

THE WAY FORWARD FOR AIRCRAFT NOISE SHARING  
AT SYDNEY (Kingsford Smith) AIRPORT

***-THE SACF Inc REVIEW OF LTOP 1997-2003***

EXTENDED EXECUTIVE SUMMARY

***SYDNEY AIRPORT COMMUNITY FORUM INC (C) 2003***

**Convening Editor: Philip S. Lingard**

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***ANOTHER PAPER PRODUCED BY SACF Inc TO ASSIST WIDE-SPREAD  
COMMUNITY DEBATE ON THE PERFORMANCE OF THE  
GOVERNMENT'S "FAIR-SHARE" NOISE PLAN [LTOP]  
AND FLIGHT PATH AFFECTATION UNDER SYDNEY AIRPORT'S MASTER PLAN***

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THE WAY FORWARD FOR AIRCRAFT NOISE SHARING  
AT SYDNEY (Kingsford Smith) AIRPORT  
- *The SACF Inc REVIEW OF LTOP 1997-2003*

*SYDNEY AIRPORT COMMUNITY FORUM INC (c) 2003*

**FOREWORD & EXTENDED EXECUTIVE SUMMARY**

***Foreword:***

This is the second major position paper from Sydney Airport Community Forum Incorporated<sup>#1</sup> (SACF Inc) . SACF Inc is an open forum representing airport community groups across the whole of the greater Sydney region from Randwick to the Blue Mountains, and from Hornsby to Sydney's south-west extremities (see Appendix A). It is representative of both the 'old' and 'newly' affected communities, in terms of existing and proposed airport operating plans. SACF Inc was established in August 1998 as a result of an initiative by founding convenor, Paul Zammit, the former MP for the Federal Seat of Lowe.

Paul Zammit realised shortly after introduction of the Long Term Operating Plan for Sydney (Kingsford Smith) Airport [LTOP] that, far from realising the pre-election liberal 'dream' of an airport and air-space management plan based on "putting people first" , the newly conceived LTOP was in many respects as community unfriendly and ill-advised as the preceding Labor government's Nov. 1994 opening of the Third Runway with a totally flawed EIS.

He also quickly realised that the LTOP, instead of maximising movements over water as promised, was implementing exactly the opposite scenario. He protested, was ignored, and as history will record, resigned from the Liberal Party. In the closing stages of his tenure as MP for Lowe, Paul had the vision of inaugurating a non-party political community forum, comprised of representatives of aircraft noise and airport-concerned community groups across the whole of the Sydney Basin.

Paul's vision was for an open [non-gerrymandered] community forum chaired by a retired judge, which would attempt to achieve outcomes putting the human environment of Sydney first, refusing to be influenced by short term political party games involving environmental trade-offs among electorates. Although Paul, following his failure to gain re-election as an independent for the seat of Lowe in December 1998, retired from active participation in SACF Inc., its founding community group representatives have endeavoured to keep the inaugural spirit alive. The objectives of SACF Inc are stated in Appendix A.

After nearly five years of following the frustrating machinations of the Government appointed Sydney Airport Community Forum [SACF] , SACF Inc is still comprised of community group representatives and convenors whose main concern is to "depoliticise" <sup>#2</sup> the airport and aircraft noise debate and reintroduce consideration of the human environment both in respect to development of airport operating plans and the new and/or second airport debate.

Since its inception, SACF Inc has carefully followed the proceedings of the government forum (SACF), and has made a deep and lengthy study of the LTOP. This paper was inspired by repeated calls from early 1999 by the Government's own forum [SACF] for an independent audit of the LTOP to ascertain why the plan was not meeting its "movement targets". The Government SACF LTOP audit has still not commenced. This present *SACF Inc Review* began in early 2001 and, though awhile in gestation, has in its final stages been coincidentally produced against the background of the production of the Sydney Airport Corporation Limited [SACL] airport master plan.

<sup>1</sup>

The first was "The Way Forward from Sydney's Airports Quagmire" , which appeared in July 1999.

<sup>2</sup>

Whilst political parties are invited to have a representative on SACF Inc for the purpose of consultation and for putting that political party's position, these representatives cannot vote or have membership on the Executive Committee of SACF Inc.

## 1. INTRODUCTION

The objectives of the present paper are to examine the impacts and outcomes of the federal government's Long Term Operating Plan [LTOP] against its stated goals. Whilst supporting in principle the concept of "Maximising movements over water" and "sharing noise" and other detriments of airport activity from the various Sydney airports, SACF Inc says that, where detriment is absolutely essential, the guiding principal should be that the human environmental interest should be put first.

SACF Inc agrees with the *stated aims* of the Government "Noise Share Plan", ie. "putting people first", but as will become apparent, disagrees in several major ways with the methodology and detail of its implementation, and resultant outcomes. LTOP has for some years now been increasingly failing to achieve its stated goals of maximising aircraft movements over water, and reducing the movements to the north of the airport to a runway end target of 17% . There is uncritical acceptance by the Government Forum [SACF] that the maximum over water movements proportion that can ever be achieved is 55% (projected to reduce to 49% with Master Plan movement increases by 2024) .

These failures increase air traffic complexity over Greater Sydney, in turn increasing both air pollution, noise, and third party crash damage risk. Since 1999, the government forum (SACF) has been requesting the Transport Minister to approve an independent audit of LTOP to ascertain why the LTOP plan is not achieving its goals, ie. movements to the north still double the 17% target by 2002, and movements over residents projected to treble by 2023 under Sydney Airport's "Master Plan"!

The Minister for Transport , however, persists in insisting that LTOP has succeeded, that the noise problem has been solved, and that it could be a waste of taxpayer's money to fund an independent review. There appears to have been excessive concern by government to avoid interfering with the sale process for Sydney Airport, which was first predicated on the promise of "no sale before the 'noise' problem had been solved."

SACF Inc believes that the "noise" ( and not so prominently considered air pollution) problems from aircraft movements over Sydney have not been solved by LTOP. In this position it is supported by numerous resolutions from the government's appointed forum of similar name [SACF] . SACF Inc further says that the reasons for the failure of LTOP to "*solve the noise problem*" are manifold but not inherently difficult to discover and fix.

It also believes that by failing to implement LTOP according to its Ministerial Directives , the Government-appointed SACF, the Implementation and Monitoring Committee [IMC], the Department of Transport and Airservices Australia have introduced elements into LTOP which constitute profound public danger.

This is due to the vastly increased third party damage risk from departing jets should they crash when taking off overland . This risk could be almost entirely avoided by full implementation of the primary LTOP principle of maximising movements (and principally takeoffs) over water. Moreover, as will be shown , there has been no independent review by CASA of the safety of the LTOP flight tracks, nor was the "Safety Review Committee" ever constituted, both promised in the LTOP Proponent's Statement of 1996. This state of affairs cannot be permitted to continue.

This Document offers many viable and practical solutions. However, it necessarily covers several topics from different standpoints, and at varying technical depths, from which the essential recommendations converge . There is therefore some unavoidable repetition of Recommendations in this summary, of which we trust the reader will be forbearing. The principal repeating recommendation is for movements over Botany Bay to be truly maximised as Ministerially promised through fullest possible use of the over-water LTOP Modes 2 & 3 , ie. Simultaneous Opposite Direction (Segregated) Parallel Runway Operations ( SODPROPs).

Herewith are the major findings of this report. :

**EXECUTIVE OVERVIEW AND SUMMARY:**

**2. EXECUTIVE OVERVIEW -**

- 2.1 The so-called Long Term Operating Plan for Sydney (Kingsford Smith) Airport (hereafter KSA) has persistently failed to meet its compass-direction movement targets of 17% north, and 55% over water. More movements (including most departures) now take place over residential areas than ever before.
- 2.2 The LTOP has produced a system of aviation anarchy in the skies over Sydney.
- 2.3 Many interested parties have contributed to this fundamentally unsafe system where there are dangerously criss-crossing flight paths with artificial overland altitude ceilings for departing jets.

