to noise exposure levels and the "ALC's" plans following consultation, for managing aircraft noise intrusion above significant Australian [sic] Exposure Noise Forecast (ANEF) levels* [dot point 6]; and *"assess environmental issues and the ALC's plans for managing these issues."* [dot point 7].

Whilst PDMP-09 produces purported ANEF contours for the years 2023 and 2029 and compares these with calculated ANEI's for the year 2007 [PDMP Figure 14.5 -14.6] , it fails as follows:

(a) There are no street and suburb layouts on the plans to enable the community to judge the extent to which their areas will be affected by aircraft noise. These are usually available on Airservices ANEI & ANEF charts.

(b) It provides no plans whatsoever for ameliorating or preventing noise intrusion above significant or conditionally acceptable ANEF levels, or evidence of having ***"assessed environmental issues and the ALC's plans for managing"*** them. Nor does it state what it considers to be "significant" ANEF levels. A further analysis of this problem is conducted in this critique at Paragraph 8 ff with reference to the example ***Noise Affectation Analysis submitted by SACF Inc*** in para 8.6 and Appendix "A" [This Critique] .

---

1 PDMP p. 16

2 "Strategy - 1999" p. F-i

4 Statutory and Policy Framework :

4.1 Section 3.4 (3.3 in Index) Statutory and Policy Framework - "Noise Sharing"

The term ***"noise sharing"*** may conjure up what was put forward as a grand scheme to implement the long term operating system [LTOP] as the key to mitigating the impacts of both the third runway and airport future growth up to 360,000 aircraft movements per annum. LTOP was in fact a lot more than merely "noise sharing." With its ***"high and wide"*** component, it was supposed to be taking away the noise.

Whilst citing the maintaining "Noise Sharing" as a key element of the proposed Master Plan, SACL is entrenching the environmental health and welfare detriments of Sydney Airport in the worst possible way , by ignoring the failure of Airservices Long Term Operating Plan for Sydney (Kingsford Smith) Airport, 1996 the ***LTOP***.

As ultimate driver for traffic capacity maximisation at KSA, SACL must investigate and justify why important environmental goals enshrined in LTOP were rejected by Airservices Australia [#3]. It is the moral if not statutory environmental duty of SACL to ensure that environmental impact minimisation is achieved by Airservices Australia, because SACL benefits most from the commercial advantages extracted from airport expansion at the expense of Sydney's residents.

As implemented to-date the LTOP ***has utterly failed*** in two of it most important and ministerially ordained goals:

(a) ***"maximum use is to be made of flightpaths over water and non-residential areas" and*** *[Minister Sharp 20/3/1996] ;*

(b) ***"that noise abatement procedures for runway selection be optimised to facilitate the equitable distribution of the noise generated by the Airport ..."*** *[Minister Sharp 24/5/1996]*

The latter (b) was summarised in the LTOP Summary report in the following terms :

(c) ***"Where it is not possible for flight paths to be over water, the objective is to operate the airport to ensure that the overflight of residential areas is minimised and that noise arising from such flights is fairly shared"*** *[LTOP Summary Report Dec. 1996 , p. 10]*

The full set of LTOP goals are not as stated in this section of the "Master Plan."

The LTOP was hijacked early on from its original goals and movements never were and are not now proposed to be maximised over water, nor were noise-minimised flight paths designed for residential areas so as to share ***only the unavoidable overland noise*** over residents equitably [#4].

The use of Runway 34R for takeoffs to the north with dangerous acute right turns over the east have been continued even since the ***Government SACF 's Airplan Review of LTOP*** (2004) [#5] made the point that they were dangerous due to wind -shear (velocity gradient effects) from Coogee escarpment.

Moreover, Low-Noise-Optimised Noise Abatement Departure Protocols [NADP's - Steep Takeoffs type] , ministerially requested for takeoffs over residential areas in August 1998 [#6] , and repeated in September 2007, have yet to be implemented in optimal form [#7] . There is also an abundance of low-altitude turn-requirements close-in which create unnecessary noise nuisance for residents - some of which, admittedly, were part of the original LTOP.

---

3 Airservices Australia formally renounced the goals of achieving LTOP according to the "The LTOP Reports 1996" in a submission to then Transport Minister Anderson in a document not tabled at the Government SACF which culminated from meetings of a so-called "Task Force 2". While it stated that "LTOP" with its "High and Wide" approach and departure tracks could be achieved, it claimed that "increased fuel costs to airlines" would negate any benefits achieved environmentally. Meanwhile it has intermittently pursued the design of revised flight paths for Sydney in programs being developed by a so-called "Task Force 3": *See "Implementation of the Sydney Long Term Operating Plan (LTOP H & W) High and Wide Flight Paths." Airservices Australia SY DOC No. 125_TC_R_N_1 Feb. 2003,* SACF Doc 2006-046.

4 LTOP Summary Report Dec. 1996, p. 104 Airservices Australia.

5 Airplan Review of LTOP (2004), s. 5.7 p. 42.

6 Vaile - 28 August 1998 ; T159/98.

7 Govt SACF Doc. 2007-022,*"Supporting Data for SACF Noise Abatement Departure Protocol Discussion."* P.S. Lingard March 2006.

Even the hijacked goals of the defective LTOP embodied a directional movement target regime of 17% North, 55 % South 15% West and 13 % East [#8] . Even these targets were not achieved, and this requirement wasdropped from its Master Plans by SACL since the 2004 [See Table 3, this SACF Inc Critique] .

In no LTOP planning was the Ministerial Directive to maximise movements over water given sufficient consideration by the LTOP Task Force (s) or since then by the government SACF , so as to ensure that the original LTOP Modes 2 and 3, which have the capacity to enable as much as 85% movements over water , were retained in the Proponent Statement.

No remedy is suggested for these failures to comply with the LTOP principles in this Preliminary Draft Master Plan .
Moreover, the LTOP was not subjected to the rigours of undergoing an Environmental Impact Statement, as would be required today under the Environmental Impact (Biodiversity and Conservation) Act. The environmental clearance given (by Senator Hill as then Environment Minister) , was conditional on the achievement of strict monitoring and surveillance and in particular :

> ***"noise insulation should be provided for households and institutions which will be affected through the implementation of the Long-term Operating Plan and fall within the criteria for financial assistance."***
>
> *[Hill Media Release , 24 July 1997, 88/97]*

Noise Levy collection was ended in July 2007 by the previous government, despite both this organisation (SACF Inc) and the NSW Government having pointed out in their responses to the 2004 Master Plan that new areas were becoming affected, and some severely .

Where is the SACL's proposals for the implementation and/or continuation of the provision of noise insulation for affected residences as the Noise contours spread inexorably further inland across residential Sydney? Can SACL continue to hide behind the veil of government tort immunity?

4.2 Section 3.7 Statutory and Policy Framework - "Second Sydney Airport":

The discussion is incomplete as there is no reference to alternative airport sites apart from Badgerys Creek and Richmond. Relevant important sites considered in the Kinhill-Stearnes 1985 EIS , which achieved higher human-impact environmental clearance than Badgerys Creek , and which with more modern transport systems are now potentially within 30 minutes of Sydney CBD include Wilton, and Darkes Forest.

(a) *SACF Inc does not believe that Sydney Basin air-traffic can be catered for in an environmentally responsible way, having regard to the health and welfare of the citizens of Sydney without an additional primary airport at all . SACF Inc believes that it would be detrimental to the human environment to place any additional airport "in the Sydney Basin" , and that there should be a "new and/or replacement airport outside the Sydney basin"* [#9] .

5. Aviation Activity Forecasts :

5.1 SACL Predicted Movement and Passenger Growth Rates - Sections 5.1 - 5.6:

Passengers: 4.2% per annum ; Movements: 2.% per annum

Of particular concern to the communities surrounding the Airport is the growth in aircraft movements , the manner they fly , and the noise level they make.

Growth rates used by SACL in this DMP are only slightly greater than those used in the 2004 Master Plan.

A major assumption was made in ***Master Plan 2004*** that aviation movement and passenger throughputs would not recover from the "9/11" World Trade Centre effect. Well, it has.

The historic growth in passengers from 1992/93 to 1999/2000 was 5.9 % per year for seven years. Including the Sydney Olympic year (2000/01) resulted in an annual average growth of around 7.35% over 8 years. ***Master Plan 2009*** shows there has been a 32% increase in passenger movements since 2002 [PDMP Figure.5.1] which is over 6% per year, while the movement total appears plateaued at ca. 280000/annum [PDMP Fig.5.1]. Yet planning for passenger movement growth is only being projected at 4.2%!

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8 Sharp - 29 May 1997, TR 72/97

9 "The Way Forward from Sydney's Airports Quagmire," SACF Inc July 1999.

Another assumption is that of this plan is that larger wider bodied aircraft such as the Airbus A 380 will replace the current fleet of passenger aircraft progressively over time between now and 2029.

One may agree with this conclusion, but there is no analysis showing if , as current aircraft are approaching capacity , there will be a movement bulge, or an immediate transition to larger capacity aircraft. . Given current passenger demand and the economic downturn, extensive wider body introduction may be delayed, leading to a significant ***"movement bulge"*** after the end of the current "economic crisis."

There is also no analysis of whether the airport will have reached its ultimate environment-limited capacity [said to have been ca. 360,000 movements in the LTOP Reports , Dec. 1996 - See also [#10]] before 2023 , or 2029? If a movements figure of 360,000 applies, then airport capacity will be reached by 2014 [MP 2009 PDMP Figure 5.6 - a mere five years away! The Minister should therefore be ultra-cautious in giving this un plan the guernsey to 2029, or even 2023!

The historic growth in movements from 1992/93 to 1999/00 was 3.0 % per year for seven years. Including the Olympic year (2000/01) resulted in annual average growth in movements of around 4.5% over 8 years. Nevertheless, the annual average growth with 2001/02 [the "9/11" year] was only 0.95% over 9 years as against the 2% predicted here.

Department of Transport "whole of Sydney Basin" forecasts provided to PPK for the 1998 Badgerys Creek EIS to 2021-2 were for 480,000 +/- 60,000 movements , ie +/- 12.5% [# 11] . Corresponding passenger movements were stated to be 49.1 million as against a figure of 68 million for 2023 in Master Plan 2004.

This Draft Master Plan provides no indication of the error margin on its growth predictions . To comply with the Master Plan requirements of the Airports Act , the consequences of such errors , and any projected ***"movement bulge"***, caused by growing pains, must be expressed in terms of the environmental and health and welfare and noise insulation cost for affected Sydney residents .

Whilst the SACL movement forecast of 427,000 *may be* correct for 2029, there is explanation provided for the apparent reduction in noise affectation in the stated ANEFS is the movement to lower-noise wider-bodied aircraft - and the geographic spread of movements . This is indicated by the changing ANEF between 2023 to 2029 in the ANEF data of PDMP Figure. 14.5. This conclusion is probably suspect because only the international segment is likely to be greatly affected by the introduction of the A380. Also there is VERY WIDE variation in passenger/freight -movement ratios among airports around the world (See Table 1) .

The major assumption of the Master Plan is that penetration of Extra Large Wide Bodied jets - "ELWB's " will significantly reduce, both international and domestic movements . At this time (December 2008), ELWB's - are only barely "creeping" into service after several years of delay. Moreover, the existing fleet will not disappear overnight. It is therefore misleading to employ ELWB passenger capacity for the entire projection to 2029. In any event the predicted capacity of a current model A380's is only around 550 [# 12] . On current aircraft specifications this value is only 6.6 % greater than the largest capacity B747 available today [# 13] .

The uncertainty of the assumptions behind the targets is further highlighted by comparison with contemporary world airport passenger / movement statistics as listed in Table 1 of this SACF Inc critique.

All airports currently operating with an annual passenger movement number comparable to Sydney airports company 's 2029 goal of around 79 million passengers per annum show aircraft movements currently exceeding the Sydney 2023 and 2029 predictions [Range 477,000 (Heathrow) to 976,000 (Atlanta)]. The annualised ratio of passengers per movement varies widely [53 at Vancouver to 331 at Tokyo (Narita) in 2005] .

The predicted aircraft movement rate for Sydney in 2029 is 427,000 / annum. Similar airports include Atlanta (976447 movements; 85 m passengers) , Chicago (958643 movements; 77 million passengers) , Los Angeles

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10 G. Nero and J. Black (2000) A critical examination of an airport noise and an aircraft noise charge, Transportation Research Part D5 , 433-461, at 441, Table 9

11 Environmental Impact Statement (1999) , Second Sydney Airport, Supplement to Draft Vol. 3, Chapt 4.3.3, p. 4-5, DOTRS July 1998, PPK

12 Clayton, G. (1997) "Battle for the airways" , New Scientist, 17 May , p. 43.

13 Janes Aircraft Recognition Guide (1995) Harper Collins, p. 235 - B747 Passenger Capacity 516.

(656842 movements; 61 million passengers) and London Heathrow (477,000 movements; 67 million passengers). The major international hub of Tokyo -Narita already achieves passenger movement rates (31.3 million) comparable to those now at KSA with significantly fewer aircraft (95,000) , but without "new larger aircraft" . However, this may be because most aircraft using Narita are of the current international high capacity wide body types. Narita has the highest Passenger per movement ratio of 331 as a *predominantly* international airport , which Sydney is not.

Airports such as Atlanta, Chicago and Los Angeles (which have a wide variety of traffic), show larger aircraft movement numbers for the same passenger throughput, than , say Heathrow, because of the wider variety of aircraft types (eg. General Aviation, Regional and Commuter) which use them . For example, when Military, General Aviation and Air Taxi traffic is subtracted from the Los Angeles figures (where this data is readily available) the number of large transport movements reduces to 524,014. This, however, is still much greater than that expected by the Sydney airport lessee company for comparable passenger movements in either 2023 or 2029.

Reported freight tonnages per movement also vary widely, ie. from 0.69 (Vancouver) to 12.89 (Hong Kong) tonnes/movement. The average tonnage per movement for the 20 airports is about twice the current tonnage moved by Sydney [3.5, cf. 1.69 per movement].

This analysis suggests that the goals of Sydney Aiport , with its landlocked status on all sides but one and, surrounded as it is by heavily populated residential areas on every other, seem over ambitious . Given the predominance of essentially domestic traffic at KSA, and the likelihood that the Australian population is unlikely to double in 20 years , the sought-for traffic growth may not materialise. If it does, however, or reach today's movement rates for Chicago and Los Angeles, Sydney's skies will be swamped and the already horrendous predictions of ANEF- creep and increased movement affectation in Section. 14.2.1 , p. 135 Figures 14.5-9) .

Similarly, the predicted movement of freight transport to and from KSA is limited due to the limited nature of its connecting road and rail corridors , every one of them thrombosed to stagnation during peak traffic hours, even after the construction of the M5- East. Without wholesale demolition of Sydney's residential hinterland it seems unlikely that the KSA will be able to achieve anything like the freight movement efficiency of 2.5 tonnes/ movement which is forecast in this PDMP [1077000 / 427000 = 2.52] . The lessee company must explain its solution to these problems before the Minister (s) approve this PDMP.

This PDMP does not reconcile its targets with what is compatible with maintenance of "noise sharing" (ie LTOP) when the LTOP proponents statement projects it as being good only up to 360,000 movements .
Indeed, there is substantiated evidence for a slot-capacity practical capacity limit at Sydney (Kingsford Smith) Airport of around 353, 000 movements. [#14]

Hence SACL needs to rethink its return on investment calculations, although this will not reduce the environmental danger of permitting it to test the limits.

5.2 2029 Representative "Busy Day" Forecast Section 5.7 - (PDMP Fig.5.7 , p. 52)
S. 71(2) (e) to (f) of the Act obliges the airport company's plans for amelioration and prevention of such environmental effects, although none are stated anywhere in this defective "master plan".

There is no description of how the experience of 80 movements per hour for between four and six hours at a time will affect hapless residents under the flight paths ; and no admission of the cessation of "noise sharing" and reversion to " parallels" by 2029 or its projected human impacts , nor any real acknowledgment the environmental limits to airport capacity. .

The 2004 *Govt SACF Airplan Review*[#15] (seeking opportunities to extend noise-sharing) , showed that the airport was then practically out of time. The Sydney 2000 Olympic experience of 900 -1100 movements per day completely saturated available slots with its effective annualised 328, 500 - 401, 500 movements/annum [#16] [Sydney's North West was spared the brunt of this during the Olympics by airspace restrictions for the games].

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14 G. Nero and J. Black (2000) ibid
15 SACF Long Term Operating Plan "Review of LTOP Performance Report", Airplan, March 2005.
16 Govt SACF Meeting Notes 7/7/2000, per J. Alroe, SACL

TABLE 1 - AIRPORT MOVEMENTS BY AIRCRAFT , PASSENGERS & FREIGHT CA. 2006

AIRPORT	MOVEMENTS	PASSENGERS	FREIGHT	RATIOS	RATIOS	
	AIRCRAFT	MILLIONS	KILOTONNES	PASS/MOVT	FREIGHT Tonnes /movement	
				P/Mvt	Tonnes/Mvt	Notes
ATLANTA (O6)	976,447	84.8	746.5	86.85	0.76	#1
CHICAGO (06)	958,643	77	1,546.1	80.32	1.61	#1
LOS ANGELES (06)	656,842	61	1,907.5	92.87	2.9	
LOS ANGELES (01)	738,433	61.6	2,064	83.42	2.8	#2
LOS ANGELES (97)	781,492	60.1	2,064	76.9	2.64	#1
HEATHROW (06)	477,000	67.3	263.1	141.09	0.55	#1
FRANKFURT (06)	489,406	52.8	2,127.7	107.89	4.35	#1
PARIS (cdg) -97	402,713	35.3	954	87.66	2.37	#1
PARIS (cdg) -06	541,566	56.9	2,130.7	105.07	3.93	#1
PARIS (orly) -96	251,234	27.4	246	109.06	0.98	#1
HONG KONG	280,000	43.9	3,610	156.79	12.89	#1
BANGKOK (00)	280,216	29.6	865	105.63	3.09	#1
NEW YORK (JFK)	378,389	43.8	1,636	115.75	4.32	#2
SINGAPORE (01)	179,359	28.1	1,637	156.67	9.13	#1
SINGAPORE (06)	214,000	35	1,911	163.55	8.93	#1
TOKYO (NARITA) -01	129,000	25.4	1,604	196.9	12.43	#1
TOKYO (NARITA) -05	94,548	31.29	2,291	330.94	24.23	#1
SYDNEY -07	258,700	31.9	471	123.31	1.82	#3#4
MUNICH (01)	411,335	30.8	NA	74.88	NA	#1
BRUSSELS (00)	326,050	21.6	687	66.25	2.11	#1
MANCHESTER (00)	181,000	19.6	113	108.29	0.62	#1#4
MELBOURNE (01)	180,200	22.5	356.5	124.86	1.98	#2
VANCOUVER (99)	367,249	15.8	290	43.02	0.79	#1
VANCOUVER (02)	296,626	15.1	235	50.91	0.79	#1
VANCOUVER (07)	328,563	17.5	226	53.26	0.69	#1
AVERAGES	407,160.44	39.84	1,199.28	113.69	4.27	
STANDARD DEVIATIONS	240,263.83	19.57	914.12	57.64	5.39	

#1 A~Z World Airports Online http://www.azworldairports.com/index.htm
#2 Individual Airport Data
#3 Sydney Airport Preliminary Draft Master Plan
#4 No Current Data Readily Available

The environmental impact of the resulting traffic increase (shown in Table 2, below) for the residential hinterland of Sydney would be horrendous . Most of this will consist of aircraft flying over existing residential areas which will become progressively "newly-affected" as the "Plan" advances and the environmental impact liability consequences of the proposal must be honestly and accurately analysed and addressed by this airport lessee corporation (or its aviation backers) for it to comply with s 71(2) of the Act.