The parties involved include, Bureaucrats with the Department of Transport, the Civil Aviation Safety Authority, The Bureau of Air Safety Investigation, Airservices Australia, The Royal Australian Airforce, the Government's own Sydney Airport Community Forum, its IMC, and politicians of all political persuasion who have been complicit in the planning and introduction of LTOP.
- 2.4 The perverse effect of LTOP since its inception in 1997 has been to increase the proportion of heavily laden jet departures over heavily populated areas to the north, east and west from 29% to 50% whilst decreasing takeoffs over water from 65% to 50%.
- 2.5 The per person affectation for the northerly takeoff modes under LTOP is fifty times the affectation for comparable takeoffs using the over-water modes.
- 2.6 Military Airforce Exclusion Zones [PRD's] appear responsible in some measure for the extremely low ceiling heights on takeoff. Together with Airservices refusal to implement the originally promised offshore (wide ) arrival routes , they cause both unwarranted noise and further create dangerous criss-crossing of arrival flights increasing likelihood of mid-air collision over heavily populated Sydney.
- 2.7 If no new and/or replacement international airport is to be built on the rim of the Sydney Basin it is recommended that all RAAF facilities impacting on the airspace around Sydney Airport (including Richmond and Williamtown if necessary) be removed so that Military airforce exclusion zones do not worsen the environmental impacts of operations at KSA. The original offshore arrival routes should be reinstated.
- 2.8 The current management puts KSA in breach of the LTOP commitment to implement International Civil Aviation Organisation [ICAO] "Noise Abatement Departure Procedures" "A" & "B" [ now "2" and "1"].
- 2.9 Simultaneous Opposite Direction Parallel Runway Operations (SODPROPs) should be used in segregated mode when weather conditions permit on the two parallel runways in different directions. To permit maximum utilisation of over-the-water modes using SODPROPs , Precision Radar Monitoring [PRM] and "Secondary Surveillance Radar" [SSR] should be employed continuously over Botany Bay.
- 2.10 The evidence shows that the LTOP promise of "fair and equitable" sharing of aircraft noise has not been implemented. In particular there has been a decrease in noise over unpopulated areas and water and increased noise over extensive heavily populated residential regions of greater Sydney, together with overwhelming evidence of politically determined flight paths.
- 2.11 Evidence is presented that community representation to determine flight paths is not based on affectation.
- 2.12 Current LTOP management does not allow rapid height attainment of jet aircraft after takeoff and there appears to be a deliberate policy of maintaining noisy large jets at low altitudes for long distances. ICAO -A [now 2] Noise Abatement operations should be enforced as originally mandated (but ignored by Airservices Australia at KSA) for all overland takeoffs .
- 2.13 Politicians should show due care for their constituents and insist on effective proper noise protection for the millions now affected around Sydney Airport. They should employ every means at their disposal to persuade Parliament to develop regulations under the Airservices Act (1995) for controlling the maximum noise impact from flying aircraft on underlying residential suburbs. Such controls should be consistent with the currently recommended standards for architectural acoustic design of residential homes in Australian Standard AS 2021-2000, and preferably also comply with recently promulgated World Health Organisation [WHO] recommendations for residential areas and/or with the New South Wales Noise Policy for residential areas near industrial sites.

## **EXECUTIVE SUMMARY IN DETAIL**

### **3. COMPARISON OF LTOP AS IMPLEMENTED WITH LTOP AS CONCEIVED**

*[Refer Section 3 of Main Text]*

#### **3.1 IMPLEMENTATION OF THE MODES:**

The evidence shows that the present LTOP Mode implementation minimises movements over water, and maximises movements, departures and people affectation overland. This is contrary to the primary LTOP Principle and Ministerial Directive. *[See Summary Figure A].*

#### **3.2 TURNING AROUND THE AIRPORT:**

The present implementation of LTOP has "turned around the airport" from the standpoint of the prevalence of departing noisy, maximally fuel-laden, jets over land. *[See Summary Figure B].*

#### **3.3 "PER-PERSON AFFECTATION" - AN EVALUATION OF THE MODES -**

The evidence shows that the per - person affectation by noise from overflying aircraft has been maximised by LTOP as presently implemented. Rather than maximising movements over water and non-residential land which were primary LTOP principles, exactly the opposite result has been achieved. *[See Summary Figure C]*

#### **3.4 THE BOTANY BAY MODES [SODPROPS MODES 2 AND 3]**

In this submission, and though not included in LTOP as finally implemented, the Botany Bay Modes 2 & 3 quite clearly provide the optimum opportunity for Airservices Australia to achieve the primary LTOP goal of maximising movements over water. It is shown that unfortunately the LTOP consultation process was hi-jacked from its inception to ensure these essential features of the plan could not be implemented. So-called "SODPROPS" Mode 4 as adopted is inherently unsafe and operationally problematic. *[See Summary Figure D]*

### **4. THE DEFICIENCIES OF LTOP WITH REFERENCE TO STATED OBJECTIVES**

*[Refer Section 4 of Main Text]*

Major Design and Planning Flaws with LTOP and its implementation identified in this review include:

#### **4.1 DEFICIENCIES OF THE FOUR-POINT COMPASS TARGET GOAL**

An important factor in early misdirection of LTOP was the simplistic "four -point-compass" runway end target used to measure success. This led to early corruption of the plan and the failure by the so-called "*LTOP Task-Force*" to properly identify the meaning of "equitable distribution" and "fairness". There is now apparent blind adherence to the fallacy that spreading noise and pollution nuisance without regard to the need for airspace modification is inherently "fair" *[S. 4.1]*.

The "four point compass" target fails to differentiate between effects over different geographic areas and the different environmental effects of takeoffs and landings, not to mention different times of day. *[S. 4.1].*

#### **4.2 FAILURE TO MAXIMISE OVER-THE-WATER MODES**

The failure to maximise movements over the water is key to the fundamental failure of LTOP overall, and the current decline of the process into one by which movements are becoming progressively more concentrated over land. *[S. 4.2; S. 6.3]*

#### **4.3 DEFECTS OF THE EXISTING APPROACH TO EQUITABLE SHARING**

Refusal to effectively address the concept of "equitable sharing" in quantitative terms *[S. 4.8]* resulted in no quantitative dosage system being developed to ensure that the resulting overland distribution of departing aircraft is actually "Equitable" or "Fair".

The "Australian Noise Exposure Forecast" [ ANEF ] was not intended for determining equity. ANEF is unsuitable for this because it lacks sufficient sensitivity for measuring impacts from flight tracks which are spatially separated. No principle has been devised by Airservices Australia to implement its obligation under the Airservices Act to ensure equity, and no attempt is made to minimise the environmental impact from the operation of overflying aircraft as required of Airservices Australia by the Airservices Act S. 9(2).

#### **4.4 INADEQUATE USE OF SPREADING**

The evidence shows that there is inadequate use of "Spreading" of flight paths over residential areas, when spreading can reduce the "per person -day" impact on residents, where flight paths must be directed overland for meteorological reasons *[S. 4.4]*.

The principle of flight track spreading, espoused in LTOP for arrival tracks from the north, and implemented to a token extent in departure tracks across the inner north west, is not universally applied. The evidence suggests that failure to implement spreading over certain areas to the east and north west may reflect political pressures. If so, this contradicts the originally stated principle of "putting people first."

If possible Airservices Australia should be directed to implement "spreading" without fear or favour, for the benefit of all Sydney Residents. Given that departing aircraft necessarily make more noise on the ground during takeoff than do arriving aircraft approaching on a "glide path", then spreading must be employed for departing aircraft too. But spreading without paying attention to the need for noise minimisation is pointless.

#### **4.5 FAILURE TO INCLUDE "NOISE MINIMISATION OBJECTIVES" IN TERMS**

No effective "noise minimisation" objective or principle was established by LTOP for aircraft flight paths, when the resulting movements must overfly residents [S. 4.5]. Consequently no attempt is made to minimise noise impact on the ground. The prevalent low-altitude turns close in to the airport, replacing the Ministerially Directed ICAO noise abatement procedures, render noise impact minimisation impracticable for suburbs from 3 - 10 km from KSA.

#### **4.6 FAILURE TO MONITOR RESULTS**

The history of LTOP reveals a refusal to monitor the noise impact effects on residential areas newly affected by noise as promised in the proponents statement and LTOP Reports [S. 4.6].

The Department of Transport has not fulfilled its obligation to monitor noise impact results over newly affected areas. Monitoring tends to be concentrated in areas of maximal representation on the Implementation and Monitoring Committee (IMC), or of the Government SACF. Only in early 2003 was noise monitoring offered to badly-affected residents of Summer Hill where effective annual ANEI have already reached 17 dB(A), and B 747 -400 noise averages 80 +/- 4 SD dB(A) outside.

#### **4.7 FAILURE TO INCLUDE PERSON-IMPACT NOISE METRIC IN FLIGHT PATH PLANNING**

No metric was proposed by the LTOP Task Force for accurately gauging residential noise impact in order to provide an objective system for ensuring equity of noise share. The absence of any "person-impact" metric in the plan for flight path spreading, prevents there being any assurance of "equity", "honesty" and "fairness" in the resulting noise sharing [S. 4.7].

#### **4.8 THE FAILURE OF THE COMPLAINTS LINE SYSTEM**

Community observations show that the complaints line system is being abused, not by the public, but by those politicians and bureaucrats who persist in the pretence that it offers a scientific and objective means of gauging public opinion.

The Airservices Noise Enquiry Unit [*The "Have Your Say", Line*] is not appropriate for honestly monitoring community response to a major infrastructure change such as LTOP. Where community response has been negative, the government and its community forum have responded by denial and public claims of "rorting" by those who persisted to complain in the naive belief that the line was there for the purpose of honestly reporting community feeling [S. 4.8]. In extreme cases there have been last resort calls for prosecution of those who make so-called "abusive" phone calls to the complaint line. This is an inappropriate response to nuisance-induced community distress.

#### **4.9 FAILURES OF MANAGEMENT AND APPROPRIATE REPRESENTATION**

The evidence shows that the community consultation for the LTOP implementation was carried out in bad faith by the deliberate exclusion from representation both on the Government SACF and the Implementation and Monitoring Committee of representatives from areas which have become newly affected under the plan. This breached both the Minister for the Environment's guidelines, in deciding to exempt the process from the need for an EIS, and also the fundamental principles of equity, "fair sharing" and "putting people first" upon which the "Fair Share Noise Plan" was purportedly based. This also resulted in the effective abandonment of the primary stated goal which was to maximise movements over water [S. 4.2].