The claim on PDMP p. 47 and elsewhere that Sydney Airport can ***"sustainably"*** accommodate all likely growth for a further 20 years is not supported by the facts, or one may ask : ***" for whom?"*** Aircraft takeoffs and landings are planned to operate at 80 per hour continuously from before 8am right through to 10:30 am noon on this PDMP 2009 [PDMP Figure 5.7].

Inexplicably , the morning peak in this Master Plan projection is at least two hours shorter than that portrayed for 2023-4 in PDMP 2004 where the absolute peak extended from before 08:00 through to at least 12:30 am.

"Peaking" currently occurs from before 06:30 am through to 08:30 am and there is already a significant potential "curfew-breaching shoulder" period for part of the year between 05:00 and 06:00 am.

Queuing theory shows that even with well-regulated slot allocations, there will be both terminal and arrival delays , with resultant ***"bunching"*** causing traffic-flow plugs, and the "distributions" in fact represent a notional rather than absolute cap. The closer planned movements are to the movement cap, the worse this will become. This is because the normal problems that occur every day or month will cause unacceptable delays due to the terminal- and in-flight- queuing space being insufficient for more than twenty planes to maintain the cap over the continuous 4 hour period. Planes simply cannot routinely queue for hours on end to gain access to a runway!

The cost of *insufficient* airport capacity is about ten times the cost of having a little extra capacity which is underutilised. Such planning is normally done with scenarios which reflect about ¾ of a standard deviation above the mean. In some cases this is done by having high, low and mean volume projections, and doing the capacity planning for the higher end of the range of estimates. All that the PDMP shows is that, if airports ran like clockwork, AND aircraft flew on railway lines, AND growth in aviation is only very moderate over the coming decades, AND airlines all move to larger capacity planes, then KSA would be precisely choking in 20 years.

If aviation grows even slightly faster than predicted, airlines do not upgrade uniformly to larger planes or there is a day busier than the 95% percentile, the one additional plane approaching the airport at 8am will cause a backlog through to noon , and any hiccup in operations will cause waiting times to blow out to such an extent that planes will have to be diverted to Canberra to land before running out of fuel.

It has already been observed that "movement cap" exceedances can occur due to mis-scheduling of long-haul arrivals due to overnight delays in the early morning period which result in carry-overs to subsequent slot hours. These exceedances resulted in "actual movements" reaching as much as 90 /hour between March and May 2001# [17] . Unless accommodated, such carry-overs cause resulting queuing problems in later hours which result in later exceedances etc. With the ambitious slot-scheduling forecast for 2029 and 2023 , it is possible to foresee areal log-jams being created of unprecedented proportions._

6 Land Use Zoning - S. 12 pp. 99 - 107:

6.1 Infrastructure Crowding:

There is too much "Crowding In" of the runways at KSA , as if every square metre must generate a return. Yet a fundamental safety mantra for airports is that planes overshooting runways should not encounter any significant obstacles (especially building containing people) , and even veering off a runway should not create a major crash opportunity.

The Southern Cross Drive overpass already encroaches the safety zone for the East-West runway's eastern end. The proposed "mixed-use" business areas Mixed Uses 1 & 2 also increase the crash accident damage risk for third parties and business operators, not to mention the occupants of overrunning aircraft at the north end of

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[17] Government SACF Minutes , 15/6/2001

runway 16L/34R. The airport lessee company's proposal to abandon such 'safety-first' principles in favour of 'commerce first' priorities, will be to the detriment of safety when measured over any reasonable period.

Similarly, the building of a new high-density freight facility right on the runway end of the main long north-south runway 16R/34L shows a gross lack of concern for safety and on-site worker health . If even an existing long haul plane failed to gain altitude, instead of finding open land immediately across the Alexandria canal, it will in future crash into a multi-storey super-market, carpark or freight complex built on land which was previously clear because it is right under final approach and just after runway clearance on takeoff.

Moreover, it is simply hypocritical for SACL to seek to build in such super-high ANEF zones, when all manner of neighbours for kilometres around are prevented from building the types of structures they would like to build on their own land, simply because of the airport's activities. The airport lessee company refers to the possibility of being required to meet state planning laws, though not currently required due to the Airports Act [PDMP S. 12.1] , but SACL is required to comply with normal EP+A Act and Council requirements in respect of its proposals on the privately-owned land outside the airport perimeter.

Accordingly, local Councils and the Land and Environment Court would be advised to refuse permission for large -scale airport-related developments close to the airport site. There is a ***'duty of care'*** that both SACL and the Councils owe to SACL's employees, SACL's tenant's and freight lessees' employees, contractors etc, as well as invitees who will attend as freight forwarders, truck drivers, tradespeople, customs staff, quarantine staff, art gallery staff, and all the other manner of people who presently visit the freight facility.

None of these people ever agreed to take on additional risks from death through to deafness due to relocation of the SACL freight facility to the very end of the longest runway. Given the projected growth in air traffic and ANEF for the site this is madness . The Local Councils' role as consent authorities for such developments should be to protect the public interest, per the NSW EP+A act. The existing freight facility is a mix of commercial offices with light industrial use (ie no heavy forges or stamping equipment) - clearly the 120dB+ events of 747s taking off just metres over workers and their invitees will be the noisiest events they will encounter in the working day creating a potential Workcover issue.

So new freight facilities should not be allowed near runway ends . Indeed, the point is made well on PDMP p139 that AS 2021 -2000 states: *"In no case should new development take place in greenfield sites deemed unacceptable because such development may impact airport operations."*

Further, the above deals only with the noise aspects. The fact that 747s taking off just metres above the heads of such workers and guests also means that this site would be the most dangerous for airborne hydrocarbons, including NOx and SOx with 5% of Sydney Basin's generation of such substances . It would be grossly irresponsible to permit people to work or visit for work purposes a site just metres below flying 'kerosene sprinklers' because of its effect on human health. These are now more appropriately dealt with in Section 14.2.3 (p.142) , but the implications for human resources need to be spelt out.

It is well recognised that aircraft exhaust include toxic byproducts and known carcinogens. Thus if additional freight and/or business centre construction is permitted , the airport lessee company and Local Councils might be subject to expensive law suits for one bad planning decision.

SACL now admits that airfreight handling capability is nearing capacity (PDMP Section 8.5, p. 74) which should foreshadow the nemesis of the Master Plan. It shows that the existing airport in this location cannot handle the freight requirements up to 2.5 tonnes/ movement planned by SACL through 2029.

7 AIRSPACE PROTECTION (And Safety in General) :

7.1 Airspace Protection and Air Safety in General - Section 13 , p. 117 :

The PDMP Section 13 deals with safety aspects of airspace protection from penetrating obstacles (ie tall buildings) surrounding Sydney Airport. However, it fails to point out that CASA has never carried out the Safety Audit for the flight paths required in the LTOP Proponent Statement [#18] . Both the Design and the Audit of the LTOP were carried out solely by Airservices Australia, when heavily influenced in execution by "community" and "political" pressures . In August 1998 the Bureau of Air Safety Investigation [BASI] criticised the high dependence of LTOP (as implemented) on crossing low-altitude , minimal-separation arrival and

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[18] LTOP Proponents Statement Para 3.6 , p. 3-32.

departure flight paths [#19] . Since then there has been minimal consideration of flight path safety from a design perspective.

The 1998 BASI investigation revealed safety deficiencies due to "separation assurance" problems which it claimed were caused by defective management of change, and the rate and complexity of change since 1994 . Three such ***"separation occurrences"*** [#20] were reported before the investigation and a further three such occurrences took place while it was being carried out.

BASI emphasised the higher level of controller skills required for a "highly structured" airspace environment (such as LTOP in the inner west, north-west and -east) compared with operating in straight-on parallel modes [#21] . It said more controller activity is required to keep aircraft within their respective departure and arrival strata when these cross frequently than when departures can be instructed to climb to cruising altitude as soon as possible, and arrivals can go straight to terminus. It concluded that putting the onus entirely on ***".....[air traffic controller management practices] ... in order to effectively reduce the level of risk of an identified hazard to an acceptable level, are not considered to be acceptable mitigation strategies in the light of known human performance limitations."*** [#22] .

Although Airservices claimed to have resolved these problems through subsequent organisational change, the inherent hazard of the low-altitude, low-separation crossing flight paths still remains. This is because the originally proposed LTOP "high and wide" , and oceanic-corridor arrival-routes, designed to avoid collision possibilities between departing and arriving aircraft crossing Sydney, have not been implemented [#23] .

Given that Sydney Airport is the largest airport for which CASA has responsibility , one cannot but suspect that CASA has not undertaken the audit promised with LTOP, because its safety shortcomings would be highlighted by a review. The resulting inherent conflict of interest in the past of Airservices role as both designer and auditor of the plan , not to mention having the principal environmental monitoring role , is not what the proponent statement envisaged, nor what the ***"Falling on Deaf Ears"*** (Parer Review) expected or the community was promised.

This failure to perform its required function means Australia is contravening its international obligations under The Chicago Convention, whereby supposedly independent bodies for air safety are required to prevent the government of the day compromising safety. Apart from the noise impact question being worsened by low-flying, frequently- crossing flight tracks across the Sydney Basin, ***this is an important safety issue which must be resolved*** as soon as possible. The airport lessee company standing to benefit from air traffic growth at Sydney Airport is now on notice that its plan to maintain the status quo of the LTOP flight paths may also be unsafe.

8 Environmental Management :

8.1 Section 14 .1 Environmental Management - Environment Strategy

Sydney Airport's "***Airport Environment Strategies***" [#24] make no undertaking whatsoever for the "management" (whatever that may mean) of downstream aircraft noise impacts, and neither does this Master Plan. A major defect of such Strategies, highlighted by the 1999 Schiphol Benchmarking Study [Appendix "D" of the 1999 AES], was the failure of the airport environmental regulatory system.

This failure is because the aviation/airport regulatory system does not make the promoters of increased traffic flows (SACL) directly responsible for the human health and welfare consequences of the environmental impacts of increased aircraft movements over neighbouring residential zones. Instead it is ***Airservices Australia*** which is given that responsibility by the Airservices Act Cth. (1995)[#25]. This breaks the chain of responsibility. It also means the taxpayer picks up the cost of noise insulation and land acquisitions , where these occur, when it is the polluter who should pay!

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19 BASI Investigation Report B98/90, August 1998.

20 A "Separation Occurrence" is when two aircraft approach closer than 1000 ft vertically or 3NM horizontally.

21 BASI Investigation Report B98/90, August 1998, S. 1.3.5 & 1..4.3.

22 BASI Investigation Report B98/90, August 1998, S. 2.4.

23 LTOP Summary Report , Dec. 1996, p. 89-90.

24 Henceforth "Strategy"

25 Airservices Act Cth. (1995) S. 9(2); s. 8(1) (d) .

Schiphol concluded its report by saying that some of the more important aspects , involving the neighbouring populations, lay outside the airport boundaries , and were poorly addressed, including operational aircraft noise, air pollution from aircraft , external safety risks for third parties and recognition and compensation of environmental damage. It finished stating :

> ***'These subjects would need to be addressed equally well if one aims at becoming the airport with "the worlds best environment management system" '.***

In neither Master Plans 2004 or 2009, there is no reference to the Schiphol recommendations, nor to the vexed issue of responsibility for downstream aircraft environmental impacts, or any claim to responsibility whatsoever (as cited in the p. (i) Disclaimer)!

Instead the "Strategy" is summarised as if dealing mainly with the consequences of airport operations within the airport boundaries [Section 14.2] , whilst presenting down-stream aviation noise data as an incidental bundle of statistics, over which SACL has no control, and cannot accept responsibility.

8.2 Section 14.2.1 Aircraft Noise and Mitigation Strategies pp. 135 - 140:-

(i) Regulatory Background:

The requirements for the Master Plan in connection with Aircraft noise are specified in Section 71 (2) (d) to (g) of Part 5 Division 3 of the Airports Act (1996) Cth., ie:

> ***"(d) forecasts relating to noise exposure levels; and***
>
> ***(e) the airport-lessee company's plans, developed following consultations with the airlines that use the airport and local government bodies in the vicinity of the airport, for managing aircraft noise intrusion in areas forecast to be subject to exposure above the significant ANEF levels; and***
>
> ***(f) the airport-lessee company's assessment of environmental issues that might reasonably be expected to be associated with the implementation of the plan; and***
>
> ***(g) the airport-lessee company's plans for dealing with the environmental issues mentioned in paragraph (f) (including plans for ameliorating or preventing environmental impacts); ..."*** [S. 71(2) (d) -(g) AA Act 96]
>
> *[Author's emphases]*

Note: "***Significant ANEF levels***" are defined in the Airports Act (1996) as ***ANEF's greater than 30*** [S. 5 -Definitions] .

(ii) Noise - What has the Airport done?

At page 135 the Master Plan 2009 begins by stating that aircraft noise has been a longstanding issue , and that it does not make any changes to , *inter alia*, the existing airport curfew , the existing movement cap, or existing aircraft flight paths. By inference it does not even consider any possible changes to flight paths or operating conditions (eg. Noise-Abatement Downwind Condition to favour operations over Botany Bay which might benefit aviation-affected residential populations north of the airport without harming others). Yet by S. 71(2) (d) - (g) SACL must "make forecasts" (d) ; "make plans for managing aircraft noise in areas above 30 ANEF (e); "make its own assessments of environmental issues which may be associated with the plan" (f) ; and " make plans for dealing with issues" in subsection (f) , including ***its plans for ameliorating or preventing environmental impacts*** *(g) ."*

Rather SACL prefers to extol the virtues of the newest , largest and potentially the most noisy behemoth ever to use the airport, ***the Airbus A 380***! It proclaims the benefits (data attributed to ***Airservices Australia*** p. 135) of the allegedly lower noise levels of the Ultra-Wide Body A380 than the B747 . ***However, it fails to observe that such benefits are entirely wasted if A380's continue to be flown at as low or altitudes over residents as the current Boeing 747s !***

What is the benefit of the much heralded 3dB(A) noise reduction if the aircraft flying over houses at 1400 ft [as at Summer Hill or Bexley] is generating 100 dB(A) at ground level and one suffers from Tinnitus [ringing in the ears] which causes severe head pain, and one cannot run fast enough to get away. Or perhaps one suffers from Meniere's Disease [a condition causing pathology of the semicircular canals (The Balance Centre) in the head] , which can result in loss of balance , and precipitate falls on exposure to high noise levels! It is one thing

to say (as have staff from Airservices Australia) , such noise levels cannot make you deaf! They're wrong, of course, but what does that matter when it can make one fall and break ones hip!

In achieving aviation outcomes , the interests of the Airport , Airservices Australia and the Airlines are as one, ie to maximise airport throughputs ! SACL is therefore utterly conflicted . There is no independence, and therefore there can be no community trust of any predicted outcomes promoted by it .

The PDMP in Section 3.4 (p. 32) earlier repeated the principles said to underlie the Noise Sharing Flight Paths and at page 136 the so-called "mitigation strategies" used by [the airport] are listed and include several previous government initiatives.

It then states that Sydney Airport "supports" all the above noise mitigation initiatives introduced by the Australian Government such as the curfew, movement cap , property acquisitions (!!!) , provision of acoustic insulation, aircraft type controls, the movement cap, and hours of airport operation [p. 136], compliance with AS2021-2000, and providing Local Government with "significant" ANEFs .

It repeats that it does not "propose" to change any ***"noise sharing"*** flight paths [p. 137] . Much emphasis is placed on "newer quieter aircraft types" as being the potential saviour of the people from aircraft noise, if not the airport from extinction. In Section 3.4 [p. 32] it states, in the context of Flight Path Management , that these are managed by Airservices Australia and the Sydney Airport Community Forum (government SACF) and the Implementation and Monitoring Committee [IMC].

It says that ***Airservices*** carries out noise monitoring (which take place mainly on the old north south axis) and runs the Noise and Flight Path Monitoring System (NFPMS). ***It has not considered whether the above measures are a success; and moreover has nothing to do with planning or implementing them .***

All this is presented as part of the "milieu" within which Australia's airports operate.

But SACL displays "no ownership" of the so-called "mitigations" and reveals no "assessment" of the environmental impacts , management , amelioration and prevention plans as required by the Airports Act, which S. 71(2) states is "the airport lessee company's" responsibility.

The primary means put in place by Government in 1996-97 for the ameliorating of aircraft noise was LTOP . Whilst laudable in apparent intent ("putting people first" and "fair share noise") , the LTOP "Noise Share" plan has manifestly failed to conform to several of the Minister's principal directives, viz:

- Maximising movements over water;
- Minimising and fairly sharing the unavoidable overland noise; and
- Implementing optimised noise abatement protocols for takeoffs over residents.

As stated earlier (para. 4.1 above) , the LTOP appears to have been hijacked for unstated reasons and deflected from its originally -stated purpose of maximising movements over water, and may be instrinsically unsafe (para 7.1, above).

If the airport lessee company had addressed these crucial primary issues it might not have stated that it proposes no new or altered flight paths in PDMP S. 14.1.2, because it would have recognised that the present situation is environmentally unworkable , unacceptable, unsatisfactory and potentially unsafe.

The identification of flight path changes needed to conform to the original LTOP principles is central to addressing the current environmental and safety problems. Flight path changes are needed which :

(a) **Maximise movements over water and non-residential land;**
(b) **Minimise noise over residential areas where overflight is absolutely necessary;**
(c) **More fairly share the inevitable (minimised) noise distribution;**
(d) **Implement noise-level optimised Noise Abatement Departure Protocols for all residential takeoffs &**
(e) **(at minimum) comply with the hijacked LTOP movement targets of 17% north, 55% south, 13% east & 15% west**

Minister Sharp's actual prescription was to ***maximise movements over water***. This has never been seriously attempted in the "fair share" noise plan.

SACL has not addressed these crucial and important defects in the LTOP . Neither has Airservices Australia , the government SACF or the IMC. This airport corporation relies entirely on third parties and committees for the solution to these problems, when under the Master Plan specification it is the ***"airport lessee company's "*** responsibility to :

> ***(i)*** ***assess the environmental issues flowing from implementation of the (master) plan [S. 71(2)(f);***
> ***&***
> ***(ii)*** ***deal with these assessed environmental issues in such a way as to ameliorate or prevent their impacts [S. 71(2)(g)]***
>
> *[paraphrased]*

As the primary commercial driver for airport growth, SACL should therefore assume the primary responsibility for community friendly environmental amelioration and prevention .

It is not sufficient for SACL to set out its long term annual movement targets (79 m passengers, 427,000 aircraft and 1 m tonnes of freight by 2029) without putting forward any means of ameliorating and prevent adverse human impacts which will inevitably result.

8.3 Section 14.2.1 Aircraft Noise Descriptors other than Metrics -Pictorial

The PDMP Figure 14.2 shows the "average daily movements" for each of the LTOP flight path-spreading zones employed today . Using "average days" in such presentations has the same problem for which the ANEF system was criticised by the Senate Select Committee Enquiry into the Third Runway EIS [# 26] . It underestimates the effective impacts during actual operational periods. It should be made clear that an "average day" does not represent a "typical day of affectation" when the movements per day which can be from 2 to 4 times the levels indicated depending on runway selection options available the time.

PDMP Figure 14.2 confirms that this Airport Lessee Company has neither intention nor power to comply with the LTOP Movement targets of 17% north, 55% south , 15% east & 13% west.

In PDMP 2004 the movement proportions projected for 2023 show 31% north, 49% south, 6% west and 14% east. These are far from the promised targets of the "fair share" noise plan, yet this airport lessee company provides no comment justification or apology for this whatsoever! The present PDMP 2009 projects movements of 38% north, 49% south, 8% east and 5% west.

Table 2 compares the projected movements and percentage movements for 2023 and 2029 with those for the year 2000.

PDMP Figure 14.2 also illustrates that the original goal of maximising movements over water has not been achieved, and cannot be achieved without some change to flight path availabilities at KSA. Although Airservices Australia is responsible for this debacle , the public has a right to expect the 20 March 1996 Ministerial directive to be carried out!

After all maximising movements over water also minimises potential cost from the need for noise insulation. It also minimises crash risk damage in the manner proposed in the LTOP Proponent Statement, but long since forgotten[#27]!

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26 "Falling on Deaf Ears" - November 1995 - The Parer Committee Report, ISBN 0 642 24416 2, AGPS

27 DOT&RS Proponents Statement Para 3.6 at page 3-32.

TABLE 2 **COMPARISON OF MOVEMENTS & PERCENTAGES 2000 , 2023 and 2029**

			MOVEMENTS	MOVEMENTS	MOVEMENTS	
Flightpath	*Direction Description*	*Arrivals/Dep or Both*	**2000 Actual**	**2023 Forecast**	**2029 Forecast**	**% Increase 2023 / 2029**
A (North)	Sydenham (B+C)	Both	126 (26%)	284 (31%)	314 (33%)	225 / 249%
B (NW)	Burwood & NW	Dep	55 (11%)	103 (11%)	115 (12%)	87 / 209%
C (North)	Hunters Hill & N	Arrivals	72 (15%)	181 (20%)	200 (21%)	151 / 278%
D (NE)	Double Bay	Dep	28 (6%)	70 (8%)	46 (5%)	150 / 164%
E (East)	Coogee	Both	17 (3%)	26 (3%)	29 (3%)	53 / 171%
F (East)	Maroubra	Dep	32 (7%)	28 (3%)	50 (5%)	-13 / 156%
G (South)	La Perouse	Dep	26 (5%)	56 (6%)	86 (9%)	115 / 330%
H (South)	Kurnell	Arrivals	140 (29%)	233 (26%)	244 (26%)	66 / 174%
I (South)	Wanda	Dep	87 (18%)	150 (17%)	136 (14%)	72 / 156%
K (West)	Rockdale	Both	33 (7%)	56 (6%)	36 (3%)	70 / 212%
	Total Movements		**616**	**1,187**	**1,256**	**93%**

Table 3 shows the approach to the LTOP Movement Targets achieved since 1997, with projection to 2023 & 2029 from PDMP Figure. 14.2

TABLE 3 APPROACH TO LTOP MOVEMENT TARGETS

	NORTH	SOUTH	EAST	WEST
LTOP "TARGETS"	17%	55%	13%	15%
2000	26%	52%	16%	7%
2023	31%	49%	14%	6%
2029	38%	49%	8%	5%

Note that instead of approaching the "targets" more closely as time goes by , as might be expected from "fine tuning" of a professionally-designed successful "noise share" system, the disparity between targets and achievements becomes even greater - especially over the north - where the movement percentage increases from 26 % (year 2000) to 31% (2023) and 38% (2029) against a "target" of only 17%.

Similarly percentage movements for the "South" , which are almost entirely over water and notably affect few residents , decreases from 52% (2000) to 49% (2023 & 2029) when the LTOP "target" was 55%. Incidentally 55% has never been achieved in the history of this LTOP, yet all the while the movement targets north have been exceeded , and those east and west often not quite reached.

This critique concludes that had a competent environmentally responsible Airport Lessee Company properly carried out its environmental impact assessment and planning functions under S. 71 (2) of the Act it would have highlighted and explained these failures and, at the minimum , explored what could be done to achieve the "noise share targets"!

Had it been even moderately concerned to fulfil its environmental obligations, it should have noted that the obvious and most environmentally suitable solution for Sydney was , as the Minister first directed, ie. to maximise movements over water. Why is this not so?

8.4 Section 14.2.1 Aircraft Noise Descriptors- The "N70"

These are presented in PDMP Figure 14.4 . The meaning of "N70" is better presented here than in Master Plan 2004. ***However, in none of the graphics data in this PDMP are there street location and /or suburb outlines in the plots.***

This makes the graphics virtually worthless to both residents, councils and politicians trying to evaluate how the noise boundaries will shift around their homes.

The Minister (s) should demand that Sydney Airport Corporation re-draft all noise-related data in PDMP 2009 to show the usual outline of local government boundaries, and residential street locations as was managed for the 2004 PDMP .

The N70 parameter was first used in the LTOP Reports (Dec. 1996) and then in the Badgerys Creek EIS [PPK 1997-98] , where it was used with some explanation of the significance of the parameter in terms of how individual homes might be affected by the resulting exposure. N70 is not a Standards Australia -sanctioned official noise metric.

The Airport Company should be required to include a sufficiently detailed explanation to enable the lay person unfamiliar with acoustic terminology, or the architectural acoustic standard (AS2021-2000), to understand the information provided. As presented, PDMP Figure 14.4 is misleading. Many people taking only a cursory look at an "N70" contour might assume that the only noise people were subjected to within the contours was at the level of 70 dB(A), and it was only the number of events which varied. Yet the fact is that ***any level above 70 dB(A) may occur within each contour.*** This results in there being many occasions when speech will be drowned out and sleep or concentration will be disturbed by the resulting noise .

In a relatively recent (2003) three month survey on an inner west property ***by Airservices Australia*** [#28] , no jet aircraft produced noise levels below 70db(A). The majority of 747 -400's (***and more recently Airbus 380's***) departing over that location produced an average maximum noise of 80.3 dB(A) +/- 4.1 (Standard Deviation) [#29] . This means that 95% of the data fall within the range of 72.1 - 88.5 dB(A) and 99% within the 68 - 92.6 dB(A) .

Ongoing private monitoring by ***a Community Monitoring Station*** at Summer Hill shows this continues to be the case. Summer Hill is approx. 9 km from takeoff roll on Runway 34L . The high noise levels are produced because the aircraft are mostly very low (only 1200 -2500ft), Large long-haul jet aircraft actually could be much higher (and less noisy) if they climbed at 15 degrees for the first 3 kilometers from takeoff roll to 4000 or 5000 ft and then levelled out . ***Better still, they should be forced to takeoff out to sea.***

The N70 is not a ***Standards Australia*** - approved means of representing sound level affectation in connection with aircraft noise (ie a noise metric) . The explanation in PDMP 2004 for the use of 70 dB(A) as the criterion in such charts ***is only true for external sound level maxima of exactly 70 dB(A) at the outer edge of the contour.***

Moreover, the N70 contours underestimate the frequency of exposure in a typical impact period , because of averaging over a typical year. With LTOP "noise sharing" this results in approximately 2 to 4 times the number per day in any actual "impact period" [#30] (ie when prevailing winds cause aircraft to be directed over that location).

Thus a home within an N70 (20 movement) contour will experience from 40 - 80 intrusions of at least 70 dB(A) per day in any impact period. This is why N70 contours can be highly misleading to the lay observer.

The standard explanation for the using the N70 representation will mislead because most places within an N70 boundary will experience noise levels well exceeding of 70 dB(A), the talking has to stop, and people get annoyed.

By 2023 this master plan proposes to extend the N70 (20) contour from Haberfield to Ermington in the north west (a distance of 10 kilometres) , from Boronia Park to Gordon in the north (7.7 km). In the immediate east

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28 At a residence in Summer Hill, near the 20 per day N70 contour boundary.

29 Environment Services Branch Canberra, Report No. 1360, 30/7/2003, Table 2.

30 An "actual affected period" is a period during which aircraft are actually flying overhead.

the N70 bands retreat somewhat, while in the north east [Paddington/ Woollahra] the N70(20) band advances from Alexandria/Zetland to Point Piper. Then by 2029 there is a forecast contraction - due to the unstated reversion to parallels with larger jets and movement cap saturated operation.

8.5 "Noise Descriptors" ANEI/ ANEF Distributions - PDMP S. 14.2.1, Figs. 14.5 - 14.9:

In PDMP Figure 14.5 of PDMP Section 14.2.1, the Airport Lessee Company presents cumulative noise distribution charts for 2023 and 2029 [ANEF]. Then one has to go to Figure 14.8 to find a comparison of (only) the 2029 purported ANEF with the 2007 (actual) ANEI .

These should be compared with the 2001 ANEI (as used in PDMP 2004) for completeness, because unrecognised noise affectations continue to accumulate , and for the purposes of assessing changes at properties becoming newly affected one needs to evaluate the position from the point when the noise insulation program effectively ceased, not from a more recent time.

SACF Inc has made this assumption in the increment estimates provided in Table 4 which uses the PDMP - 2004 -represented 2001 ANEI as baseline.

Between 2001 and 2023 the 20 ANEF zone moves out from the vicinity of Lewisham Hospital to beyond Croydon in the northwest, and in the north east it moves from near Mascot to Kensington, with somewhat lesser affectation in the west and east. In the immediate north [Bennelong] the 20 ANEF zone shifts north from Drummoyne to Boronia Park (north of the Lane Cove River!). Similarly the 30 ANEF zone moves out from Stanmore to Lilyfield (north) . However, its movement in the east and west appears marginal. But none of this is explained by SACL.

The 2029 ANEFs show contractions both *from the north and in the east and west (See Figure 14.8 -9)* suggesting some change in flight paths from those represented for 2023. SACL attributed these to the new wider-bodied aircraft, with 3dB(A) -quieter engines, but this would not explain the effect! One could achieve significant contraction today , with the current fleet , if sustained steeper take-offs were employed to an interim 4-5000 foot ceiling, or the aircraft could continue to climb out to cruising altiitude without danger off colliding with crossing arrivals.

8.6 Noise Affectation Analysis - The Cost of ANEF Creep 2023 cf. 2029:

This organisation's assessment shows that under the proposed ANEF regimes for 2023 2029 the following numbers of people and dwellings will have become affected at the stated ANEF levels since the ANEI was produced in 2001 (See Table 4).

TABLE 4 - INCREASED AIRCRAFT NOISE AFFECTATION - 2001-2023 & 2029 :

[PDMP 2004 CF 2009 - Reference Year ANEI 2001 refer Appendix "A" for details]

	AFFECTED BY ANEF 20 Ex 2001[#1] to 2023 /2029	*AFFECTED BY ANEF 25 Ex 2001 to 2023 / 2029*	*AFFECTED BY ANEF 30 Ex 2001 to 2023 / 2029*
PEOPLE [#2]	128,284.14 / 62,771	50,186.25 / 18,006	12,222.85 / 5,304
DWELLINGS [#2]	52,085.22 / 26,195	20,376.34 / 7,514	4,962.66 / 2,214
COST OF INSULATION ($millions)			
AT Nom $50,000 DWELLING	*2,604.26 / 1309.77*	*1,018.82 / 375.72*	*248.13 / 110.67*
AT Nom $100,000 / DWELLING	*5,208.52 / 2619/54*	*2,037.63 / 751.43*	*496.27 / 221.35*

[1] Reference Year 2001

[2] Calculated from the Australian Bureau of Statistics Census data 2001 & 2006. See Appendix "A" for details

By 2023 Table 4 reveals that approximately an additional 5000 homes involving 12000 residents will become affected at the ANEF 30 level . Similarly the increased numbers of dwellings affected at the 25 and 20 ANEF

levels will be in a range from 20,000 to 52000, respectively, making a total of over 70,000 additional affected homes involving nearly 200,000 residents!

By 2029 , however, these numbers are projected to decline, due to the contraction of the forecast contours produced by Airservices Australia, and which probably reflects the massively increased period during the day when the full slot-quota of 80 movements / hour is expected to be realised.

There is also the fact that with such increased movement numbers , ***"noise sharing"*** will have been abandoned and the system will revert to full parallel operations [Note the decreased east and west movement quotas for 2029 in PDMP Figure.14.2] . Indeed ***"noise sharing"*** will practically cease once movements reach the level of those experienced at the Sydney-2000 Olympics (around 365000 movements / annum).

The airport lessee company continues to present the significant environmental data of PDMP Figures 14.5-14.8 in a "take-it-or leave-it" fashion, without due explanation, and no regard to its obligations to *"assess and plan for"* the consequences of the projected environmental impacts as required under the planning obligations created by S. 71(2) of the Airports Act. People and councils should be informed if their property ***appears likely to come within an increased ANEF*** **boundary.**

Note that between today and 2029 there is expected to be a significant ***"bulge"*** in aircraft noise affectation, due to the continuance of ***"noise sharing"*** in the forecasts from 2001 through to around 2023.

Table 4 also shows the cost of insulating the above homes at two nominal cost levels of $50- $100,000 . These data should be considered in light of the fact that the Federal Government Grant for noise insulation in Third Runway Affected areas from 1994 was only $47,000.

On the above estimates, the total additional insulation cost for new homes affected at the 30 ANEF level would be from $250 - $500 million. For insulation of all new homes affected above the 25 ANEF level the cost would be in the region of $2.5 billion!

8.7 Section 14.2.1 Environmental Management - Insulation p. 138 :

Apart from flight path changes, noise insulation can ameliorate noise impacts from aircraft operations.

The inadequacy of past noise insulation programs is referred to below . There are many experts who will testify that a proper insulation requirement for aircraft noise affected residential homes is 25 ANEF, and some will even venture to say that for newly-affected homes a 12 ANEF level is more appropriate in particular cases of extreme affectation.

Therefore this Airport Lessee Company must be required to detail its plans for dealing with potential insulation and resulting medical damages claims from progressively newly exposed residents under its proposed growth plan.

The statement at p. 138 that the Sydney Airport Noise Amelioration Program provided a mechanism for the insulation of homes ... etc., is misleading and should be either removed , qualified or properly explained.

The "third runway" noise insulation program [Sydney Airport Noise Insulation Program - or SANIP] for original third runway impacts had not been completed by June 2001, and was then expected to be completed by June 2002 [#31] . Since that time it has either been wound up, and has not been applied as yet to newly-affected homes under the "noise sharing" LTOP flight paths [# 32] [#33] .

In the PDMP the ***"airport lessee company"*** states that insulation is administered by DITRLG" (ie the Federal Government 's Department of Infrastructure and Transport etc) and further recites that the current and future status of the SANIP is a matter for the Australian Government!

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31 Minutes, Government SACF, 15/6/2001;

32 House of Representatives Notice Paper No. 41, 16/9/2002, Q 667, p. 1208

33 Minutes, Government SACF, 31/3/2003, AI 6

By implication the home noise insulation program is thus "in limbo". In the 2004 MP it was stated that funds are raised from a noise levy applied to passenger tickets and that ***"more than $400 million has been spent on this program."***

There are many reports that the SANIP noise insulation was unworkable and of non-compliance with AS2021-2000. The ***Australian National Audit Office*** found in 1998 that the lack of any quantifiable noise reduction target for residential insulation made it difficult for the program management to assess its own effectiveness and hold contractors accountable for the achievement of noise reduction standards [# 34] .

The Master Planning process demands evidence of the ***"airport lessee company's"*** **PLANS** for continuing amelioration and prevention. As will be seen below , this will be more significant than ever before as LTOP continues its inexorable plague-like spread across Sydney's most heavily populated residential suburbs in the manner projected by this airport company up to 2023 , followed by a significant contraction through to 2029 [PDMP Figures 14.2 -14.8].

Instead of the evidence of amelioration and prevention required by S. 71(2) (f) and (g) of the Act , SACL's expectation is that Sydney Airport will be given a free ride at taxpayer's expense ! The taxpayer , residents and communities affected by aircraft noise of Sydney want to know who is going to take responsibility for what is generally accepted is an inadequate noise insulation program [# 35] .

This ANEF description in MP 2009 is marginally better dealt with than in the MP 2004. As stated on p. 138ff , the conditions requiring noise insulation for building siting and construction near Airports are specified in Australian Standard AS 2021-2000 [# 36].

AS 2021-2000 states that noise insulation is desirable if the noise levels in residential relaxing and sleeping areas exceed 50- dB(A) [# 37] . It also defines the Australian Noise Exposure Forecast (ANEF) system which is employed as a so-called "land-planning" tool around Australia's airports. The ANEF parameter is obtained mathematically by summing all predicted noise exposures due to aircraft over a year [# 38].

"Significant ANEF levels" as defined in the Airports Act (1996) are ANEF values greater than 30 (See para 8.2). An ANEF level of 30 corresponds to around 2000 70 dB(A) -equivalent flyovers per day [ie 110 per hr] [#39].

8.8 A Proposed Better Noise Descriptor than "N70" - The Equivalent Fiduciary LA max:

It is submitted that representation by the number of *equivalent 70 dB(A) LAmax flyovers* more meaningfully displays the effect of different ANEF bands than the N70 contours presently used, because it illustrates the annoyance factor in terms of an LA max which people can relate to. . A typical set of such values is offered in TABLE 5 .

Australian Standard AS 2021-2000 ranks an ANEF = 30 as very definitely ***"unacceptable"*** for residential home construction and even ***unacceptable*** for "public buildings". Yet it is only with reference to ***"significant ANEF's"*** (ie above 30) that the airport lessee company need be concerned for the purposes of noise insulation with the aid of government grants: S. 71(2) (e) . ***This is a factor of legislation which the government needs urgently to remedy.***

The "significant ANEF" criterion in the Airports Act is remarkably ungenerous considering the enormity of the affectation at ANEF = 30. TABLE 5 shows calculated numbers of aircraft flyover events each of exactly 70 dB(A) max which would result in various ANEF levels. An ANEF value of 30 is seen to correspond to nearly two 70 dB(A) events per minute, although fewer louder events will achieve the value.

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34 Audit Report - Sydney Airport Noise Amelioration Program, The Auditor-General Audit Report No.17 Department of Transport & Regional Development 1998 ISSN 1036-7632 ; ISBN 0 644 39016 6

35 Minutes, Government SACF, 7/7/2000; ibid 31/3/2003 .

36 Acoustics - Aircraft noise Intrusion- Building siting and construction, AS2021-2000

37 ibid Table 3.3

38 Acoustics - Aircraft Noise Intrusion- Building siting and construction, AS2021-2000, Appendix B

39 "The Way Forward for Aircraft Noise Sharing at Sydney (Kingsford-Smith) Airport" , May 2004, Chapt 8, Table 8.1.4.1, p. 113; Sydney Airport Community Forum Incorporated [SACF Inc].

However, S. 71(2) (f) and (g) impose an wider environmental impact responsibility on the airport lessee company , in addition to merely informing on the insulation-significant ANEF. Without qualification, ***it is required to assess environmental issues that might reasonably be expected to be associated with implementation of the master plan, and put forward plans for dealing with , ameliorating and preventing them.***

Arguably S. 71(2) (f) and (g) could also apply to noise impact ANEFs of less than the statutory ***"significant level"*** *of 30 , but which are still of significant objective nuisance value to residents in their homes.*

The Airport Lessee Company should therefore detail its proposals for the implementation and/or continuation of the provision of noise insulation for affected residences as the Noise contours bulge inexorably further inland across residential Sydney, for whom successive previous governments have denied liability .

At common law a public corporation creating an objectionable noise would normally be liable for damages in nuisance just like any other person manufacturing toxic and noxious substances, eg tobacco, or creating hearing loss or inducing falls through loss of balance in people, as are employers under Workcover provisions in NSW. ***SACL needs to address these issues of future liability in its Master Plan. If SACL has received government indemnity for this liability under the terms of its lease, then that should be stated.***

TABLE 5. COMPARISON OF NOISE DESCRIPTORS - ***70 dB(A) max events***
[Reprinted by permission from "*The Way Forward for Aircraft Noise Sharing at Sydney (Kingsford Smith) Airport, Sydney Airport Community Forum Incorporated (SACF Inc) May 2004, Table 8.2.4, Chapt. 8 , p. 122; Ed. P.S. Lingard*].