#### **4.10 NO-RECIPROCITY PRINCIPLE ABANDONED:**

The principle of LTOP that wherever possible no area overflowed by landings should also be overflowed by departures has been totally ignored, except for residents within the north shore Bennelong Funnel. This means that there are now new areas of Sydney where there is no respite from the intrusion of Aircraft flyovers. These areas are spread as far apart as the inner north west, Coogee and The Hills.



## 5. SAFETY IMPLICATIONS AND DANGERS OF LTOP

[Refer Section 5 of Main Text]

This section reviews evidence which highlights a number of serious safety concerns with the design and implementation of LTOP including :

### 5.1 WORLDWIDE CRASH ACCIDENT RISK IN OVERVIEW

An analysis of crash accident statistics worldwide shows that the risk of non-ticket-payer and third party property damage is maximal for takeoffs overland and over residential areas . Furthermore, some aircraft types are more prone to crashing during takeoff than during landing.

Fully fuel-laden jet aircraft with up to 160 tonnes of Avgas on board potentially cause the greatest third party property and personal injury harm to both ticket payers and non-ticket payers alike. Overseas airports with close ocean access such as KSA employ that area as much as possible to relieve residential areas from unnecessary noise and risk [Eg. Amsterdam -Schiphol, Boston-Logan and San Francisco and Los Angeles].

#### 5.2.1 CRASH ACCIDENT RISK AND DUTY OF CARE AT KSA:

The present maximisation of departures overland by fully-fuelled long- to- medium haul jets, without regard for the aircraft crash-type propensity, and up to 160 tonnes of aviation fuel on board, significantly raises the third party damage risk for Sydney residents [S. 5.1 -5.3]. Because of the fuel-load factor, crashes over residential areas during takeoff are more likely to cause substantial harm to non-passengers and property (third parties) than crashes during landings. The LTOP Proponents Statement highlighted this component of reducing crash damage risk to residential areas.

The failure by the LTOP planners to maximise movements over water is thus a fundamental breach of their common law duty of care to Sydney residents [4.2, 5.2.2]. From a risk-management perspective, the current LTOP implementation is both contrary to the Ministerial Directive and the Proponents Statement because it maximises movements and departures overland.

This failure is the more damning when considered against the fact that Sydney Airport has no immediately surrounding overland "green fields" crash zone as recommended for airport design by ICAO.

The heavy fuel loads of departing long-medium -haul jets for airports in position of KSA should determine that over-the water takeoff options be employed whenever possible. This is not the case at present.

#### 5.2.2 LACK OF PROMISED CASA INVOLVEMENT IN LTOP SAFETY CASE REVIEW

The evidence shows that the Proponent Statement Recommendations for an independent CASA review of the safety of LTOP flight tracks have NOT been implemented. The LTOP Proponent Statement promised that there would be an independent safety review of the LTOP flight paths conducted by the Civil Aviation Safety Authority [CASA], together with the creation of an ongoing specialist LTOP Safety Review Committee .

The LTOP planners failed to ensure that an independent safety review of the LTOP flight paths was conducted by the Civil Aviation Safety Authority [CASA] as promised by the LTOP Proponents Statement ; and the promised Safety Review Committee has never been appointed and has not met. [S. 5.2.2]

### 5.3 SPECIFIC DANGERS INHERENT IN THE LTOP

Specific air-space Crash-Risk dangers identified in this study of the LTOP as currently operated include:

- 5.3.1 The "departures overflying regime" which maximises avoidable collision risk between departing and arriving aircraft over residential areas to the east and northwest. The Bureau of Air Safety Investigation agrees with this [S. 5.3.1] .
- 5.3.2 A "conflicting missed-approach" regime with northerly traffic flows due to the intersection of "missed approach" tracks for arrival go-arounds from runways 34L & R with turning departure tracks for aircraft leaving the same runways [S. 5.3.2].
- 5.3.3 Existing and potential increased future conflicts with Bankstown airspace, especially were jet overflow traffic to be diverted to Bankstown, or the proposed "Sydney West" airport were to be located at Badgerys Creek [S. 5.3.3].
- 5.3.4 The lack of the ICAO -recommended greenfields crash zone buffer for residential takeoffs from KSA [ S. 5.1.1] .

## 6 TOWARDS MORE EQUITABLE AIRSPACE MANAGEMENT

[Refer Section 6.1-6.2 of Main Text]

This section reviews existing Sydney Airspace and shows that there are several actual and/or potential problems which must be addressed :

### 6.1 OVERVIEW

Major issues with Sydney Airspace Planning causing adverse environmental impacts on Sydney Residents and highlighted in this review are:

- 6.1.1 The existence of the (arrival ) overflying ceilings for departing aircraft travelling north-west and -east.
- 6.1.2 Low altitude flying of jet departures across tens of kilometres of greater Sydney in Sydney Basin airspace [S. 5.3.1] .
- 6.1.3 Military "**Prohibited, Restricted and Danger**" [ie PRD] zones to the north west beyond Richmond, which could compromise altitude gain for departing aircraft heading north west on the Richmond track [See *The Richmond Wedge* , S. 6.2] . Offshore similar Military **PRDs** exist beyond about 12 nautical miles (n. mi) offshore, continuing thereafter at increasing altitude towards the 200 n. mi limit [S. 6.2]. However, it seems less likely that the latter might influence offshore arrivals using the originally-proposed LTOP patterns in Modes 7, 8 and 9 [S. 6.2] . See eg. PRD profile for Track V295 in the northwest -**Summary Figure F**.
- 6.1.4 The question as to whether LTOP Recommendation 31 has been implemented ie:  
*"That Airservices Australia and the Australian Military Forces enable implementation of the in principle agreements for changes to military airspace surrounding Sydney through the Air Coordinating Committee."*  
[LTOPSR p. 9 Rec. 31]
- 6.1.5 The fact that at numerous overseas airports with traffic flows and airspace complexity much greater than at KSA , departing jets take off much more steeply and are directed to achieve significantly greater altitudes before turning onto their designated corridor than at KSA. With comparatively miniscule traffic flows compared to the studied overseas examples, there is no logical reason for the extent of environmentally harmful low altitude overflying that is practiced at KSA. [S. 5.6; Appendix L].

### 6.2 EXISTING SYDNEY AIRSPACE

An exhaustive review of existing Sydney Airspace reveals several major design impediments preventing air-traffic control achieving "equity" in the distribution of overland departures in Modes 7, 8 & 9. First is the existence of a seriously low "departure ceiling" caused by overflying arriving aircraft in northerly traffic flows. [ S. 5.3.1 ] .

#### 6.2.1 THE DEPARTURE OVERFLYING PROBLEM

This departure "ceiling" prevents overland departing jet aircraft heading north , which include the heaviest, noisiest jets, achieving sufficient altitude quickly enough to ensure noise impact minimisation beyond 3 km from KSA - ie most of greater residential Sydney north west of the airport becomes impacted [S. 6.2] . A similar departure ceiling applies for aircraft taking off north and turning to the east along the Coogee -Maroubra tracks. [See **Summary Figure E**]

#### 6.2.2 MILITARY RESTRICTED AIRSPACE

The second airspace design impediment to be sorted out is the extent to which Military "Prohibited, Restricted and Danger" zones [PRDs] constrain current air-traffic movements around the greater Sydney area . PRDs potentially most affect altitude gain parameters for the Richmond Track to the north west , and may also affect the ability of arriving aircraft from north and south to track wide and high over the ocean in the approaches to Botany Bay, causing the current low "bunching" over residential areas, both west and to the northeast and east of the city. In the northwest the Richmond PRDs constitute a gigantic three dimensional trapezoidal wedge extending from 32 to 277 km from KSA with widths varying from 15 km (at Richmond) to 105km wide between 165 & 277 km from KSA. The Altitude of parts of this variable exclusion zone extends to 60,000 ft. [S. 6.2] [See **Summary Figure F**]

If LTOP Recommendation 31 (See 6.1.4 above) has not been followed then the solution to much overflying and low-altitude criss-crossing of the Sydney Basin might lie in its immediate implementation. However, no Airservices Officer with whom SACF Inc has discussed this issue has suggested (or admitted ) this obvious possible reason for the low altitude overflying.

### 6.2.3 PROFERRED IMPROVEMENTS TO AIR-SPACE PLANNING

The analysis of current Sydney airspace reveals inadequate airspace planning for the introduction of such a radical "noise share" plan as LTOP, and that much environmental impact harm could be reduced by the relatively simple airspace redesign. Improvements suggested in this review include [S. 6.2.7]:

- 6.2.3.1 If the military airspace PRD wedge issue prevents northwesterly departures achieving optimal altitude gain, then the north-west tracks should be diverted west at high altitude on the Katoomba Track, where there is no current military affectation, and after reaching a station sufficiently far west beyond the Richmond PRD wedge [See. S. 6.2.4] , should then be directed to turn north or north west towards their destination corridor [ S. 6.2.6] .
- 6.2.3.2 If there is no valid on- or off-shore military reason for the "departure ceilings" [discussed above] caused by overflying arriving aircraft in northerly traffic flows, then they should be eliminated by full implementation of the original LTOP "wide arrival" concept .

In northerly winds this proposed diverting northerly and southerly arrivals in "bee-lines" around the city **[from the north around the Hawkesbury Estuary and from the south across the Royal National Park]**, followed by southerly or northerly procession , respectively, in a 5 km offshore traverse until the final procedure turn positions are reached off the approaches to Botany Bay [S. 6.2.7] .