				Calculated for 0.5 min events	Calculated for 0.5 min events	Calculated for 0.5 min events
	70 dB(A) max MOVEMENTS PER DAY	ANEF dB(A)	N70 PER DAY	DNL *** N> 65	CNEL N>65	LA eq [1, 24 hrs]
70 dB(A) EVENTS PER HR				US EPA (1974)		NSW EPA
2	34	13.06	34	52.41	52.76	50.77
4	68	16.07	68	55.42	55.77	53.78
6	102	17.83	102	57.18	57.53	55.54
8	136	19.08	136	58.43	58.78	56.79
10	170	20.05	170	59.4	59.75	57.76
20	340	23.06	340	62.41	62.76	60.77
30	510	24.82	510	64.17	64.52	62.53
40	680	26.07	680	65.42	65.77	63.78
50	850	27.04	850	66.39	66.74	64.75
60	1,020	27.83	1,020	67.18	67.53	65.54
80	1,360	29.08	1,360	68.43	68.78	66.79
120	2,040	30.84	2,040	70.19	70.54	68.55

9 Aircraft Noise Critique Summary and Conclusions:

In summary, this is a plan for environmental urban vandalism on a scale not seen from Sydney Airport since the opening of the third runway. It is one which should not be tolerated, and one for which the Minister or Ministers responsible would be justified in seeking a full environmental impact statement (EIS) , a fully independent specialist review, and full opportunities for community consultation with public meetings at major affected venues.

The Minister would be ill-advised to give a mere perfunctory assessment and kindly nod to this proposal . If he does so the social and environmental costs for the affected Sydney Communities will be immense .

The Government in turn should face the fact that its airport lessee corporation must be made liable in tort for the community harm which will result from the proposed expansion of Kingsford Smith Airport given the manner, and with the minimal environmental assessment which has been presented. The "LTOP - noise share" plan behind which this airport lessee company hides for environmental justification has been hijacked and misdirected away from the high and laudable goals set by then Minister for Transport Sharp in 1996.

It is not a plan which maximises movements over water as promised . It is a plan which instead maximises aircraft movements, takeoffs, noise and crashrisk over the most heavily populated residential areas of Sydney . Not only does it maximise movements and takeoffs over residential areas, but it maximises the use of low-altitude high noise impact flight path trajectories for both arrivals and departures in the most unconscionable way . This is both harmful to Sydney residents and inconvenient for airlines which use more fuel through failure to reach cruising altitude in optimal time .

SYDNEY AIRPORT COMMUNITY FORUM INC

CRITIQUE OF

SYDNEY AIRPORT CORPORATION LTD'S

"PRELIMINARY DRAFT MASTER PLAN 2009 " SEPT 2008

APPENDIX "A" THE COST OF SYDNEY AIRPORT'S MASTER PLAN: THE SPREAD OF AIRCRAFT NOISE AFFECTATION BY POPULATION AND DWELLING

THE COST OF SYDNEY AIRPORT'S MASTER PLAN:

THE SPREAD OF AIRCRAFT NOISE AFFECTATION

BY POPULATION AND DWELLING

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Synopsis:

In its Preliminary Draft "Master Plan" Sydney Airport Corporation Limited (SACL) proposes to increase passenger movements by 4.2% per annum and aircraft movements by 2.4% per annum between 2001 and 2023 with the result that passenger movements in 2023 will reach 68.3 million (2001 data ca. 24 million) and aircraft movements will reach 412,000 per annum (254,729 in 2001-2) .

Airservices Australia was contracted by SACL to produced an "Aircraft Noise Exposure Forecast" (ANEF) chart for the airport in 2023, and an "Aircraft Noise Exposure Index" (ANEI) for the year 2001 as a basis for comparing the resulting impact increase on affected Sydney residential communities. The results are provided in Figure 16.5 of the Preliminary Draft Master Plan (PDMP) document.

Given that this increase in traffic movements is convenient for SACL to offer its shareholders as an incentive for investment, is it surprising that the PDMP provides no assessment of the resulting noise impact on its neighbouring residents other than to present the data? No cost benefit analysis is provided by which the community can assess the degree to which the benefit to the airport corporation from its proposed expansion can be offset against the damage to the community caused by the extension of the predicted noise contours overland.

This brief paper takes the ANEF/ANEI charts from the PDMP with the Australian Bureau of Statistics Census statistics for 2001 and calculates the increased numbers of people and existing dwellings which will become moderately- to severely- noise affected by aircraft in accordance with the terms of Australian Standard AS 2021 -2000 . It also estimates the cost of various levels of noise insulation which will inevitably be required for dwelling protection, assuming that somebody can be made liable for the resulting environmental harm .

The paper concludes that the number of people to be transferred into the zone that AS 2021-2000 describes as ***"unacceptable"*** for residential home construction will be in the order of 52000 . The corresponding number of dwellings is around 25000 and the additional cost of noise insulation to satisfy the Australian Standard would be ca $2.5 billion dollars at an average cost per dwelling of $100,000.

Similarly the number of people to be transferred from the zone below 20 ANEF which is currently defined as ***"acceptable"*** for residential dwelling construction to one which is only ***"conditionally acceptable"*** (ie between 20 and 25 ANEF) will be around 128, 000 representing around 52000 dwellings. Within this zone the Australia Standard says that up to 45% of people will be moderately to severely affected by the resulting aircraft noise, and that *"land use authorities may consider that the incorporation of noise control features in the construction of residences and schools is appropriate."* Should this be found to be the case then the cost of insulating all existing dwellings in these areas would be in the region of an additional $5.2 billion at an estimated cost per dwelling of $100,000 .

Note : The Federal Government only ever allowed a grant of $47000 for the worst - affected zones (> 30 ANEF) under the defective "Sydney Airport Noise Insulation Program" (SANIP), implemented only reluctantly by government after opening of the Third Runway.

Introduction:

In its Preliminary Draft "Master Plan" Sydney Airport Corporation Limited (SACL) proposes to increase passenger movements by 4.2% per annum and aircraft movements by 2.4% per annum between 2001 and 2023 with the result that passenger movements in 2023 will reach 68.3 million (2001 data ca. 24 m) and aircraft movements will reach 412,000 per annum (254,729 in 2001-2) . Airservices Australia was contracted by SACL to produced an "Aircraft Noise Exposure Forecast" (ANEF) chart for the airport in 2023, and an "Aircraft Noise Exposure Index" (ANEI) for the year 2001 as a basis for comparing the resulting impact increase on affected Sydney residential communities. The results are provided in Figure 16.5 of the Preliminary Draft Master Plan (PDMP) document.

Given that this increase in traffic movements is convenient for SACL to offer its shareholders as an incentive for investment, it is hardly surprising that the PDMP provides no assessment of the resulting noise impact on its neighbouring residents other than to present the ANEF/ANEI comparison data. No cost benefit analysis is provided by which Sydney Community can assess the damage to it caused by the extension of noise affectation, for offset against the degree to which the airport corporation benefits from its proposed expansion.

This brief paper takes the ANEF/ANEI charts from the PDMP with the Australian Bureau of Statistics Census statistics for 2001 and calculates the increased numbers of people and existing dwellings which will become moderately- to severely- noise affected by aircraft in accordance with the terms of Australian Standard AS 2021 -2000 . It also estimates the cost of two monetary levels of noise insulation which be required for their protection assuming that somebody anyone can be held liable for the resulting environmental harm.

Methods:

The ANEF/ANEI comparison chart from Figure 16.5 of Sydney Airport Corporation's Preliminary Draft Master Plan (PDMP) was scanned into a computer. An Adobe Photodeluxe® Business Edition multilayered photo-file was created from it . The section of the ANEF/ANEI chart built into the photo-deluxe (*.pdd) file is shown herein as Figure 1.

A scanned image of Sydney Local Government Areas (LGA) map [#1] , corresponding to those in existence at the time of the 2001 Census , was then superimposed as a separate layer onto the ANEF/ANEI chart and its scale adjusted to match the latter. The portion of the Sydney LGA map employed is reproduced in Figure 2.

[1] Sydney , Newcastle , Wollongong Local Government Areas , NSW Dept. Land & Water Conservation, October 1993 [Inset]

Figure 1: The Sydney Airport Draft 2023/24 ANEF and 2001 ANEI:

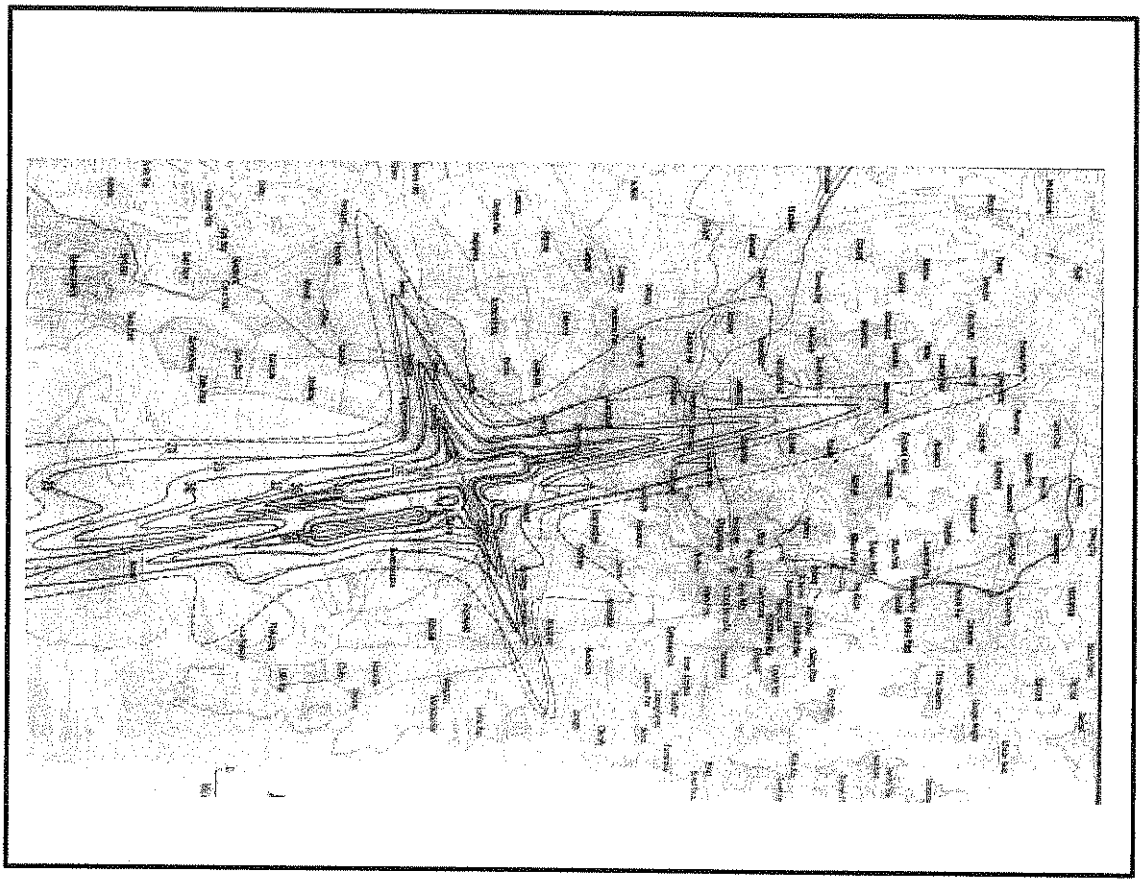
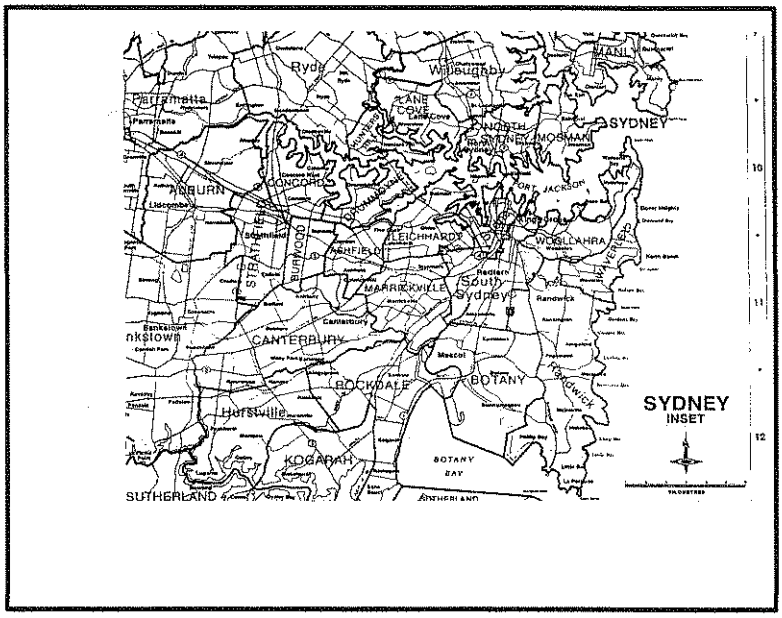


Figure 2 Local Government Area Boundaries October 1993 - Sydney Area



The images were made transparent, blended and constrast-adjusted using the facilities available in the Photodeluxe® software package. Finally, an image of a graph paper grid was added as a third layer and similarly blended so that the data on all three images could be seen together. The dimensions of the grid squares on the screen were calibrated using the LGA map scale and the fiduciary distance between Stanmore and Redfern CitiRail Stations (2.326km) . Each grid square was found to correspond to an area of 0.119 square kilometres. The resulting graphic is reproduced in Figure 3.

Data were obtained from the Australian Bureau of Statistics internet web site for Census 2001 [# 2] for the then existing populations and numbers of dwellings in the Local Government Areas most severely affected by aircraft noise. The LGAs included were Ashfield, Drummoyne, Leichhardt, Marrickville, South Sydney, Randwick, Rockdale and Botany. These data are reproduced in Table 1.

The total numbers of grid squares were then counted within each Local Government Area and between the 20, 25 and 30 ANE* contours for the 2001 ANEI and the 2023 ANEF . This estimate was made to the nearest 0.05 grid square and is accurate to approximately 0.1 square. Only grid squares corresponding to areas on the map which were residential in nature were counted . Water and open land areas were specifically excluded from the counts. Where the 2023 ANEF had retreated from the corresponding 2001 ANEI position the grid square area was subtracted from instead of being added to the total.

2 http://www.abs.gov.au - Look for Census 2001, Free data

Figure 3: Superimposition of Figures 1 and 2 as scaled and overlain with Fiduciary Grid

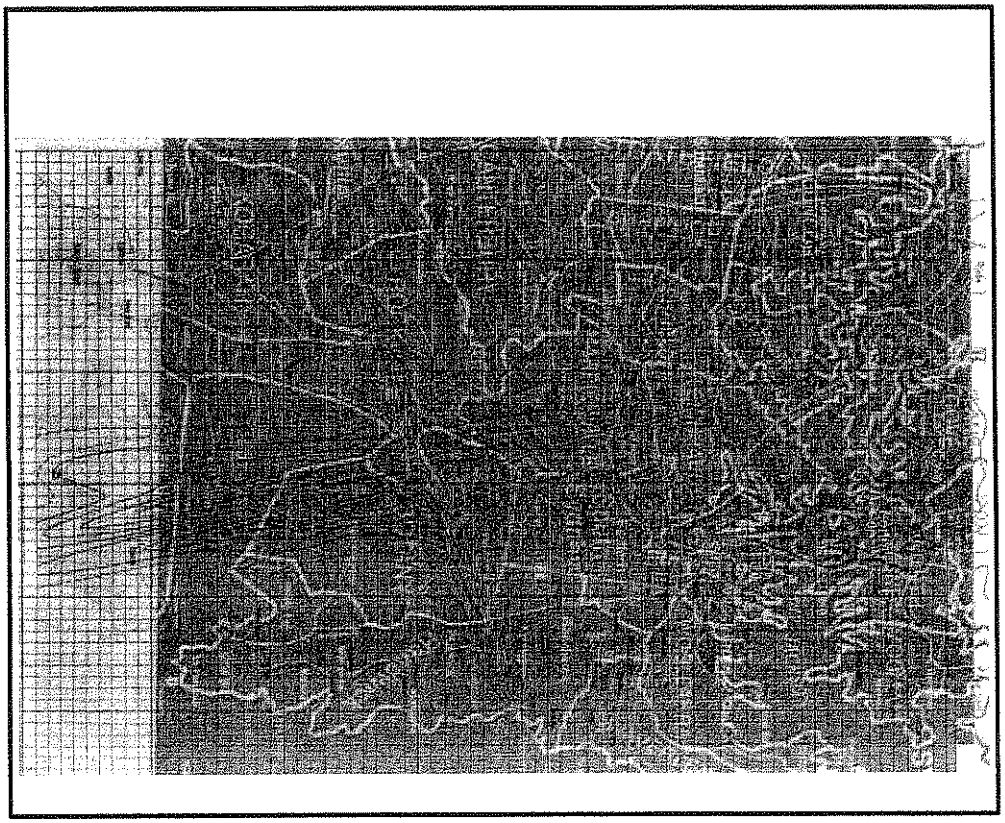


TABLE 1 Local Government Area Statistics - ABS Census 2001

SUBURB	*POPULATION*	*DWELLINGS SINGLE*	*DWELLINGS SEMI OR TERRACE*	*DWELLINGS FLAT/UNIT*	*DWELLINGS OTHER*
ASHFIELD	39,494	5,794	1,882	7,206	162
DRUMMOYNE	32,972	6,623	1,736	5,328	116
LEICHHARDT	62,452	8,417	10,475	8,437	344
MARRICKVILLE	73,431	10,057	8,144	10,752	778
S. SYDNEY	92,249	1,533	12,492	27,907	457
RANDWICK	121,497	14,448	7,577	24,737	503
ROCKDALE	88,523	17,503	4,024	11,118	327
BOTANY	35,897	5,590	2,021	5,297	108
TOTALS					
POPULATION	***546,515***	69,965	48,351	100,782	2,795
DWELLINGS		***221,893***			

The numbers of grid squares counted for the representative local government areas for which populations and dwelling counts were obtained from Australian Census 2001 data , and for the shift in position of the ANEI/ANEF contours, are shown in Table 2.

TABLE 2 GRID COUNTS CORRESPONDING TO LOCAL GOVERNMENT AREA AND ANEF SHIFT

(1) BY LGA	*GRID SQUARES*
ASHFIELD	67.7
DRUMMOYNE	159.2
LEICHHARDT	53
MARRICKVILLE	123.4
S. SYDNEY	151.7
RANDWICK	179.4
ROCKDALE	55.4
BOTANY	189.5
TOTAL GRID SQUARES	***979.2***
(2) BY ANEI/ANEF	*GRID SQUARES*
ANEF 20	229.9
ANEF 25	89.9
ANEF 30	21.9

The average number of dwellings was then calculated per representative grid square, which is 226.81.

The assumption employed is that each dwelling , whether single house, semi, terrace or apartment carries the same weight, as far as insulation cost is concerned. For a provisional analysis this assumption is reasonable, since it is the duty of Sydney Airport Corporation to carry out this study anyway, had its concerns for its so-called community "stakeholders" been great as those for its shareholders.

Results:

Using the Dwelling count per grid square the number of dwellings affected by each shift in ANEF/ANEI zone was calculated as shown in Table 3 and the effective cost of noise insulation calculated for two cost assumptions of $50,000 and $100,000 per dwelling. The former amount is approximately that allowed by government as a grant for insulation of homes in the 30-40 ANEF area Sydenham [# 3].

[3] Fitzgerald, P. (1998) The Sydney Airport Fiasco, Hale and Iremonger, p. 143.

Table 3 Number of Dwellings in Areas affected by Projected Shift of ANEF by Year 2023

	AFFECTED BY ANEF 20	*AFFECTED BY ANEF 25*	*AFFECTED BY ANEF 30*
No GRID SQUARES	229.85	89.92	21.9
PEOPLE	128,284.14	50,186.25	12,222.85
DWELLINGS	52,085.22	20,376.34	4,962.66
COST OF INSULATION ($millions)			
AT $50,000 PER DWELLING	*2,604.26*	*1,018.82*	*248.13*
AT $100,000 PER DWELLING	*5,208.52*	*2,037.63*	*496.27*

The Table lists only those dwellings affected by the proposed shift in the position of the ANEF contours as predicted between 2001 and 2023. It does not include those already adversely affected by the introduction of LTOP in areas where there was not previously any aircraft noise.

In order to assess whether it is reasonable for persons whose dwellings are thus affected to make a claim for noise insulation on their dwelling it is necessary to consider the guidelines in Australian Standard AS 2021-2000 [#4].

Table 2.1 of the above Standard prescribes that only building sites where the ANEF is less than 20 are ***"Acceptable"*** for the construction of houses, home units, flats or caravan parks, without special provision being made for noise insulation according to the Standard. If the ANEF is between 20 and 25 then construction becomes ***"Conditionally Acceptable", ie*** :

> ***"some people may find that the land is not compatible with residential or educational uses. Land use authorities may consider that the incorporation of noise control features in the construction of residences or schools is appropriate"*** [#5]

If the ANEF is greater than 25, then according to the Standard the siting of residential constructions becomes ***"Unacceptable"*** , and the Standard does not recommend development in unacceptable areas. If however a planning authority determines that a development is necessary , the Standard recommends that specific "noise reduction" levels [ANRs [#6]] be achieved to bring the indoor level to that specified by Table 3.3 of the Standard. For residential relaxing and sleeping areas AS 2021-2000 Table 3.3 requires this level to be 50 dB(A). At the time of the "Third Runway" debacle, the Community Advisory Committee (CAC), the NSW Environmental Protection Agency (EPA) and the then Commonwealth Environment Protection Agency all recommended that on human health and welfare grounds all residences and schools within the 25 ANEF contour should be insulated [#7]. However, the government never complied with this recommendation. Only some homes in the 30 ANEF zone were ever offered insulation, and then at a rate which could never compensate the residents for the gross nuisance they were obliged to suffer [#8].

Conclusions:

The paper concludes that the number of people to be shifted into the zone that AS 2021-2000 described as ***"unacceptable"*** for residential home construction is significant and, without assuming any population growth or increased housing density, will be in the order of 62000 . The corresponding number of dwellings at 2001 census levels is around 25000. For these dwellings the additional cost of noise insulation to satisfy the Australian Standard would be around $2.5 billion dollars at an average cost per dwelling of $100,000 [#9].

4 Acoustics - Aircraft noise Intrusion- Building siting and construction, AS2021-2000

5 ibid AS 2021-2000 Table 2.1

6 ANR = Aircraft Noise Reduction

7 Fitzgerald, P. (1998) The Sydney Airport Fiasco, Hale and Iremonger, p. 134-135.

8 ibid Fitzgerald

Similarly the number of people to be shifted from the zone below 20 ANEF which is currently defined as ***"acceptable"*** for residential dwelling construction to one which is only ***"conditionally acceptable"*** (ie between 20 and 25 ANEF) will be around 138, 000 representing around 52000 dwellings. Within this zone the Australian Standard AS2021-2000 states that up to 45% of people will be moderately to severely affected by the resulting aircraft noise, and that:

> ***"land use authorities may consider that the incorporation of noise control features in the construction of residences and schools is appropriate."*** [#] [10]

Should this be found to be the case then the cost of insulating all existing dwellings in these areas would be in the region of an additional $5.2 billion at an estimated cost of $100,000 per dwelling.

This should be considered in light of the fact that successive Federal Governments have only ever allowed a grant of $47000 for the worst - affected zones (> 30 ANEF) under the defective "Sydney Airport Noise Insulation Program" (SANIP) implemented only reluctantly by government following opening of the Third Runway; and then only after intolereable delays. Who then is going to pay for the noise disruption caused by the airport expansion now proposed by Sydney Airport Corporation in its Preliminary Draft Master Plan ?

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[9] The $47,000 offered by government for Third Runway insulation was only a "grant" and did not represent the full cost of noise insulation to the requirements of the Australian Standard .

[10] AS2021-2000, Table 2.1, Note 2

Tabled by SACF Inc at aircraft noise inquiry in Sydney on 28 May 2010.

SUPPORTING DATA FOR SACF NOISE ABATEMENT DEPARTURE PROTOCOL [NADP] DISCUSSION

By P.S. Lingard, BSc., Ph.D., LLB. ***SACF Proxy for Mayor of Ashfield.***

[Revised: 30/3/2007 -3/4/2007; Ex. 22/8/2006]

Introduction:

The LTOP Reports (1996) and Proponent Statement Recommendation 19 require that :

> ***"Noise abatement climb procedures be standardised for all runways at [KSA] and that an assessment be made to determine whether the [ICAO] Procedure 'A' or Procedure 'B' be mandated for all jet operations."***

Recently reported Noise Data from Summer Hill[#1] , suggests there has been failure by Airservices Australia to implement this recommendation considering the current low-flying and distance of the location from the furtherest runway end .

Noise abatement procedures were first considered by early meetings of the IMC (See eg. Meeting 6, 17 Nov. 1997). CASA advised that the procedures would be safe and would provide a measurable benefit.

The implementation of ICAO-A procedures was first endorsed by a resolution at the SACF Meeting No. 12 (28 Nov. 1997) . The Resolution read as follows:

> ***"The Sydney Airport Community Forum requests Airservices Australia to immediately commence all necessary procedures required to implement ICAO " A" departure procedure for all jets operating at Sydney Airport and to enable such procedures to become effective without delay.***
>
> ***SACF further requests the Implementation and Monitoring Committee to examine as a matter of urgency any necessary requirements for refining and optimising the procedure to achieve optimum noise minimisation; such further refinements being implemented as necessary after the standard ICAO "A" procedure is operating. [Proposed D. Lidbetter]***

In subsequent meetings both in SACF and the IMC, David Lidbetter persevered against protests from Qantas then representatives citing increased fuel use . By August 1998 the resolution was not actioned by Airservices . It was therefore reaffirmed at a Special Meeting of SACF held on 28 August 1998 (item 11) . On that date also an apparent Directive was issued by then Transport Minister Vaile to the effect that ICAO-A noise abatement departure procedures would be adopted by Airservices on all flight tracks taking off over residential areas (Ministerial Media release T159/98 - copy attached). Unfortunately there is no confirmation of Mr. Vaile's purported directive in the Ministerial Directives published by Airservices in appendices to their Annual Reports, for either 1998 -99 or later.

Reason for Agenda Item:

Since the SACF resolution of Nov. 1997 there has evidently been no substantive action . With Boeing 747s often taking off at inclinations to the horizontal over the inner northwest as low as 2.5° , the noise burden of sections of Dulwich Hill and Summer Hill has become both concentrated and intolerable in level . B747s are typically observed crossing Summer Hill (ca. 60% of Northwest movements [#2]) at altitudes of around 1500 ft or less [AGL] . This at times produces noise at ground level exceeding 90 dB(A) . This is a long-settled prime residential area which includes several schools . These practices are completely unacceptable to the Ashfield Community and must be

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1 *"Community Noise Report Summer Hill, Summer Hill, 2003-2005", Heinrich & Lingard , December 2005*

2 Now confirmed by Airservices Departure-time statistics for 2003 -5; showing a zone of flight path concentration .

stopped. Moreover , both the LTOP Proponent Statement and subsequent Directive of Minister Anderson 1999 [M37/99 , 3 May 1999, para. (v)] required Airservices Australia to:

> ***"Develop and implement effective aircraft noise abatement procedures and monitor and report to the Secretary on compliance..."***

A list of Official LTOP Statements on the requirement and conditions for NADPs is provided in Table 2 at the end of this paper. A question legitimately asked is: ***"What noise abatement work has been carried out by Airservices Australia in the context of Sydney Airport since that directive? "***

Noise Profile Computer Modelling using The "INM " [#3]:

This paper considers the advantages for residents under departure tracks expected from ICAO-A -like[#4] , as well as potentially improved, noise abatement takeoff procedures. These are considered with the aid of the US Federal Aviation Administration's (FAA) "Integrated Noise Model" [or INM - herein Ver. 6.2].

"INM" is a computer program which uses mathematical algorithms based on well-established aviation standards and sound-level monitoring which enables the noise at ground level to be computed from the characteristics of the aircraft model and engine type. The INM enables the calculation of absolute ground level noise for given flight path assumptions as a function of distance from take-off roll. It also enables the "Australian Noise Exposure Forecast" (ANEI) equivalent noise-dose data to be predicted.

Figures 1 to 4 show noise curve examples obtained by the author using the "INM" for the most heavily-loaded B747s for a selection of both custom and standard profiles. The custom profiles model departures with initial climb angles of 2.5, 5, 10, 15 and 20 degrees, respectively which level out at from 4000 ft to 6500 ft to a 5 degree climb beyond . They are calculated for Straight Takeoffs over level ground. The custom profiles apply staged , engine thrust - reduction factors of 82% and 63% at ca. 1600 and 4000 ft, respectively, for initial slopes of 10 & 15 degrees , and 1600 and 6500 ft for 20 degrees . Beyond each initial , steepest climb, the attack angle reduces to 5 degrees. For initial climbs at 5 degrees or less the Engine Thrust reductions are applied at 1600 ft and 3000 ft, respectively. Due to the necessary simplifications made, the benefits predicted are indicative, only, not a guarantee of performance.

Figure 1 details the custom-selected fixed-point flight track profiles used together with the "INM"-standard and ICAO profiles for noise level and noise dose calculation [Maximum decibels (dB(A), max) ; and ANEI - the Australian Noise Exposure Index].

Figure 2 shows the maximum noise level (La, max) expected at various distances along the flight path centreline for overflying B747-400 aircraft of maximum loading (MTOW) 838000 lb. The results are compared to the ***FAA - "INM" "Standard -8"*** profile for B747 -400's as supplied with the software package [Asterisked points]. Standard -8 is roughly comparable to an "ICAO-B" -style procedure with initial climb to 1000 ft , without noise abatement features [#5].

The figure shows that beyond 2 kilometres the predicted takeoff noise level declines dramatically with distance for each profile, and further reduces with increasing departure climb angle.

Thus at 10 km from takeoff-roll (roughly the distance to Summer Hill) an initial climb out angle of 15 degrees up to 4000 ft reduces the ground noise by 13 dB(A) from that for the ***FAA -INM "Standard -8"*** departure profile.

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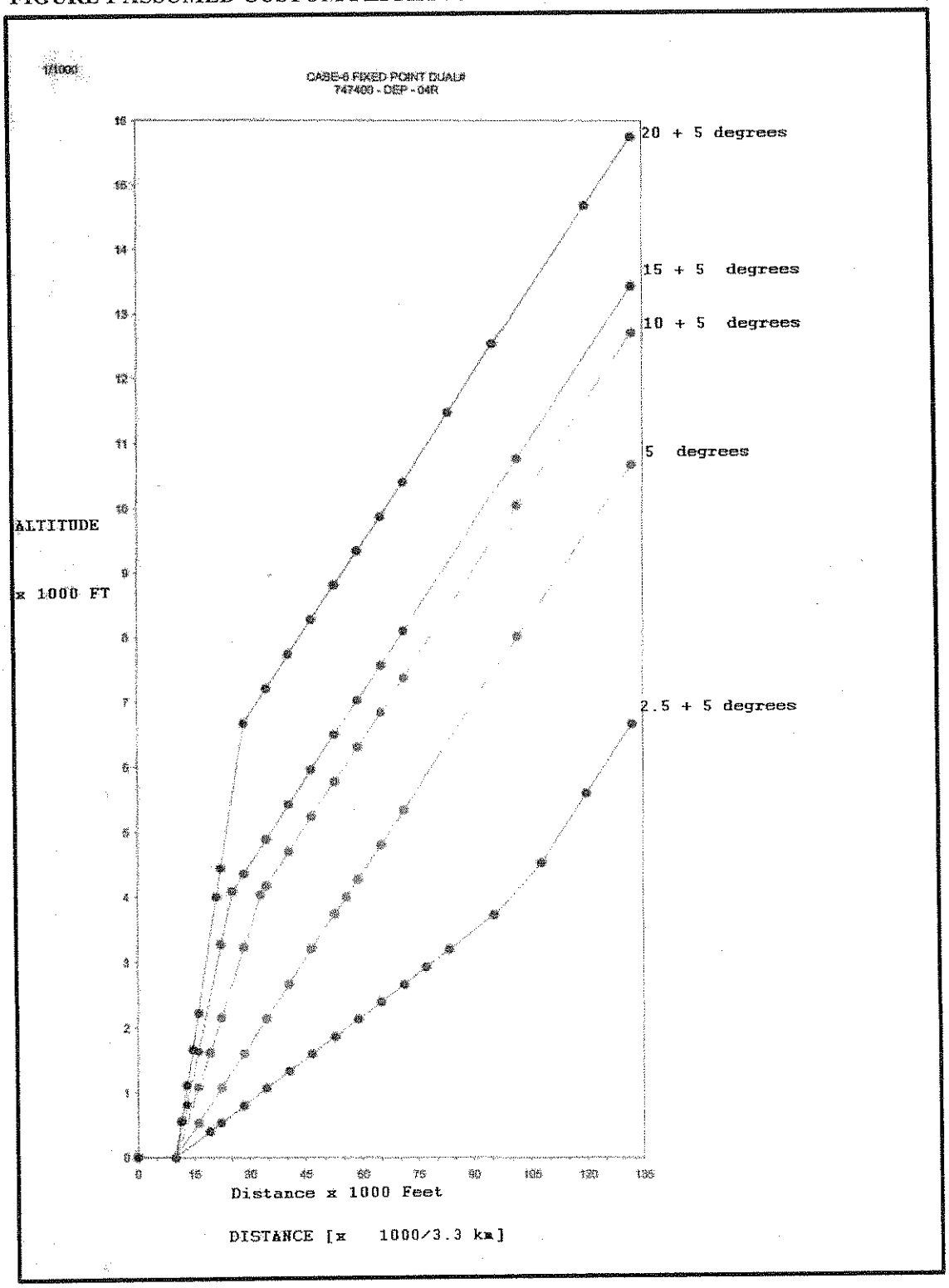
3 FAA Integrated Noise Model [Version 6.2 herein used]

4 The ICAO recommended protocols have since been changed by ICAO (Nov. 2001) . The "A" protocol now being nominally of the same intent as ICAO-2; The "B" Protocol now being "1". But the procedures for ICAO-A are well documented and not illegal.

5 INM 6.2 Software release Notes 19/5/2006, p. 4 - Commercial Aircraft Noise/Performance Database.

FIGURE 1 ASSUMED CUSTOM FLIGHT PATH PROFILES:



To have climbed only to 1500 ft by Summer Hill , as often observed with this aircraft type, corresponds to a climb-out angle of only ca. 2.6 degrees [ie. Tan $^{-1}$(1500/33000)]. From Figure 2, at 10 km the maximum sound level difference between a climb out at 2.5 degrees and one at 15 degrees is 28 dB(A) for this aircraft!