It is no excuse (as reported to the government forum ) to say that implementation of such improvements must be tied to the technically more complex "Trident." [S. 5.3.2]. Nor is it valid for Airservices Australia to claim that track mileage would be significantly increased, when the presently used alternative even more significantly increases track miles causing low altitude, high drag flying for the heaviest departing aircraft [S. 5.3.1] .

- 6.2.3.3 It is self-evident that if arriving aircraft executed the LTOP-recommended over-the-water procession at from 5 - 10 km off-shore, then there would be no requirement for the current artificial ceiling for departing aircraft. This is obvious from Figure. 4.4.1 during current Modes 7 , 8 & 9 operations. [See *Summary Figures "E" & "G"*]

Overland departing jets could then reach cruising altitude at optimal speed without interference from the ad-hoc crossing arrivals approaching KSA Centre as presently plague airport operations at KSA.

## 6.3 MAXIMISATION OF OVER WATER MOVEMENTS (Modes 2 & 3) :

[Refer Section 6.3 of Main Text]

In this section ways for effecting more "equitable" sharing for departures and arrivals over land are examined . We also analyse the myths and fallacies surrounding the use of Simultaneous Opposite Direction Parallel Runway Operations over Botany Bay [SODPROPs] - [S. 6.3] . It is surprising given the stated primary emphasis in LTOP of the need to "maximise movements over water", that so little effort was put into achieving this very goal . It is worrying to discover that statistical movement data being put out by Airservices Australia reveals ever decreasing percentages of movements over water from year to year . The *Sydney Airport Preliminary Draft Master Plan* proposes to reduce over water movements to 49% [from the LTOP target of 55%] by 2023, yet they have already reached peak depressions down to 45%. Can anything better be achieved?

### 6.3.1 Introduction - Radical Redesign of Sydney's Airspace

It has already been stated that we had received expert aviation opinion to the effect that up to 85% of movements at KSA could be operated over Botany Bay through Simultaneous Opposite Direction Parallel Runway Operations [ie SODPROPs] ! SACF Inc therefore set out in this Review to see if there was any truth in this prediction. The findings and recommendations from this analysis are summarised below:

The main priority for Airservices Australia is to implement the original mainstay of LTOP which was ostensibly to maximise movements over water [S. 6.1] . But for LTOP to be optimised in its originally stated spirit of "*putting people first*" there must also be a complete revisitation of the meaning of "fairness" in sharing.

Fairness must first come through application of flight control principles that minimise noise over residents. Then "equity" can be achieved through flight path spreading. There is no point in widely spreading the noise nuisance if everyone in Sydney is made insane. This objective requires radically redesign of Sydney airspace with a new aircraft movement management system . However, the primary objective should remain, **maximising movements over water.**

- 6.3.2 "Simultaneous Opposite Direction Parallel Runway Operations" [SODPROPs] The SODPROPs Modes 2, 3 & 4 are potentially available. First SODPROPs Mode 4 must be abandoned as being unsafe and impracticable for any reasonably typical traffic flows, because it involves simultaneous opposite direction landings and departures from the same runway. SODPROPs must be operated in segregated runway mode.

The only remaining SODPROPs modes (2 & 3) were rejected as being of insufficient capacity, inherently dangerous because of crossovers in the Bay area, or that they would impact on Cronulla and Sutherland.

An examination of the air-traffic control principles involved in implementing these currently unused SODPROPs modes was carried out using current ICAO Rules and the Australian Instructions to Pilots [AIP] for simultaneous, independent, and segregated parallel runways operations. [S. 6.3]

As independent segregated operations, Modes 2 and 3 require the availability of Secondary Surveillance Radar and/or Precision Runway Radar Monitoring [PRM]. Such radars were not, apparently, installed or available at the time of preparation of the original LTOP reports by SABRE Decision Technologies and Airservices Australia at Sydney Kingsford Smith in the Spring of 1996. They are available now.

Obstacles to the use of SODPROPs Modes 2 & 3 raised in the original LTOP Reports are found to be without foundation. For example, adequate vertical separations of around 2000 feet can readily be maintained between crossing arrival and departure traffic streams over Kurnell / Wanda for either of Modes 2 or 3 at the arrival/departure crossover point. This is better than current separations being achieved between arrivals and departures affected by the "ceilings" to the east and northwest. [See SUMMARY FIGURE "H"]

- 6.3.3 Operational Capacity of Modes 2 & 3

The application of current ATC rules (ICAO and AIP) using common sense and assuming typical mixed aircraft-type approach and departure patterns provides greater estimates of movement capacity than forecast in the LTOP Reports. The analysis shows that Modes 2 & 3 are not the low-capacity modes, suitable only for off-peak periods projected in the 1996 LTOP Reports.

Rather, they appear capable of far greater use than originally considered. The current only-used SODPROPs Mode 4 is a low capacity mode due to its use of the same north-south runway for opposite direction arrivals and departures - which creates significant operational problems. [S. 6.3.1.8 - 9]. SODPROPs must be implemented through fully segregated operations.

Re-analysis of historically available wind-direction data shows that, rather than these modes only being available in off-peak hours (from 40-60% of the time), SODPROPs Modes 2 & 3 could be potentially available for from 73 to 94.5% of the time depending on which "downwind noise abatement" criterion is selected.

Reinstatement of the "noise abatement downwind" condition, which was abolished by LTOP [LTOP Recommendation 3], to one giving preference to the interests of the majority of Sydney's landside residents is crucial to maximising movements over water.

SODPROPs Modes 2 & 3, are potentially available in a far greater range of weather conditions if the five (5) knot "down-wind" condition is used to facilitate noise abatement *preferentially over land* [from 73 - 82% of time]. With a downwind noise abatement condition of ten (10) knots, as currently practiced at Brisbane airport, then the available wind conditions suitable for SODPROPs operations would increase to 86 - 94% of time.

With typical average operational aircraft traffic mixes [ 10% long haul; 90% medium-regional jet] an arrival capacity of nearly 44 per hour and departure capacities between 30 and 55 per hour is found to be theoretically sustainable depending on the outgoing flight trajectory. [See SUMMARY FIGURE "I"]

- 6.3.4 Cronulla, Sutherland and Kurnell:

It is further found that neither Cronulla nor Sutherland need be adversely affected by the implementation of maximal SODPROPs operations, whether by departures or arrivals, provided proper arrival and departure path disciplines are observed. Similarly, Kurnell Village should be only marginally affected by side line noise from landings to runway 34L in Mode 3, although it will continue to be affected by arrival overflights at around 1000 ft at its western end with the implementation of Mode 2. Takeoffs from Runway 16L will turn left over Botany Heads rather than impact on Kurnell, and takeoffs from Runway 16R will continue substantially as they do now, but rise to possibly higher altitudes before crossing Wanda.

6.3.5 Conclusion as to SODPROPs:

Given the indisputable environmental and risk minimisation advantages of SODPROPs for all of Sydney, it is recommended that Airservices Australia, or some competent airspace management consultant be immediately contracted to draw up plans for optimising these over-the-water modes, for maximum possible exploitation in all weather conditions at Sydney Kingsford Smith Airport.

6.4 QUANTITATIVE MEASURES:

[Refer Section 6.4 of Main Text & Appendix H]

It is shown that to make noise sharing equitable, a quantitative measure of its geographic distribution must be selected. This metric must be based on noise impact dose per census unit of population by radial station from KSA. Such a metric must be followed by the development of air-traffic control directional sequencing system to ensure the distribution of a fair and equal dose [S. 6.4].

6.5 TIME- AND SPATIALLY-SEQUENCED OVERLAND DEPARTURES:

[Refer Section 6.5 of Main Text]

This proposal deals with any aircraft movements not accommodated using over-the-water SODPROPs modes - Those which for reasons of prevailing wind cannot avoid being sent overland.

With present airspace arrangements, extensive overflying of departures by arrivals occurs in northerly winds. There is also the uncertainty created by the existence of Military Prohibited, Restricted and Danger zones (PRDs) in the Richmond triangle. As seen above, this overflying appears to prevent departing jets gaining cruising altitude at optimum speed across Sydney's residential hinterland. Together it appears these cause a seemingly endless low-overflying of the Sydney hinterland by arrivals prior to landing.

These effects are produced by the practice of bringing arriving aircraft in to fixed near-airport "vectoring points" from which they are instructed to land either from the north or across Botany Bay. This creates the present "dogs-breakfast" of intersecting departure and arrival tracks.

A new, "catherine-wheel"-like, "departure time-sequenced", overland takeoff management system is proposed. Two great "roundabouts" in the sky would be employed. Coupled with steep noise-abatement climbs, the system would optimally and impartially implement "spreading" of departing aircraft noise across residential areas beyond 3-4 km from the airport.

In this proposal each successive departing aircraft uses a separate radial track (each with a different compass bearing). This ensures minimal repeated noise impact on the ground. The departure heading or bearing is programmed to rotate. Departing aircraft always proceed above the arrival level, and the "arrival roundabout" is situated below that used for departures.

The "**Catherine-Wheel**" proposal is a more disciplined approach to flight path spreading than presently used. The system involves arriving and departing aircraft each traversing separate "great circles" at significantly different altitudes in the sky. These circles are situated at the outer perimeter of the city.

For safety, progression of aircraft around the circles is always in the same direction (ie clockwise or counterclockwise). For illustration the "departure circle" could be set at an altitude of around 20,000 feet and the "arrival circle" at about half of this (ie. 10,000 feet) at the same radial direction from KSA-centre of around 20km [10 n mi]. [See SUMMARY FIGURE "J"]

After takeoff, each overland departing jet proceeds along a specified climb trajectory towards the "Great Departure Circle" along a different radial. The bearing of each successive radial is shifted by a few degrees. Each aircraft intersects the "arrival circle" along a time-sequenced different radial. This is designed to promote equitable spreading of noise from each departing aircraft over a different residential hinterland sector from that traversed by its predecessor in time. A birds-eye view from above the airport would see a three-dimensional conical "catherine wheel" departure pattern centred on the runway crossover point [See Appendix I, Figure I1 & I3]. The great circle separations ensure that departing aircraft are always at a higher altitude than any arriving aircraft approaching to land.

This scheme will ensure that there will be no intersection of arrival and departure tracks over the city. After reaching its "great circle" each departing aircraft travels around it in one direction until a point is reached convenient for its port of destination when it can leave the circle by further climbing in a tangential separation.

Arriving aircraft join the "arrival-circle" at 10000 ft from whichever direction they have come and process

around the circle until in position to turn off and commence descent to the landing target runway on runway heading. Whether that is from north or south cannot interfere with the departing aircraft taking off, and will require no significant change in operational procedure with change of wind direction.

## **7. THE PRECISION RADAR MONITOR OR PRM:**

*[Refer Section 7 of Main Text]*

The history of the introduction of PRM for northerly approaches across the northern shore suburbs is reviewed. Its operational technicalities are examined. It is concluded that the upper north shore suffers more than might be expected from arriving aircraft noise due to the altitude of the land [600-700 feet] around Hornsby Heights. Better noise outcomes for the distant north shore could be achieved by implementing a steeper descent gradient for the ILS glide path than currently used.

ICAO standards are reviewed which show that the critical criterion is the vertical descent velocity of airplanes coming in to land, and that for the heaviest aircraft in present use [B747], this will not be exceeded for a glide path angle of four (4) instead of three (3) degrees. This would enable aircraft approaching the initial approach point for the glidepath to be around 1000 feet higher than at present [ie 4000ft instead of 3000ft]. This would reduce approach noise levels prior to entering the glide path by from 3-4 dB(A).

Alternatively, the method of "continuous descent approach" [CDA], as practiced overseas and proposed by the Australian Airline Traffic Association to the government SACF in November 2000 (but surprisingly refused by government SACF) has been found in overseas experience to produce noise level improvements at 10-30 miles from touchdown of from 3 - 6 dB(A).

SACF Inc supports the use of PRM in northerly approaches, but only under the following conditions:

- (a) Where its use will enhance safety and achieve no more than normal visual arrival rates in bad weather;
- (b) It should not be employed to raise the movement cap at Sydney Airport.

One or all of the above proposals may assist in achieving noise minimisation and "noise equity" for Sydney residents exposed to the impacts of Sydney airport.

## **8. PROPOSED IMPROVEMENTS TO LTOP NOISE MANAGEMENT**

*[Refer Section 8 of Main Text]*

### **8.1 ABSENCE OF NOISE REGULATION FOR OVERFLYING AIRCRAFT**

There is currently no regulation governing the maximum permissible aircraft noise and gaseous pollution impact from overflying aircraft on the ground. This is because the Airports Act (1996) excludes responsibility of the Airport Corporation from oversight of aircraft environmental impacts. Although the Airservices Act (1995) gives Airservices Australia relevant responsibilities for the overflown environment (S. 9(2)), there is no current regulation. Similarly present Commonwealth legislation prohibits sensible State industrial "land-use" environmental controls on noise and pollution applying to similar nuisances from airports or aircraft which are in flight [S. 8.1.1].

A mathematical comparison of currently used noise metrics for aircraft noise impact forecasting [ANEF, "N70", DNL CNEL, & LA<sub>eq</sub>] is made with those used for industrial and residential site evaluation for neighbouring human habitation for a series of constant noise impacts at different levels, assuming a standard 70 dB(A) noise pulse input. The data provide a handy ready-reckoner which interprets the meaning of aircraft noise forecast units (ANEF) in terms of frequency of 70 dB(A) noise level events which people will be exposed to in ordinary daily life. *[See SUMMARY FIGURE "K"]*

This Figure shows that outdoor speech communications will begin to be affected around 10 times per hour for ANEF levels between 10 and 15 in continuous operations.

It is found that both ANEF and N70 substantially underestimate the human impact of aircraft noise from repeating sequential overflights. Comparison is made with the US Environment Protection Agency (EPA -1974) recommended standard of L<sub>Dnl</sub> = 55 dB(A), for the maintenance of human health and welfare, the NSW Industrial Noise Policy Guidelines (2000) of LA<sub>eq</sub> (15) = 40 (night) -50 (day) dB(A), and the World Health Organisation (WHO -1995) recommendations of L<sub>max</sub> = 45 & 55 dB(A) for interior rooms and exterior living areas, respectively.

The currently adopted Airservices Australia noise impact target for aircraft overflights of an  $L_{eq} = 60$  (24 hr) dB(A) is too harsh, and the currently adopted ANEF of 30 for requiring aircraft noise insulation for homes is too high. [ S. 8.1.4; Appendix K] . Proposed improvements to noise and environmental regulation and management under LTOP include :

- 8.1.1 Enactment of regulations under the Airservices Act (1995) by the Federal Government to replicate the same standard of environmental protection for residential areas overflowed by air traffic as is currently applied by State Governments to noise and gaseous emissions from industrial sites near residential areas [S. 8.1.1 -2].
- 8.1.2 Adherence to World Health Organisation Recommendations (1995) , together with present New South Wales Government (Jan 2000) "Industrial Noise Policy" guidelines on the requisite noise levels to minimise health impacts of environmental noise [S.8.1.4].
- 8.1.3 Removal from the inexpert whim of government appointed community fora [eg. SACF] of the responsibility for controlling the environmental impacts from residential overflying of Sydney , as admitted by the Minister for the Environment . Such fora should receive expert and impartial guidance [ S. 8.1.2; Appendix JJ].
- 8.1.4 Establishment of a scientifically designed "**noise minimisation regime**" for residential overflights consistent with the outcome of an unbiased and independent study of international "**best environmental practice**". Noise minimisation is best controlled by imposing maximum noise impact restrictions on overflying aircraft which are independent of aircraft type. This regime should not be limited to ascertaining what is currently "best" but should also seek to improve on that [S.8.2.1].
- 8.1.5 Improved community representation and genuine consultation with communities proportionate to affectation, both at the supervisory [Government SACF] and implementation [ie IMC] level [S. 4.9] .
- 8.1.6 Reaffirmation of Australian Standard AS 2021 -2000 (formerly AS2021 - 1994) "**Acoustics- Aircraft noise intrusion- building siting and construction**" for primary guidance in determining maximum acceptable indoor noise levels [in dB(A)] , permissible frequency of overflight by aircraft producing given on-ground noise maxima, and the definition of metrics [eg. ANEF] governing the standard of construction of buildings in the vicinity of airports .
- 8.1.7 SACF Inc recommends that the AS2021-2000 Standard be regularly revised and improved with the recommended impact levels being set having regard to medically-recognised international standards for acceptable outdoor and indoor living. Attempts to have its 'pseudo-regulatory' impact watered-down under pressure from aviation transport interests must be resisted . [S. 8.1.3]

## 8.2 INTERNATIONAL NOISE ABATEMENT PROCEDURES AND REGULATION:

[Refer Main Text S. 8.2.3; Appendix L ]

Noise Abatement Procedures and regulation at both local and overseas airports are compared . Simple physics shows that noise impacts from overflying aircraft can be regulated by aircraft flight path altitude control , both of arriving and departing aircraft [S. 8.2.1-2].

Applying these principles, SACF Inc observes that there are many examples of both Australian and overseas airport noise regulations which are superior to those employed at Sydney (Kingsford Smith) Airport. Among the ways in which other airports control noise impacts more effectively are:

- 8.2.1 The use of "**Noise Critical Altitudes**" [NCA] over cities below which (except in emergencies) aircraft of different types must not fly. The naive equation of so-called "safety-minima" [eg. 1000 ft as set by CASA] with noise impact control is not environmentally acceptable . Typical "noise critical altitudes" for comparable airports are found to be between 2000 and 7000 ft. Canberra is a local example where the limit for jet aircraft is 7000ft, and at Brisbane and Melbourne the NCA is 5000 feet. Calgary in Canada specifies 6500ft.
- 8.2.2 Many airports overseas also specify higher initial climb altitude targets than at KSA. These enable the aircraft to achieve less noise sensitive altitudes prior to turning over residential areas. Examples of these are Calgary (Canada) , San Francisco (USA) , and , within Australia, even Canberra, Brisbane and Melbourne [S. 8.2.3, Appendix L].
- 8.2.3 Several overseas airports employ critical noise maxima [in decibels] which cannot be exceeded beyond certain locations after takeoff or before landing. In exemplary cases fines are exacted from airlines and /or

pilots for exceedances of monitored levels. Examples of these are Washington DC (\$5000 for nighttime operations > 72dB(A) -takeoff) and Boston Logan (\$500 plus \$100 per day > 74dB(A)) in the USA. Steep fines [Fr20,000] are imposed in France on both pilots and airlines where noise abatement rules are breached.