FIGURE 2 MAXIMUM SOUND LEVEL (dB(A) FOR B747-400 FLYOVERS ALONG FLIGHT PATH

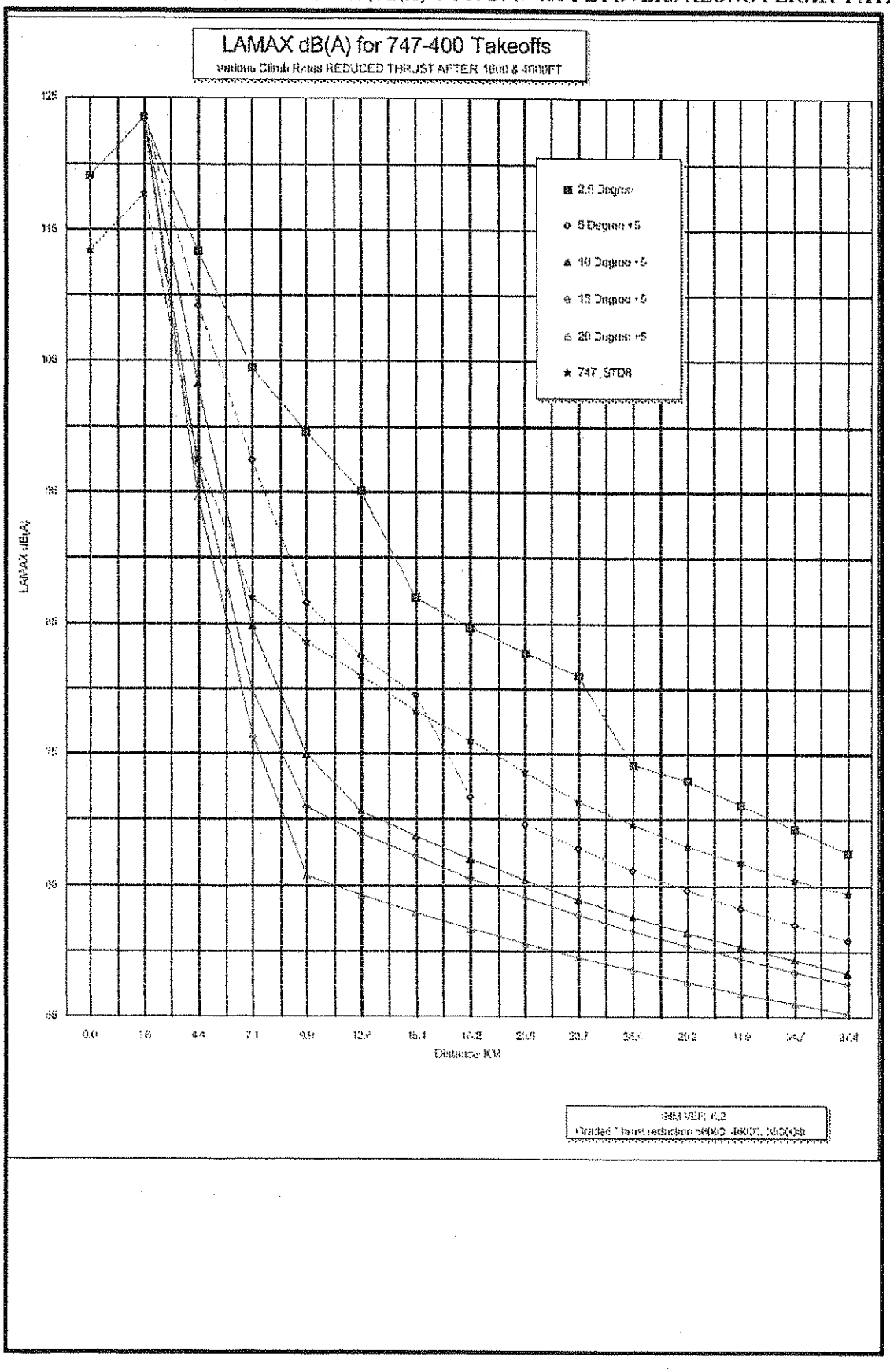
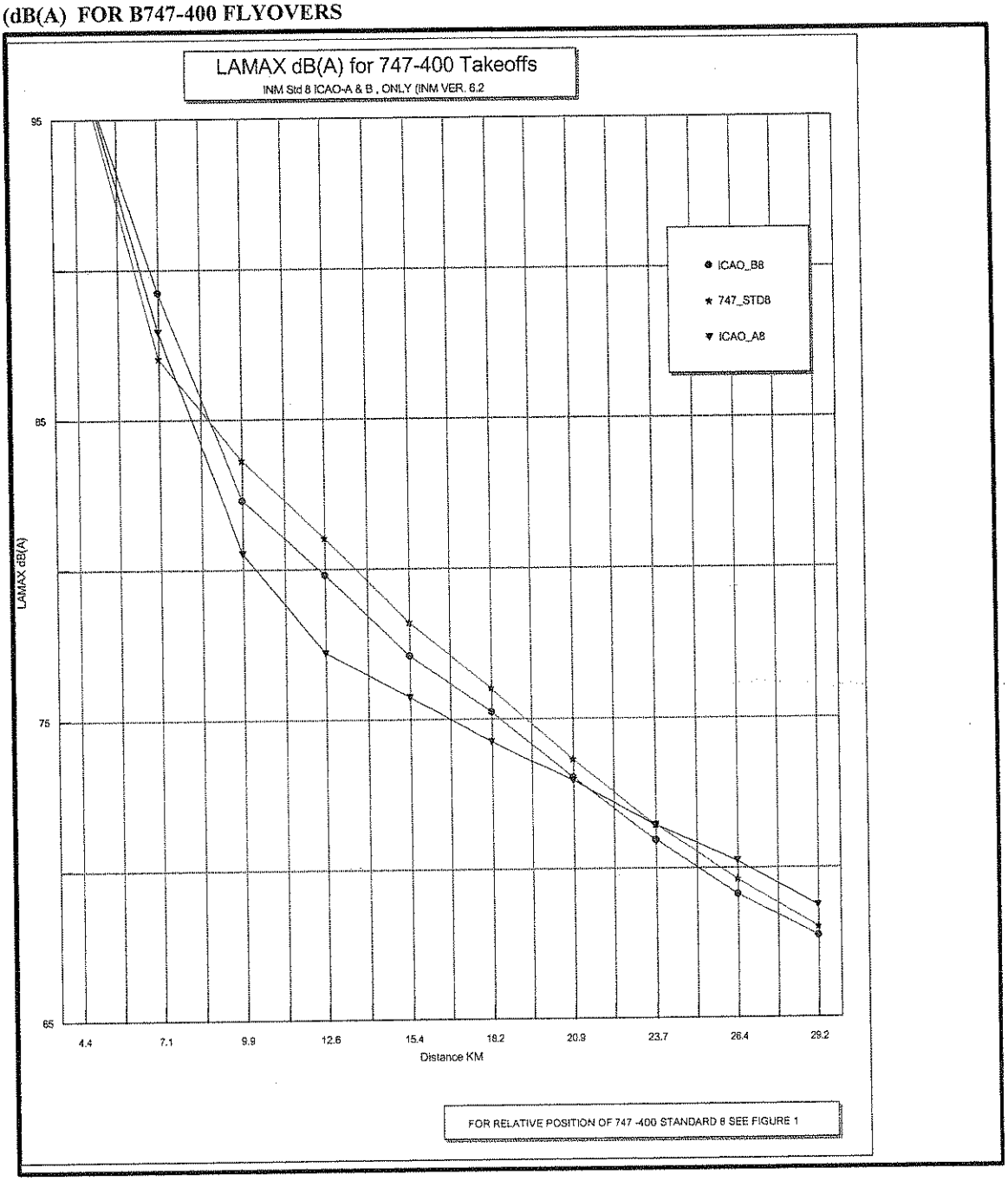


Figure 3 compares the noise results for ***INM- Standard 8*** for B747-400's with those produced with the INM-supplied profiles for ICAO-A & -B [#6] . It shows a benefit of ca. 4.5 dB(A) at 12 km of using the "ICAO-A" procedure in the INM compared to the "Standard" procedure & 1.5 dB(A) for ICAO-B. This contrasts the potential benefit of the ICAO-A [distant-benefit] versus the ICAO-B [close-in benefit] as compared to INM "Standard -8". While not as beneficial in terms of noise reduction as the hypothetical custom NADP profiles shown in Figures. 1 - 2 , ICAO -A appears better than both the "Standard" and also the ICAO-B profile for intermediate distances (7 - 21 KM) from takeoff roll.

FIGURE 3 COMPARISON OF INM - ICAO-A , B & STANDARD -8 MAXIMUM SOUND LEVEL (dB(A) FOR B747-400 FLYOVERS

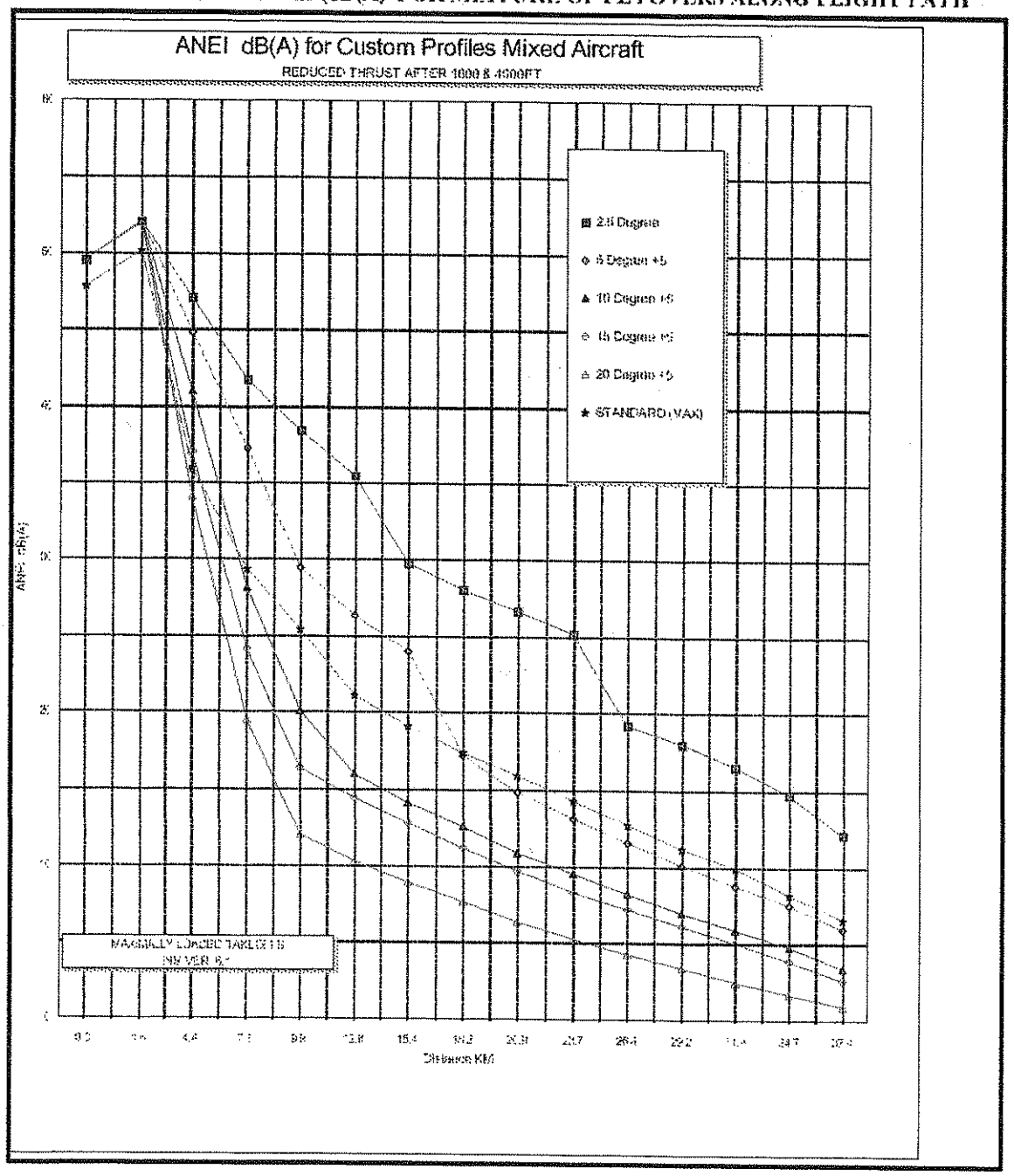


6 ICAO PANS-OPS Doc. 8168 - Part V, Chapt. 3, S. 3.1.1 - 5/11/1998 & 11/11/1993 (No. 10).

However, Figure 2 has shown that the resulting benefit can be even greater than ICAO-A if the initial climb-out is more steep. This invites the question whether any such two-stage profile could be made to work for departures over the residential neighbours of KSA?

Figure 4 compares computed ANEI (***Australian Noise Exposure Index***[4] -ie Noise Dosage) levels for a mixture of aircraft, including B747's, corresponding to the number of aircraft per day (ca. 60 [5]) logged travelling over the subject house. The mixture of aircraft used was modelled on Airservices -provided departing aircraft data for the noise monitoring terminal (NMT15) at Croydon, each assumed to be maximally loaded..

FIGURE 4 COMPUTED ANEI (dB(A) FOR MIXTURE OF FLYOVERS ALONG FLIGHT PATH



[4] See Australian Standard AS 2021-2000, "Acoustics- Aircraft Noise Intrusion - Building Siting and Construction".
[5] See "Community Noise Report Summer Hill 2003-2005" (ibid)

Table 1 (Appendix) shows the breakdown of flyovers per day by aircraft type which was used in the ANEI calculations of Figure 4.

Figure 4 shows that for the distance corresponding to the subject residence at Summer Hill (ca. 10 km from takeoff-roll) the noise dose, represented by the ANEI , is very sensitive to the climb-out angle of the aircraft. The calculations assume that all aircraft are maximally loaded, and completing climb out following the same flight profile (trajectory). This assumption is partly justified since Airservices- supplied departure times correspond with the machine-detected noise for ca. 60 % of takeoffs from 34L in the monitored period [#9] . However, it is acknowledged that there will be a spread of audible aircraft around the home, ANEI computed will therefore slightly over-estimate the true value. Similarly, there will be differences caused by the curvilinear flight paths employed at KSA and terrain effects, which is not modelled here.

The results show that from the 26 dB(A) ANEI level for the FAA ***"Standard - Max"*** noise curve , noise dosage (ANEI) reductions of 5 , 8 and 13 dB(A) are observed , respectively , for the 10 , 15 and 20 degree climb out profiles, with increases to 29.5 and 38 dB(A), for reduced climb-out angles of 5° and 2.5° respectively !

The results show that (ignoring turning effects and terrain) , the ANEI for the subject residence at Summer Hill lie between 20 & 30 dB(A) if all of the aircraft were maximally loaded. This supports the estimates calculated by Lingard & Heinrich in December 2005 [Ref. #1], and suggests that the Airservices suggested ANEI for this corridor of 17 dB(A) is being exceeded.

By Australian Standard AS 2021 -2000 [#10] an ANEI of between 20 & 25 corresponds to an only ***"conditionally acceptable"*** location for a residential dwelling. ANEI above 25 dB(A) are considered ***"unacceptable"*** and Federal Government noise insulation grants commence at ANEI = 30 dB(A)!

NADP 1 & 2 (ICAO Nov. 2001, cf. ICAO "A" &/or "B":

Some discussion at SACF and at the IMC has suggested that the new (Nov. 2001) NADPs - 1 & 2 *replace and/or are equivalent to* the old ICAO-A (2 for "A"; & "1" for "B") . ***This is not the case!***

NADP-1 (for "close-in" benefits) requires a minimum initial climbout to only 800 ft (cf. 1000ft for ICAO-A) . This will produce marginally greater noise. Similarly NADP-2 (for "distant" benefit) also requires a minimum initial climb to only 800 ft ! Furthermore the current AIP permits puts the onus of developing NADPs on "the operator" (ie airline) to select which one to use. This operator-chosen NADP need not be equivalent to ICAO-A. The LTOP Proponent Statement states ***"the overriding intention of the Plan is to ameliorate the noise impacts of Sydney Airport"*** . It would therefore defeat the overriding noise reduction objective of LTOP to permit:

(1) An inferior NADP to replace an existing superior one without discussion at SACF and ;

(2) The "fuel cost" argument from Qantas to override community hopes of noise reductions; or

(3) The "Trackmile" and /or "Greenhouse Gas" argument found in the Feb. 2003 TF2 report.

Since 1998 the ICAO recommended protocols have been changed by ICAO (Nov. 2001) . The "A" protocol now being nominally of the same intent as NADP-2; The "B" Protocol now being "1". But the procedures for ICAO-A are well documented and not illegal. The 2001 changes water-down the benefits inherent in the ICAO-A procedure, though are not inconsistent with it.

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9 P. S. Lingard - Unpublished data.

10 AS 2021 -2000 ibid.

CONCLUSIONS:

By far the worst contributor to aircraft noise annoyance in the Ashfield Municipal area are the B747's and doubtless things will worsen when the A380's begin to use KSA . The Rolls Royce Trent-900 engines they employ develop 57 %. more thrust that the PW4056's used in B747s.

For the jet departure flyover mixture using the Croydon corridor (Table 1, See Appendix), considerable impact reductions appear obtainable by increasing the steepness of the initial aircraft climbout angles from the current 2.5 - 5 ° range for B747's to between 10-20 ° up to above 4000 ft.

The ICAO-A requirement was for an initial climb to 1500 ft at maximum takeoff thrust and V_2 + (10-20) knots, followed by continued climb at reduced thrust and velocity not less than V_2 + (10-20) knots to 3000 ft, before smoothly accelerating to *"en-route"* climb . While the SACF-endorsed ICAO- A effect are not as good as the custom hypothetical profiles herein tentatively suggested, they might provide an initial benefit in the 8 - 20 km range where the present sound levels are worst.

The proferred preliminary custom-profiles involving steeper initial climbouts to up to (or beyond) 4000 ft, with two gradients and thrust reductions, suggest ways in which Airservices Australia might explore possible further benefits for residents under the northwest corridor, and thereby comply with the erstwhile August 1998 "directive" of Minister Vaile, and the May 1999 directive of Minister Anderson to *"Develop and implement effective aircraft noise abatement procedures"*. Similar benefits might also be expected for east- and west-heading takeoffs from Runways 07, 34R (with extended climb to turn) and 25.

In case of doubt , Boeing Manuals show that at least the fully-loaded B747-200B aircraft IS capable of up to 20 degree climbs , so that it appears that much better noise reduction performance is achievable than presently practiced by Airservices Australia . One Boeing - specified ***"Noise Abatement Takeoff Procedure"*** for 747 200B's refers to a 15 degree (while maintaining comfort levels for passengers) climb out pitch [#11] to 1000 ft , with ongoing climb to 3000 ft. The B747-200B represents a maximum take-off weight of 800,000 lb cf. 870,000 lb for a B747 -400 [FAA], therefore similar results should be possible for the latter.

In summary, it is shown that significantly reduced maximum ground noise can be achieved with the mixture of aircraft presently using the northwest corridor, and in particular with the heavy B747 -type aircraft which cause the most pain and suffering in those affected , by using a bimodal takeoff profile with an initial quick climb to 4000 ft or greater, followed by a levelling off to 5° and thrust reductions at 1600 and 4000 (or 6500 for the steepest climb) ft .

In August 1998 the then Minister implied by Media Release to have directed Airservices Australia to comply with ICAO-A jet climbout procedures over residential areas at Sydney Airport. This has not eventuated . If there was a formal direction, then the current Minister should remind Airservices Australia that they should comply with his directions. Airservices Australia should comply with the spirit of the LTOP and collaborate with CASA to produce more optimal NADPs for KSA. If the Minister did not so ordain ICAO-A -type takeoffs by official direction, then his 1998 Media Release was unfortunately 9 years premature and so far vain. Either way, the Proponent's intentions for LTOP and of SACF in its Nov. 1997 Resolution have been effectively subverted.

Table 2 in the Appendix (See p. 10)lists the various Authoritative Statements relevant to Noise Abatement Departure Protocols for Sydney Airport.

END

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[11] Eg. "Boeing 747-100/SP/200B Procedures" (Compilation M. Zagoren)

APPENDIX TO NADP DISCUSSION

MINISTER VAILE'S AUGUST 1998 MEDIA RELEASE ATTACHED

TABLE 1 : FLIGHT OPERATIONS ASSUMPTION

(BASED ON ASA CROYDON MONITOR STATISTICS)

AIRCRAFT	Day	Evening	Night
717-200	2	0	0
737-400	6	3	2
737-800	6	3	2
747-400	1	1	7
767-400	6	2	1
777-300	4	0	0
A320	4	3	0
A330	3	2	0
A340	2	0	0
TOTALS	**34**	**14**	**12**
TOTAL OPS	**60**		

P.T.O - TABLE 2

TABLE 2
AUTHORATIVE STATEMENTS AND DIRECTIONS ON NOISE ABATEMENT

1	**LTOP:** "The Overriding intention of the Plan is to ameliorate the noise impacts of Sydney Airport." ***Proponent Statement Ch. 3.2.4, p. 3-21.***
2	**LTOP:** "Noise abatement climb procedures be standardised for all runways at [KSA] and that an assessment be made to determine whether the [ICAO] Procedure 'A' or Procedure 'B' be mandated for all jet operations." - ***Proponent Statement Rec. 19, Ch. 1.2 , p. 1-12.***
3	**LTOP:** "Examination of enhanced noise abatement departure procedures" ***Proponent Statement*** Ch. 3.4.2 page. 3-22, dotpoint 4.
4	Re. ICAO _A: "The difference in decibels were sufficient to warrant implementation" - D. Toepfer, CASA : ***Minutes IMC*** Meeting 6 , 17 Nov. 1997 [Extraordinary Agenda Item] .
5	**SACF Resolution:** "The Sydney Airport Community Forum requests Airservices Australia to immediately commence all necessary procedures required to implement ICAO " A" departure procedure for all jets operating at Sydney Airport and to enable such procedures to become effective without delay. "SACF further requests the Implementation and Monitoring Committee to examine as a matter of urgency any necessary requirements for refining and optimising the procedure to achieve optimum noise minimisation; such further refinements being implemented as necessary after the standard ICAO " A" procedure is operating. "- ***Resolution of SACF; Meeting No. 12 (28/11/1997)***
6	Resolution of SACF [Item (5) , This Table] - reaffirmed at a Special Meeting of SACF held on 28 August 1998 (Agenda Item 11) .
7	***"SACF recommended to me that the steeper climb procedures should become a permanent feature of take-offs over land." ..... "ICAO-A" procedures involve steeper climbs and a delayed reduction in power setting which ensures that the jets reach higher altitudes before over-flying home close to the airport"***: Transport Minister , Mark Vaile, 28 August 1998 - ***Ministerial Media Release, T159/98***
8	**Activities to be performed by Airservices Australia under paragraph 8(1)(d) , and for the purposes of Subsection 9(2) [of the Act]:** "Develop and implement effective aircraft noise abatement procedures and monitor and report to the Secretary on compliance with those procedures at Australian airports.": Minister Anderson, Direction to Airservices Australia , ***dotpoint (v) - Instrument Number M37/99, 3 May 1999.***
9	**ICAO-A/B** - "These aeroplane operating procedures for the take-off climb have been developed so as to ensure that the necessary safety of flight operations is maintained whilst minimizing exposure to noise on the ground. ....Procedure A results in noise relief during the latter part of the procedures, whereas Procedure B provides relief during that part of the procedure close to the airport. In unusual circumstances . .... a special procedure meeting the limitations of 3.1.2.3 may be developed.": ICAO PANS-OPS Doc. 8168 - Part V, Chapt. 3, S. 3.1.1 - 5/11/1998 & 11/11/1993 (No. 10).
10	**NADP 1/2** - "The following two examples of operating procedures for the climb have been developed and are considered safe"..... "The first (NADP 1) is intended to provide noise reduction ... in close proximity to the departure end of the runway . The second (NADP 2) provides noise reduction to areas more distant from the runway end ": ICAO PANS-OPS Doc. 8168 - 1/11/2001 (No. 11) Appendix to Part V Chapt. 3 Paras 1.1 - 1.2.
11	AIP Section GEN 1.7 "Differences from ICAO STANDARDS , RECOMMENDED PRACTICES AND PROCEDURES" shows that Airservices does not always comply with ICAO Rules: http://www.airservices.com/publications/aip.asp
12	**NADPs Generally :** "The State in which the aerodrome is located is responsible for ensuring that noise abatement objectives are specified by aerodrome operators. The noise abatement objectives should enable the operators to develop safe procedures in accordance with this Chapter. The State of the Operator is responsible for the approval of safe flight procedures developed by the aircraft operators." : ICAO PANS-OPS Doc. 8168 - Part V Chapt. 3, S. 3.1.2, p. 5-3, 1/11/2001.
13	**NADPs Generally :** "There will be no more than two departure procedures to be used by one operator for an aeroplane type, one of which should be identified .... as the noise abatement departure procedure": ICAO PANS-OPS Doc. 8168 - Part V Chapt. 3, S. 3.2.3, p. 5-3, 1/11/2001.