- 8.2.4 Some airports require or request steeper glide path descent gradients on instrument landing approaches than applied at KSA, including the use of the "Continuous Descent Approach" (CDA) technique [S. 8.2.3, Appendix L ].

This is not to deny that there are also airports overseas which operate worse practices than those used at KSA. But should Sydney Airport, the self-professed international "*Gateway to Australia*", the capital of the "*Green Olympics*" be operating at less than world's best practice to the environmental detriment of its residents ? Perhaps more importantly, should Sydney residents be expected to endure an environmental standard which is inferior to that at Brisbane, Melbourne or the National Capital?

8.3 NOISE ABATEMENT IMPROVEMENTS FOR KSA:

The evidence shows that methods by which noise abatement can be improved at KSA include:

- 8.3.1 Maximising movements over water [S. 8.2 ].
- 8.3.2 Removing the departure ceiling for takeoffs over land [S. 8.2.5] .
- 8.3.3 Maximising immediate altitude gain for all departures [S. 8.2.6] .
- 8.3.4 The use of noise minimisation approach trajectories for landings, including CDA [S. 8.2.7] .
- 8.3.5 Use of "Noise Critical Altitudes" over residential areas (Eg. Canberra 7000ft).

**9. COMPENSATION FOR SEVERELY AFFECTED RESIDENTS**

[Refer Section 9 of Main Text]

Once an adequate SODPROPs formula is found it may be necessary to review the position of Kurnell residents. While it is glib to talk in terms of the greater good, when only one thousand residents will increasingly be affected, compensation of a generous kind and offers of a Government buy out become imperative. At the very least the Constitutional Requirement for property acquisitions and compensation on "just terms" [s.51(xxxi) - Australian Constitution] must be adhered to.

**10. CONCLUSIONS**

- 10.1 The Long Term Operating Plan for Sydney (Kingsford Smith ) Airport [LTOP] has failed. The basic concept of this so called "Fair Share Noise Plan" was that planes would fly over residential areas only when absolutely necessary. However, the very opposite has been achieved . All flights, and particularly those of noisy heavily fuel-laden jet departures, are now maximised over residential land.

This overland departure maximisation ensures that both environmental impact and risk management outcomes are far worse than that for over-the-water operations.

- 10.2 More people are moderately to severely affected by aircraft noise now than ever before. Should the Sydney Airport Master Plan (July 2003) be given Ministerial approval, the situation will become from three to four times worse by 2023, and at least 5000 more homes will require noise insulation (30 ANEF Level), all due to entrenchment of a completely failed "noise share plan".
- 10.3 LTOP has failed in implementation because of failure to address the primary Ministerial Directive of maximising movements over water.
- 10.4 The short-sighted removal of the "*Noise Abatement Downwind*" condition by LTOP Recommendation 3 left the airspace planners without any workable mechanism for ensuring movement maximisation over water. It is shown that this removal was neither necessary nor appropriate.

The fact that noise abatement downwind conditions are applied at other airports in Australia and overseas suggests that these removals were either an extremely stupid error, or a local "political" factor which resulted in the hi-jacking of LTOP from the beginning to avoid achievement of its goals.



- 10.5 Reasons put forward in the 1996 LTOP Reports and Proponents Statements for abandonment of the key over-water Modes 2 & 3 for Simultaneous Opposite Direction Parallel Runways Operations (ie **SODPROPs**) were flawed, and resulted in loss of a major opportunity to maximise the achievement of otherwise laudable Ministerial Goals.
- 10.6 Detailed Technical analysis of the **SODPROPs** Modes 2 and 3 shows that rather than they being of minimal movement capacity, and only applicable in the early morning and in light to moderate winds , they are inherently capable of providing totally adequate capacity up to the Legislated Movements Cap (80 /hr) . They would in fact be available in a wide range of meteorological conditions from 73% to 94% of the time depending on the chosen downwind condition ( 5 or 10 knots, respectively) and the use of precision radar.
- 10.7 The resulting efforts of the Government SACF and the IMC to achieve the stated LTOP goals have been frustrated by the twin handicaps of abolition of the "**downwind noise abatement condition**" and the only competent SODPROPs modes (2 & 3) . This resulted in a futile effort to achieve "movement equity" through manipulation of compass bearing movement targets (17% north; 55% south; 13% east; 15% west). This has occurred without regard to whether the movements were takeoffs or landings, and even these stated targets have not been achieved!
- 10.8 The consequence of this LTOP misdirection has resulted in a dangerous airspace spiders web in which arriving jets overfly departing jets with close to minimal permissible clearance. In addition, this occurs at low-altitudes for extended distances, resulting in significant loss of fuel economy for the airlines and maximal noise and gaseous emission pollution for extensive residential areas across the Sydney Basin.
- 10.9 The application of the SACF Inc proposed "Catherine Wheel" style aircraft departure protocol would, if approved, ensure that the altitude of departing aircraft would always exceed that of approaching aircraft around KSA and enable maximum departure altitude attainment in the minimum possible time.
- 10.10 Other factors potentially cramping LTOP airspace management are the existence of "Military Prohibited, Restricted and "Danger" [PRDs] zones both offshore in the east and in the north-west Richmond quadrant .
- 10.11 Both the "arrival overflying" and the "Military PRD" impediments could be quickly resolved through the exercise of technical initiative at the Sydney Operations centre of Airservices Australia. Unfortunately, the technical initiative behind LTOP appears to have been unduly lacking.
- 10.12 The evidence shows lack of focus by Airservices Australia (and its two advisory bodies, the Government SACF and the IMC) on the major Ministerial objectives set for LTOP, ie maximising movements over water and minimising movements over residential areas.
- 10.13 Any inconvenience to the relatively small population of Kurnell Village caused by implementation of the above recommendations can be resolved with much greater benefit-cost impact than continuing the present maximisation of city overflying, by the offer of ample compensation to those affected. This would be far less expensive than the noise insulation programs which will be necessary if the July 2003 Airport Master Plan is permitted to proceed.
- 10.14 Finally it is proposed that Commonwealth regulations be enacted under the Airservices Act to ensure that World Health Organisation and NSW EPA Noise Policy Guidelines recommended noise level maxima are not exceeded for aircraft operations over residential land. Furthermore the concept of "Noise Critical Altitude" as used both overseas and at other Australian Airports should be employed to protect the people of Sydney from aircraft noise impacts caused by city overflying.

The latter propositions would compel the air traffic control authorities to direct their minds to the flight track design features that are necessary for complying with S. 9(2) environmental protection obligations under the Airservices Act 1995.

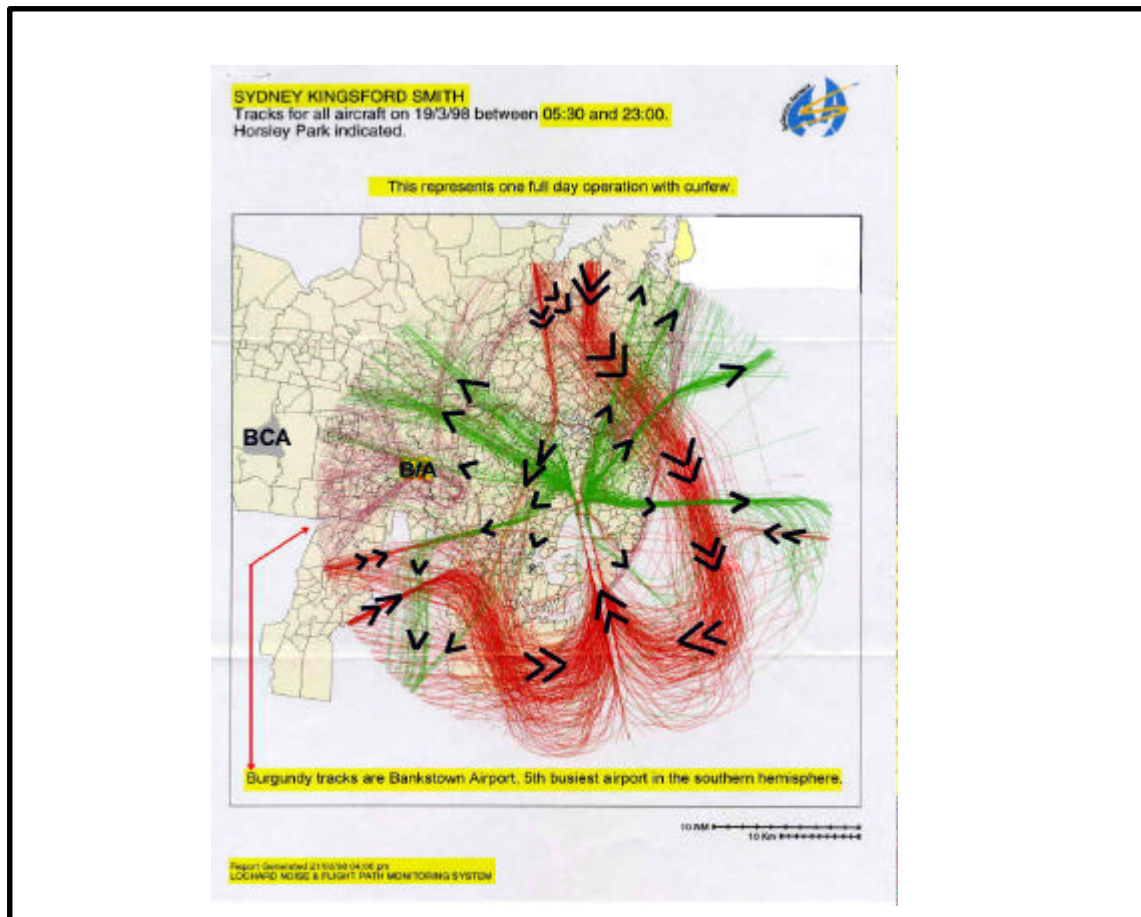
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**EXECUTIVE SUMMARY ( SELECTED FIGURES & TABLES FROM MAIN TEXT)**

**SUMMARY FIGURE "A" - MAIN TEXT FIGURE 4.1.1 TYPICAL NORTHERLY FLOWS**

**-ENTIRE NORTH-WEST & CORRIDORS IN THE EAST FLOODED BY DEPARTING AIRCRAFT AT LOW ALTITUDE**

*This Figure is reproduced for the purposes of criticism and review pursuant to S. 41 of the Copyright Act (1968) from an Airservices Australia "Lochard" plot supplied on request to residents with modifications to show the direction of arrival and departing tracks and the locations of Badgerys Creek (BCA) and Bankstown (B/A) Airports*



**SUMMARY FIGURE "B" - MAIN TEXT TABLE 3.3.1 THE AIRPORT TURNED AROUND**

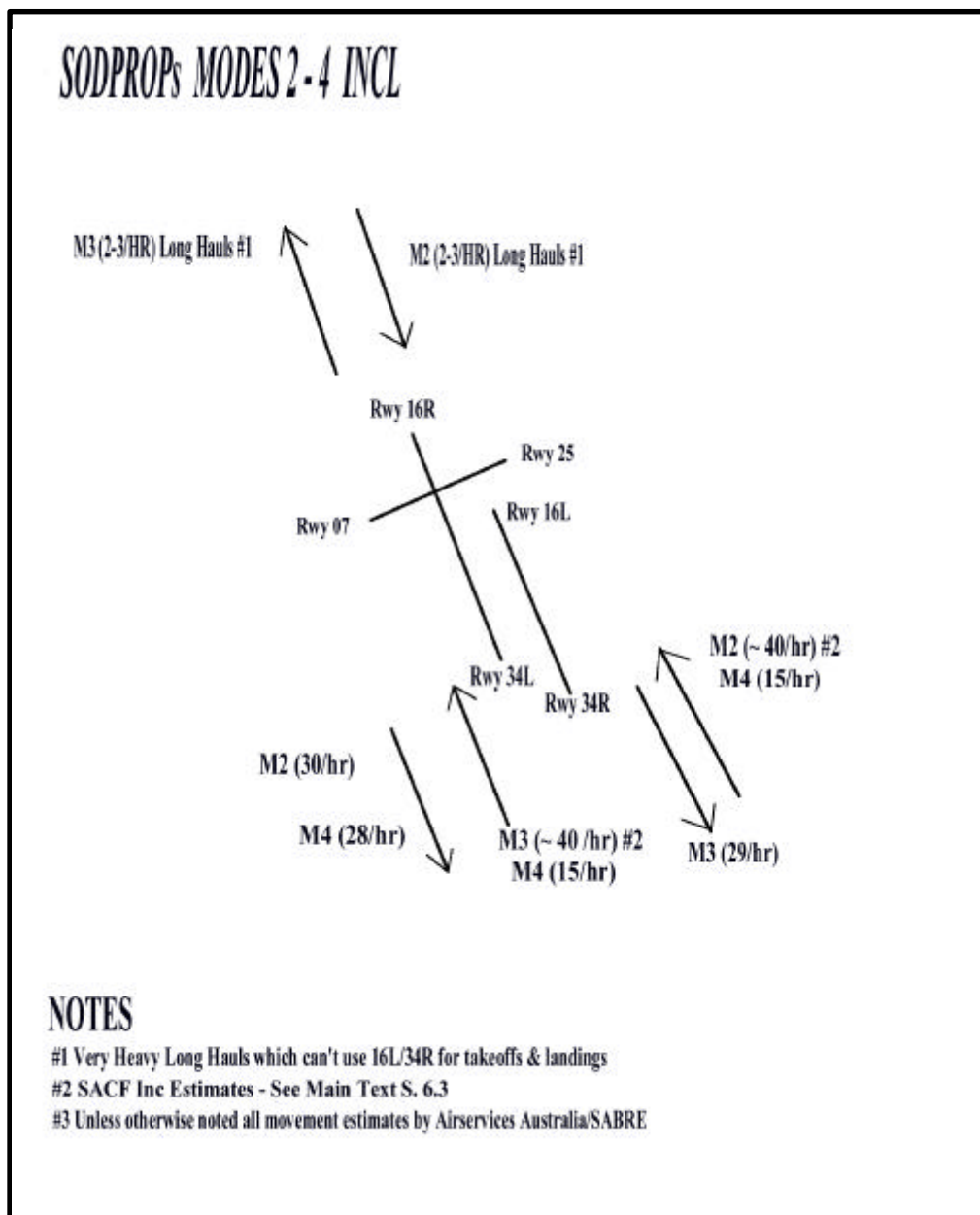
YEAR	Take-offs over Sydney Residents as a fraction of all take-offs [Modes 7,8 &9]	Take-offs over Botany Bay as a fraction of all take-offs [Modes 5,10 & 14A]
1993	34.3%	65.7%
1995	29%	65%
1999	45%	52%
2000	53%	44%
2001	49%	48%
2002	52%	45%

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**SUMMARY FIGURE "C" - MAIN TEXT TABLE 3.4.1 "PER PERSON AFFECTATION" UNDER LTOP MAXIMISED**

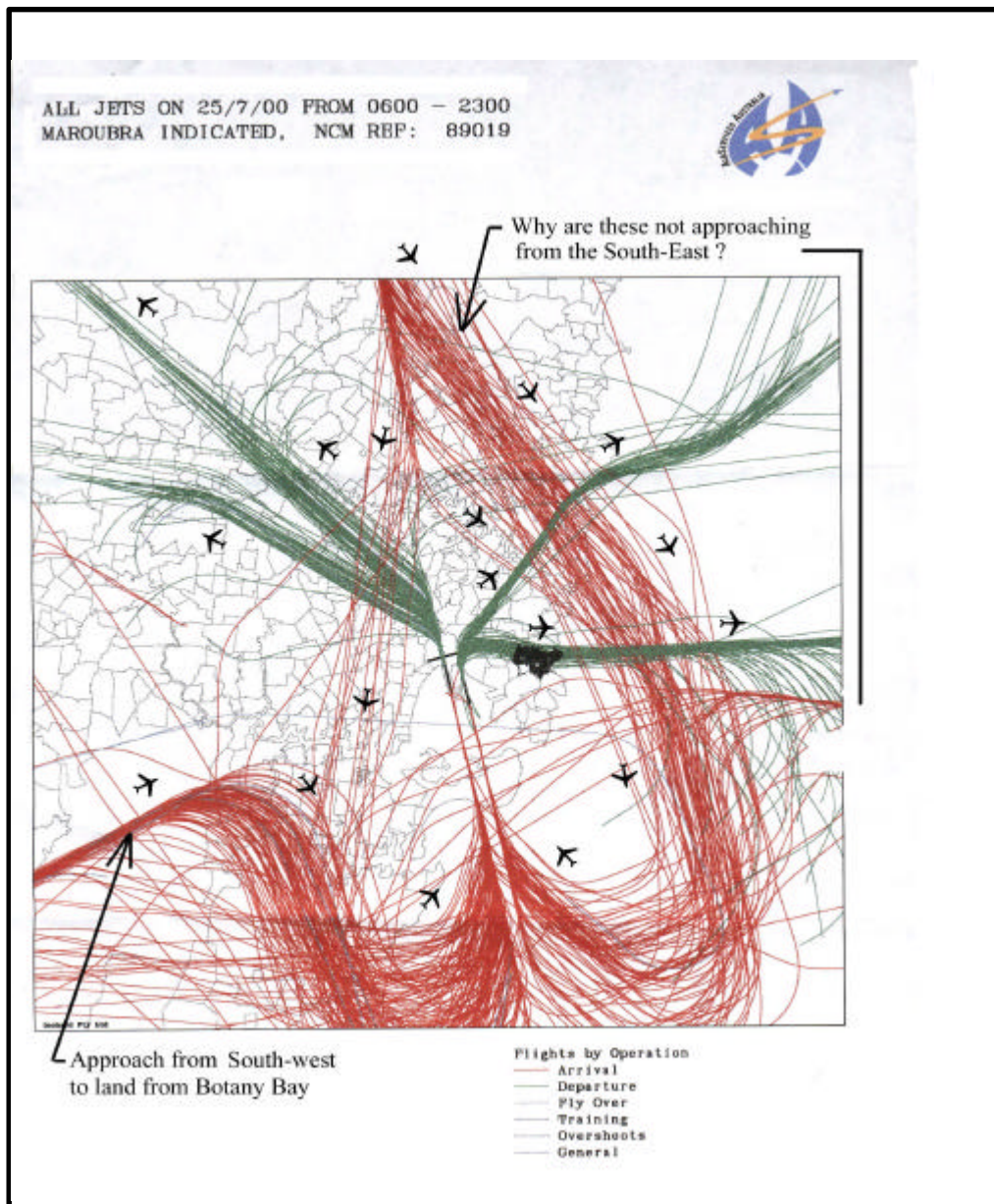
MODE	2	3	4	5	6#a	7	8 #a	9	10	14A
MOVEMENT CAPACITY	56	49	43	53	67	64	78-80 <sup>#</sup>	74	73	66
Persons Affected by Arrivals [Persons per hour of Arrivals] <sup>#1</sup>	15,556	667	700	55,024	26	497	19	700	169,900	15,531
Persons Affected by Departures [Persons per hour of Departures ]	40,000	47,014	9,800	9,800	41,475	916,219	49,055	366,750	9,800	8,000
Persons Affected by Movements [Persons per hour of Movements ]	28,929	40,498	6,626	31,132	12,391	444,089	19,018	183,725	89,850	59,348
<sup>1</sup> Nb. #1 Data for numbers of people affected by each Mode in each direction is taken from the Long Term Operating Plan for Sydney (Kingsford Smith ) Airport by Airservices Australia [Using both the Full and Summary Reports].  Nb. #a Note differential directional movement data not provided by Airservices for these modes.										