P.T.O. MINISTER VAILE'S AUGUST 1998 STATEMENT ATTACHED

28 August 1998
T159/98

STEEPER CLIMBS OVER LAND

As a result of strong community support for steeper climbs by jet aircraft taking off to the north from the new parallel runway at Sydney airport, the Minister for Transport and Regional Development, Mark Vaile announced today that it has been decided that the procedure will be required of all airlines departing north from the parallel runways.

Additionally, the steeper climb procedures for take-offs from the east west runway will be explored.

Earlier this year the Sydney Airport Community Forum (SACF) and the airlines initiated a trial of "ICAO A" steeper jet climb procedures to the north to determine whether this would reduce the impacts of aircraft noise on residents.

"Following a review of the data from the noise and flight path monitoring system at the airport, and most importantly after hearing the views of the community on the benefits of the trial, SACF recommended to me that the steeper climb procedures should become a permanent feature of take-offs over land," Mr Vaile said.

"In view of the strong community support, for the steeper climb procedures, the Government will be moving to make this a requirement for all aircraft departing the airport to the north off the parallels.

"This is a victory for the Federal Member for Wentworth, the Hon Andrew Thomson MP, who has been a strong supporter of the steeper take-offs on behalf of his constituents.

'The use of steeper take-offs from the main runway will also be welcome news to the people in the electorate of Lowe. Robert Lee, the Liberal candidate for the seat of Lowe has made strong representations to me about community support for introducing this requirement for all aircraft."

"We will also be working with the industry and the community to the east and west of the airport to determine whether there would be benefits for them in introducing such procedures off the east-west runway," the Minister said.

"ICAO A" procedures involve steeper climbs and a delayed reduction in power setting which ensures that the jets reach higher altitudes before over-flying homes close to the airport.

SYDNEY MODE 9 DEPARTURES 34L, 34R ARRIVALS 34L, 34R

RP 95/514.3a
November 1995

Built-up-area (1993)

0 km

Note: Tracks shown are indicative

Scale approx

DEPARTURES

Jet track

Non-Jet track

Dual track

ARRIVALS

Jet track

Non-Jet track

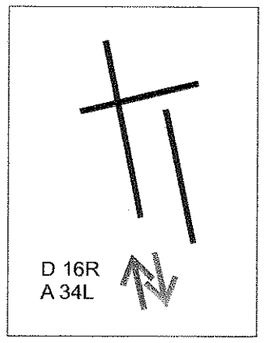
Dual track

A

Tabled by SACF at aircraft noise inquiry hearing in Sydney on 28 May 2013

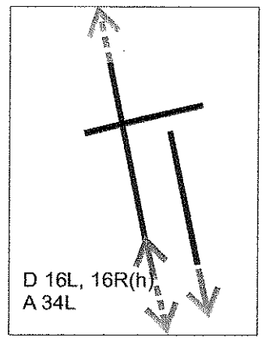
Runway Modes of Operation

Mode 1 - Curfew



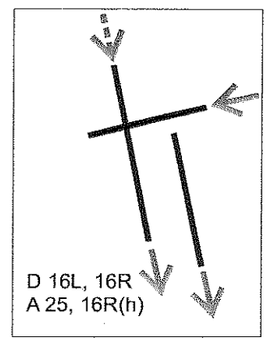
Departures to South
Arrivals from South

Sodprops



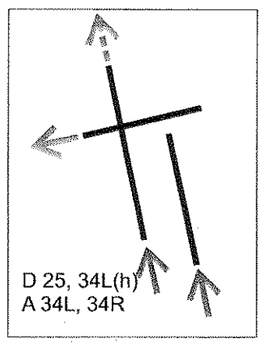
Departures to South
Arrivals from South

Mode 5



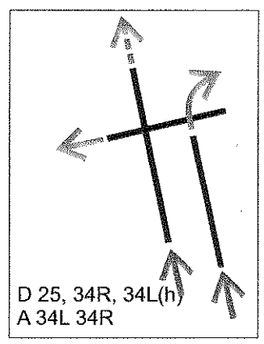
Departures to South
Arrivals from East

Mode 7



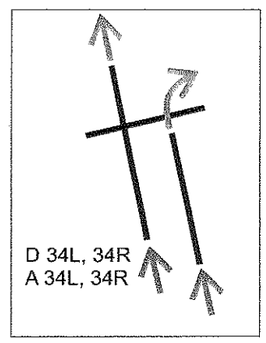
Departures to West
Arrivals from South

Mode 8



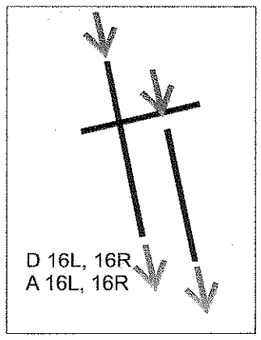
Departures to West,
East & North East
Arrivals from South

Mode 9



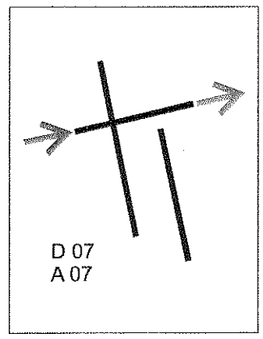
Departures to North & East
Arrivals from South

Mode 10



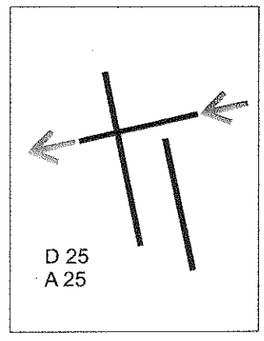
Departures to South
Arrivals from North

Mode 12



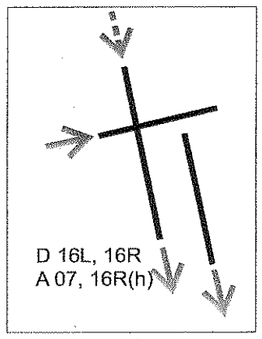
Departures to East
Arrivals from West

Mode 13



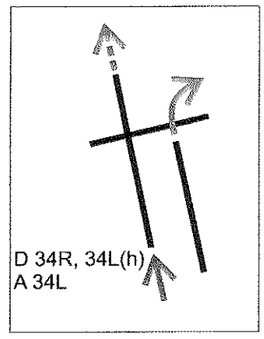
Departures to West
Arrivals from East

Mode 14a



Departures to South
Arrivals from West

Mode 15



Departures to East
Arrivals from South

Departure

Long Haul (h) Departure

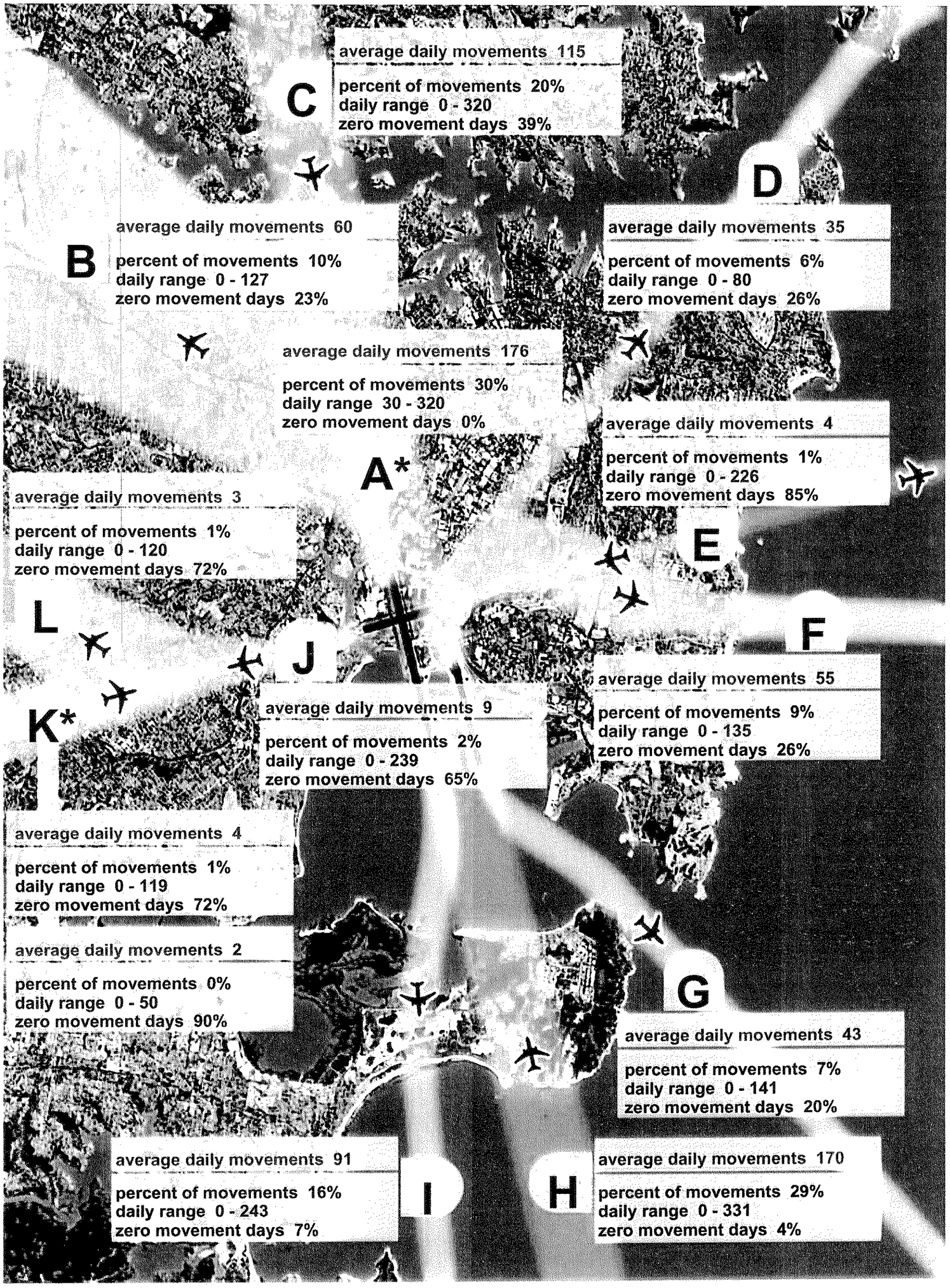
Arrival

Long Haul (h) Arrival

Source: Airservices Australia Sydney Airport Operational Statistics

Sydney Airport : Jet Flight Path Movements

1 Jan 2009 to 31 Dec 2009, All Jets



Note : Track A is Tracks B and C combined. Track K* shows departures (top box) and arrivals (bottom box).*

JET ARRIVALS
Internationals
from the North
Runway 34 Left
2009 February

Widths of Corridors are accurate but locations are only indicative

Data Source:
Airservices Australia
only for the use of SACF

BEROW
VILS
ENTL
MAJAR
ZONKA
DIPPA
QUDOK
NASHO
JAKLN

Berowra
Mackellar
Mitchell
Bradfield
Warringah
Parramatta
Bennelong
North Sydney
Reid
Lowe
Sydney
Wentworth
Blaxland
Grayndler
Watson
Barton
Kingsford Smith
Banks
Hughes
Cook

6 km to 8 km (shown) corridor prior to 2003 Envt Assessment

Current concentration less than 200 metres

1.1 km to 1.6 km (shown) corridor predicted by 2003 Airservices Environmental Assessment

2009-09-24 19:30

Environmental Analysis

Aircraft Noise should be measured cumulatively.

A single event noise measure is misleading.

The aviation industry has been managing its environmental impacts for many years, and aircraft noise is regularly raised in public debate about the operation and expansion of airports. Aviation's contribution to greenhouse gas emissions, although small when compared to others, is anticipated to grow. Environmentally sound decision-making is therefore critical to the long-term development of the industry.

More broadly, Australia has committed to working on climate change issues. In January 2006, Australia, China, India, Japan, Republic of Korea and the United States launched the Asia Pacific Partnership on Clean Development and Climate (AP6) and in December 2007 Australia became a signatory to the Kyoto Protocol to the United Nations Framework Convention on Climate Change. Airservices' partnership with the FAA and Airways New Zealand in ASPIRE is part of this commitment.

The aviation industry has responded to the issue of emissions with the International Air Transport Association (IATA) and ICAO specifically encouraging the implementation of new ATM practices and technologies in the management of aviation's environmental impacts.

Carbon Dioxide (CO_2)

Every kilogram of fuel saved saves just over three kilograms of CO_2 emissions. By comparing airline fuel consumption data with airport movement records, it has been possible to determine, with a high degree of confidence, that Stage One of Brisbane Green has saved more than 650,000 kg of CO_2 emissions.

This estimate has been based upon the ICAO recommended methodology for converting minutes of flight to CO_2 emissions. Further analysis is underway and based on actual fuel usage it indicates that for some approaches the emissions savings may be considerably higher.

But this is the beginning. This remarkable result has been achieved by just 33 aircraft in 12 months of operations. It is expected that Stage Two will significantly improve on this result with the phased inclusion of more participant aircraft over the coming 12 months.

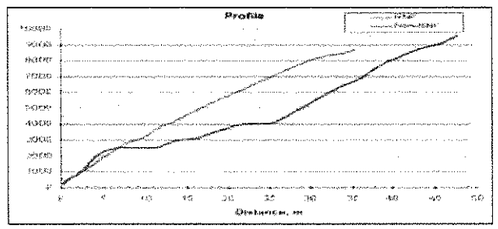
Nitrous Oxide (NOx)

Nitrous Oxide is the third largest greenhouse gas contributor to overall global warming, behind carbon dioxide and methane. Nitrous Oxide emissions by jet aircraft are correlated to the thrust produced by the engine. An approach without level flight segments, that does not require additional thrust to maintain an altitude during the approach, can minimise the production of NOx.

Level segments have traditionally been used to allow aircraft to lose speed, intercept the instrument approach, sequence flows to the runway or facilitate vertical segregation of routes. RNP procedures offer alternative means to achieve these goals, while providing a CDA from high-altitude cruise to the runway.

FIGURE 4 depicts actual data for an RNP and Non-RNP approach in Brisbane within 15mins Actual Time of Arrival (ATA).

FIGURE 4.



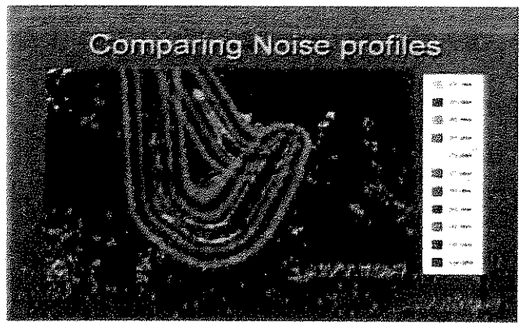
In general terms this data supports our expectation that NOx will be significantly reduced through the introduction of RNP. Stage Two of the project will see the capture and analysis of further detailed data.

Noise

Aircraft noise has been a major focus in Australia and elsewhere in the world, particularly since the development of commercial jet aircraft. Technological developments in the last 40 years have significantly reduced the noise impact from aircraft on communities in the vicinity of airports. In that time perceived noise from individual aircraft has been reduced by a factor of four.

The introduction of stricter Chapter 4 noise requirements in January 2006 have made little, if any, difference to the noise levels around Australian airports due to the modern domestic fleet, most of which were already meeting the Chapter 4 standards. As a result, noise impacts around major Australian airports have been found to increase largely proportional to air traffic increases. Improved ATM techniques will be pivotal in managing noise in the short to medium term.

FIGURE 5.



Noise footprints for the RNP procedures were estimated by AVTECH, Sweden AB (FIGURE 5). This indicated that the 70 dB and 75 dB footprints would be significantly reduced in size, and the accuracy of the RNP design allowed the procedure to be placed over non-residential areas, such as the Brisbane River.

FIGURE 6 shows the flight paths for RNP (green) and Non-RNP (red) aircraft approaching Brisbane runway 01 via the "River" noise abatement procedure. The RNP path ensures that the low level final approach is conducted over the river and industrial areas.

FIGURE 6.

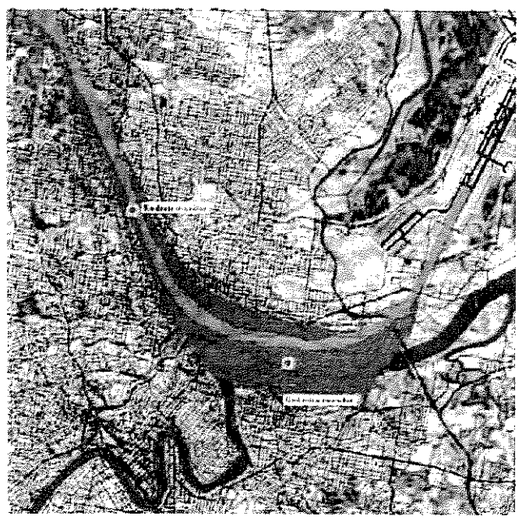
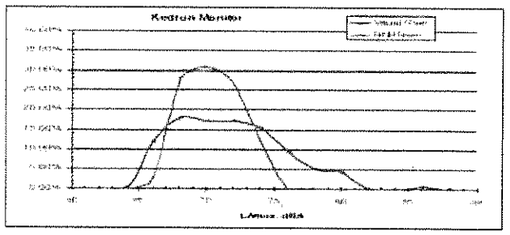


FIGURE 7 demonstrates lower noise levels for RNP flights at the Kedron noise monitor indicating that these aircraft are at higher altitude than typically flown during a visual approach. This shows that very few RNP flights generated noise above 75dB at Kedron.

FIGURE 7.



Noise forecasts for RNP and conventional approaches (FIGURE 5) have been validated using noise monitors at Kedron and Bulimba (FIGURE 6) and other locations.

FINDINGS

1. RNP approach and departure procedures provide practical means to reduce CO_2, NOx and noise emissions.
2. The Brisbane Green Project has saved 650,000 kg of CO_2 emissions in the first year alone.
3. Expectations of reduced NOx emission levels are supported by experience of uninterrupted CDA during RNP approaches.
4. The flexibility and accuracy of RNP operations allows for noise footprints to be placed over non-residential areas.

noise inquiry in Sydney on 28 may 2010.

AIRSERVICES AUSTRALIA

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Facsimile: +61 2 6268 4233
ABN 59 698 720 886

BY EMAIL
john.clarke@ugllimited.com

Mr John Clarke
Community Representative
Implementation Monitoring Committee

Dear Mr Clarke

I write to inform about future arrangements regarding attendance at Implementation Monitoring Committee (IMC) and the provision of data.

As you may be aware, Airservices Australia is accountable to the Minister for Infrastructure, Transport, Regional Development and Local Government for the convening of the Long Term Operating Plan (LTOP) IMC. Mr Tony Williams will no longer be permitted to attend IMC meetings or be afforded access to Airservices' data, effective immediately.

To assist the Sydney Airport Community Forum (SACF), Airservices Australia has willingly provided access for and to Mr Williams in his capacity as Aviation Community Advocate (ACA) to the Sydney Airport Community Forum. However, the Government has decided to not renew the ACA contract and as such it is inappropriate for Mr Williams to attend IMC meetings or to be provided with Airservices' data.

Please note that Airservices will not provide the data requested by you, just as such data would not be provided to any other SACF or IMC member. As we have done before and after the establishment of the ACA role, Airservices will continue to provide dedicated services as a strategic adviser to SACF, including the provision of appropriate information and service requested by SACF. Issues raised in IMC will also continue to be investigated and reported back as appropriate.

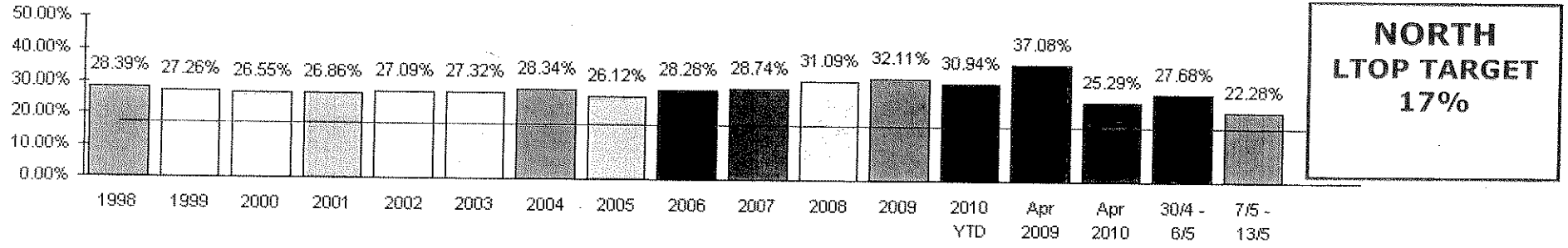
Yours sincerely

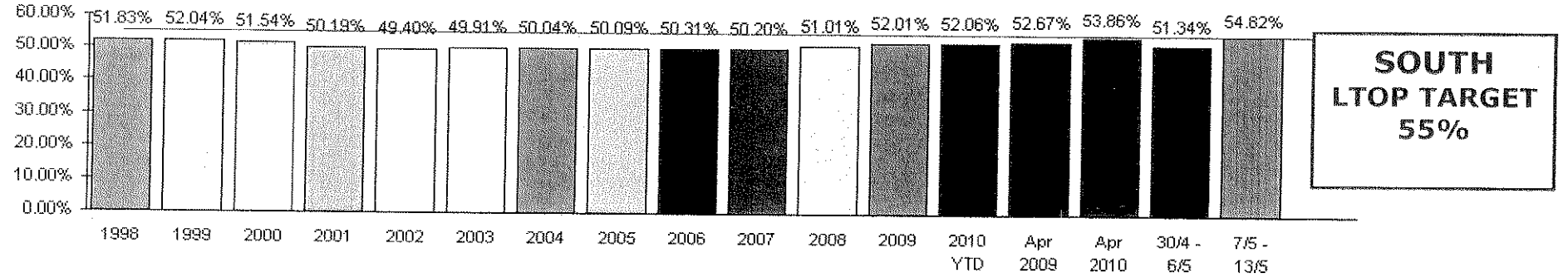
Richard Dudley
General Manager
Corporate & International Affairs

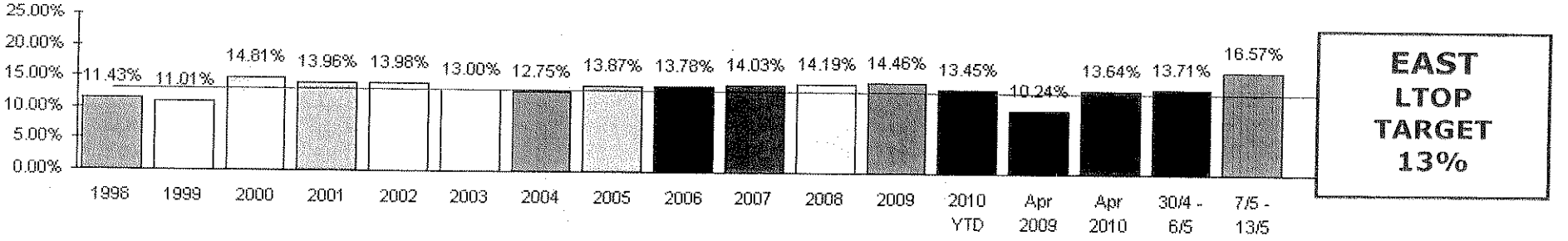
6 May 2010

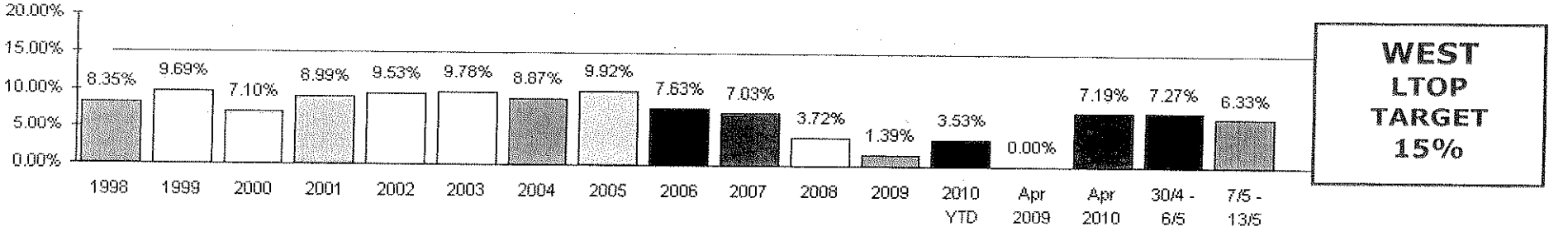
Tabled by SACT at aircraft noise hearing in Sydney on 28 may 2010

Runway End Impact
Includes comparisons with annual figures for 1998 to 2009, 2010 Year to Date, current month this year and corresponding month last year.







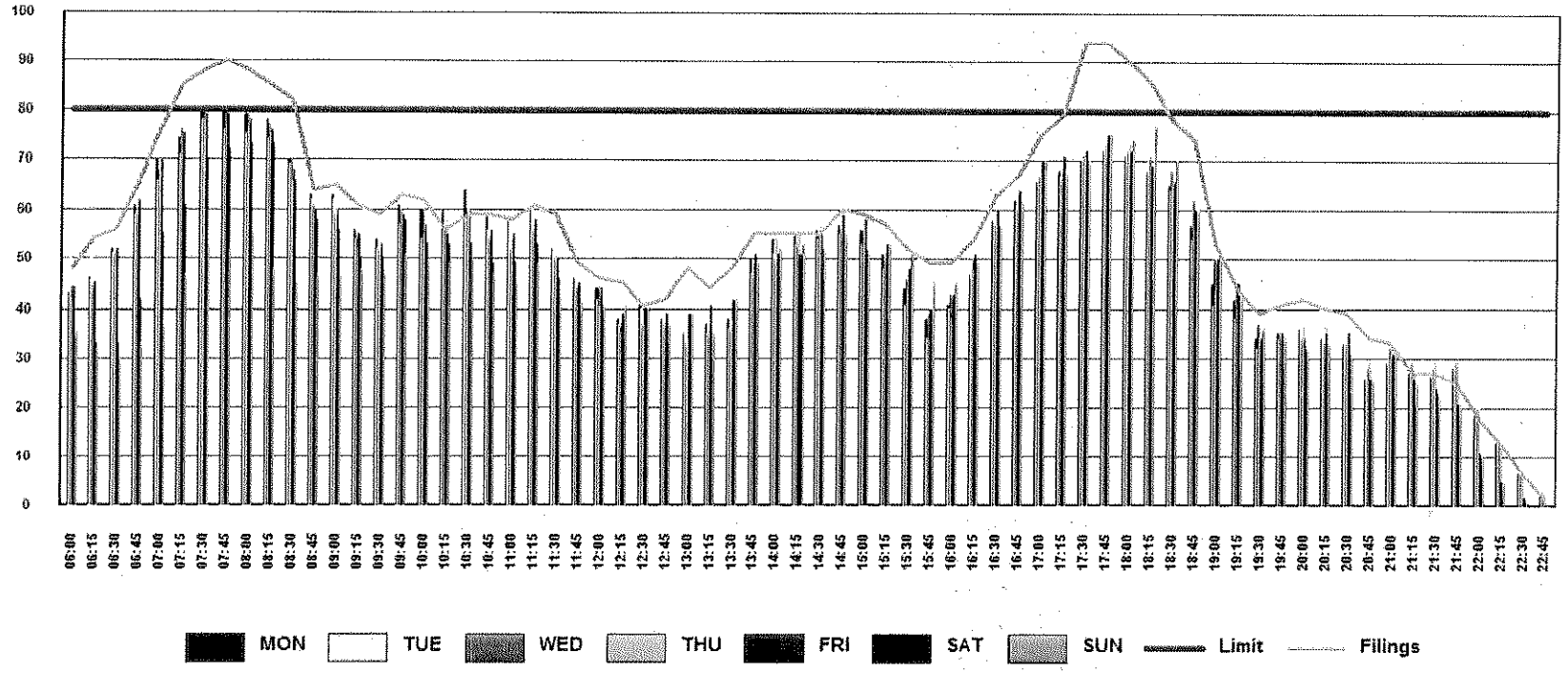


Tabled by AA at Sydney hearing on 28/5/10
re aircraft noise hearing

SYDNEY AIRPORT

Max.Runway Movements per Moving Hour

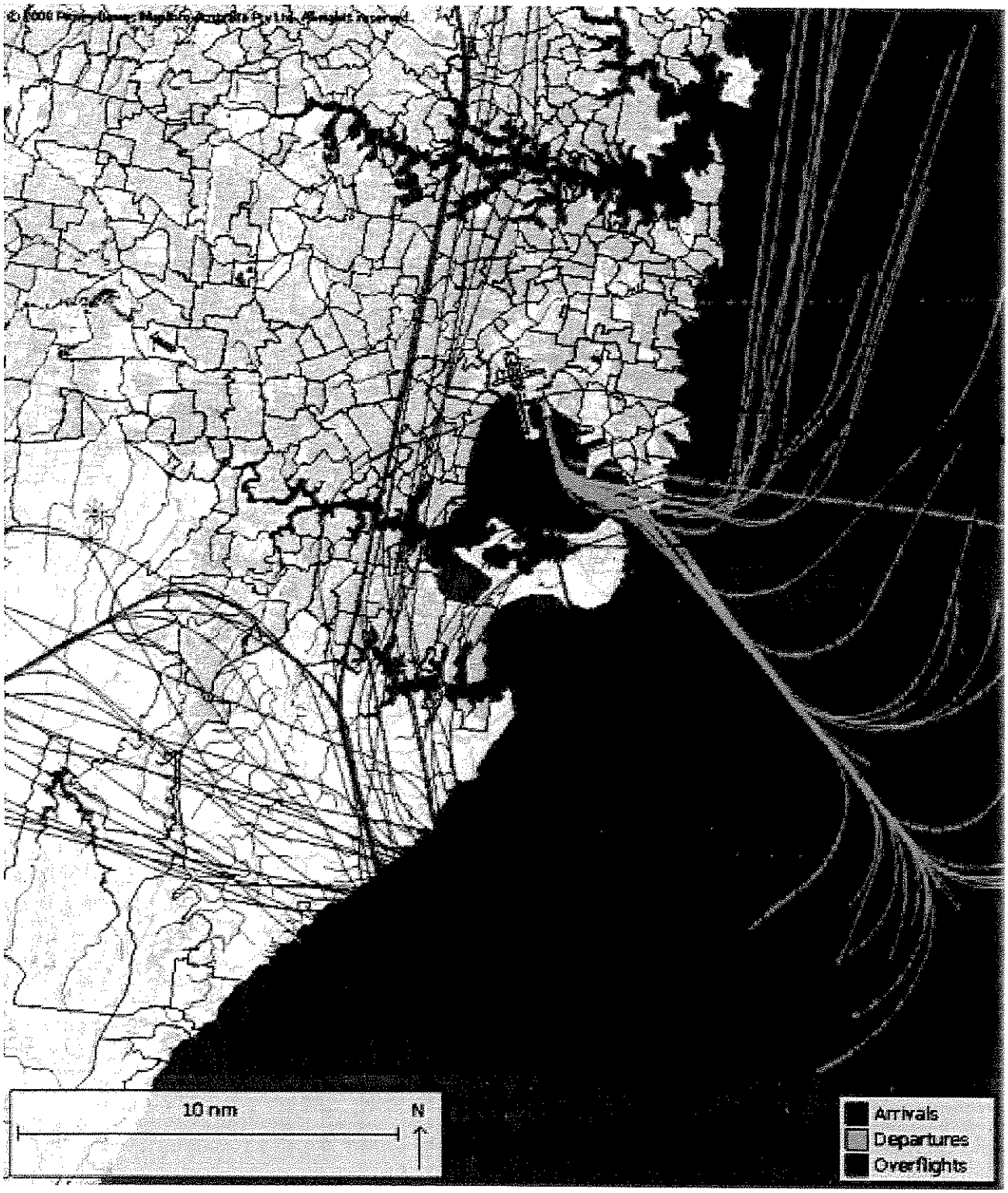
S10 April - October 2010 (August Sample Week)

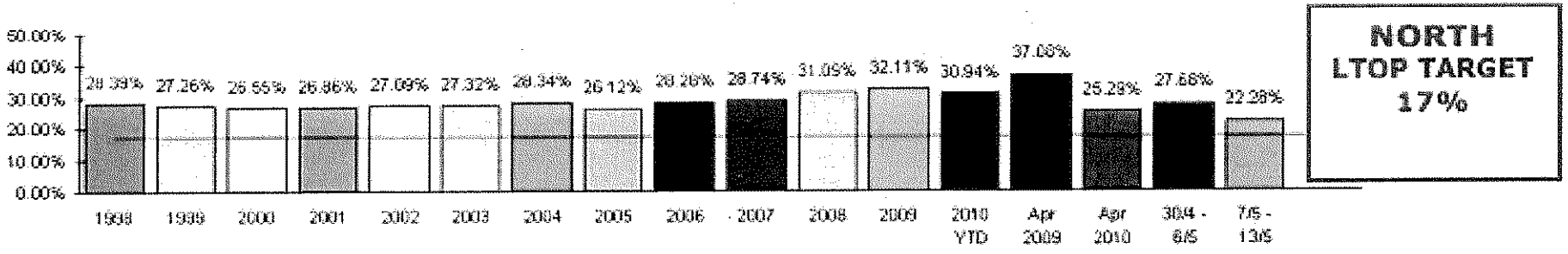


Excluding Protected services
Updated: May 2010

SODPROPS

Sydney Airport

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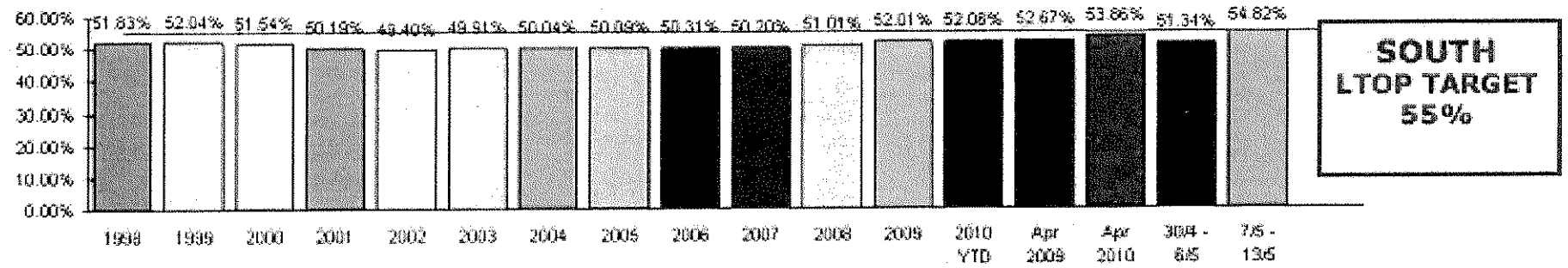
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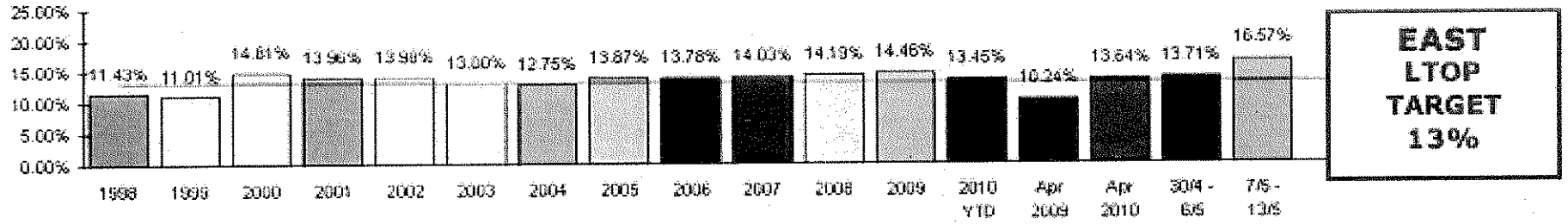
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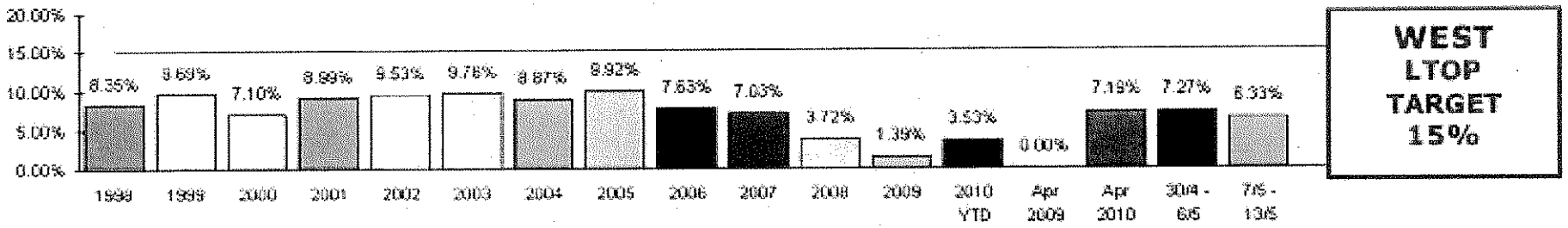
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