**SUMMARY FIGURE "D" - APPENDIX B FIGURE B2 THE OVER-WATER MODES**

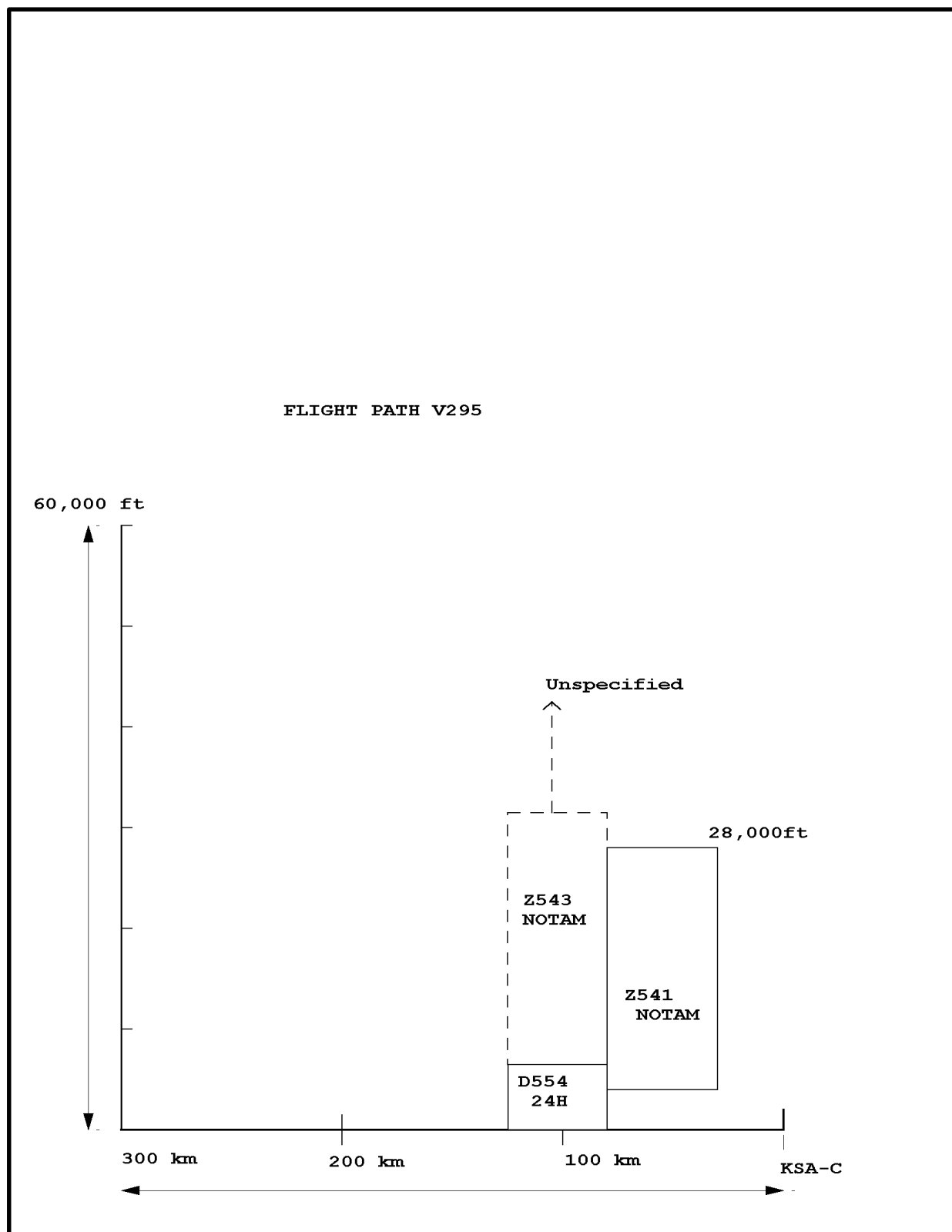


**SUMMARY FIGURE "E" - MAIN TEXT FIGURE 4.4.1 - DEPARTURE OVERFLYING**

This Figure is reproduced pursuant to S. 41 of the Copyright Act (1968) from an Airservices Australia "Lochard" plot supplied on request to residents with modifications to show the direction of arriving and departing tracks.



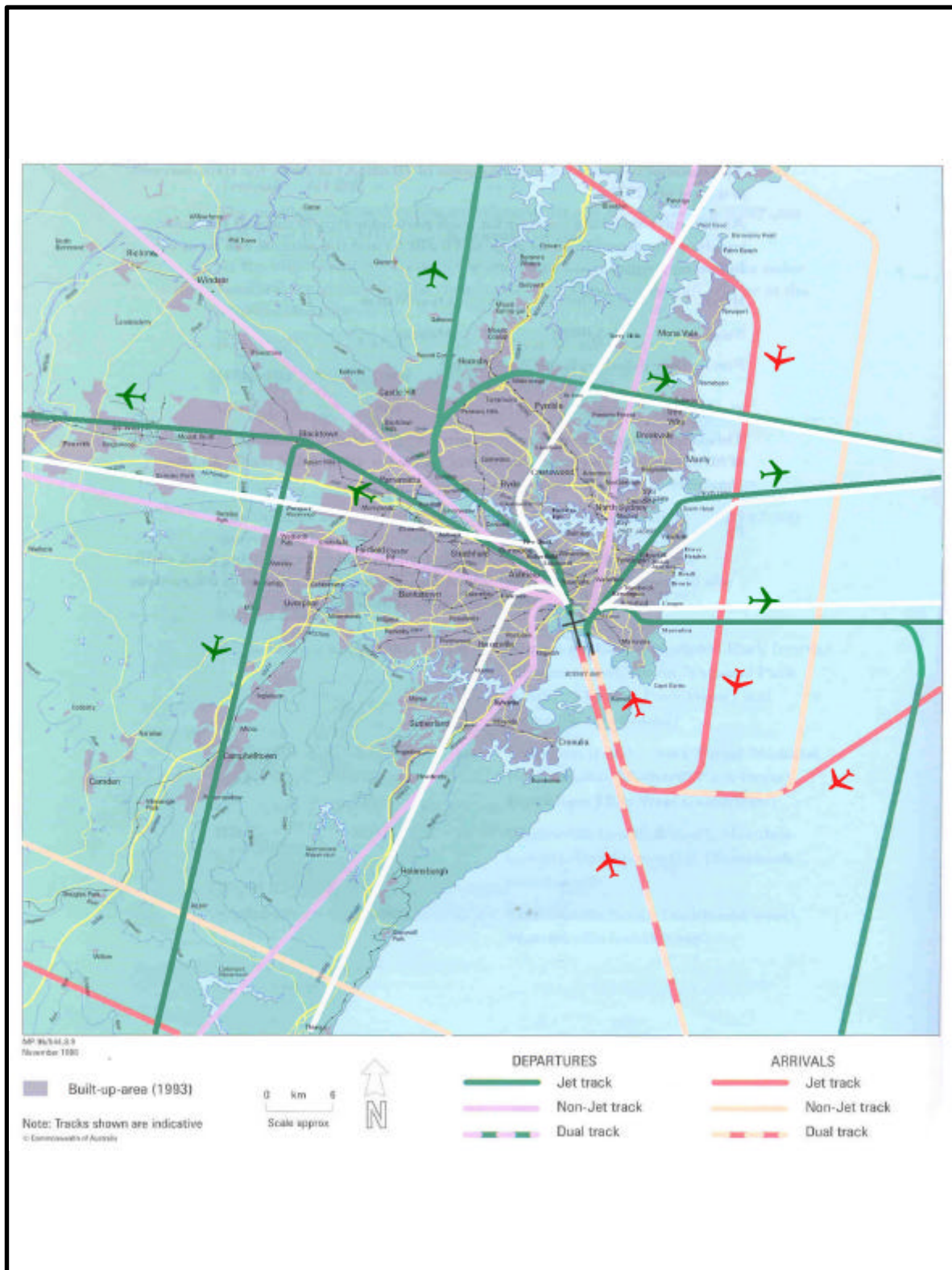
**SUMMARY FIGURE "F" - MAIN TEXT FIGURE . 6.2.2 MILITARY RESTRICTED AIRSPACE - TYPICAL PRD -on Richmond Track**





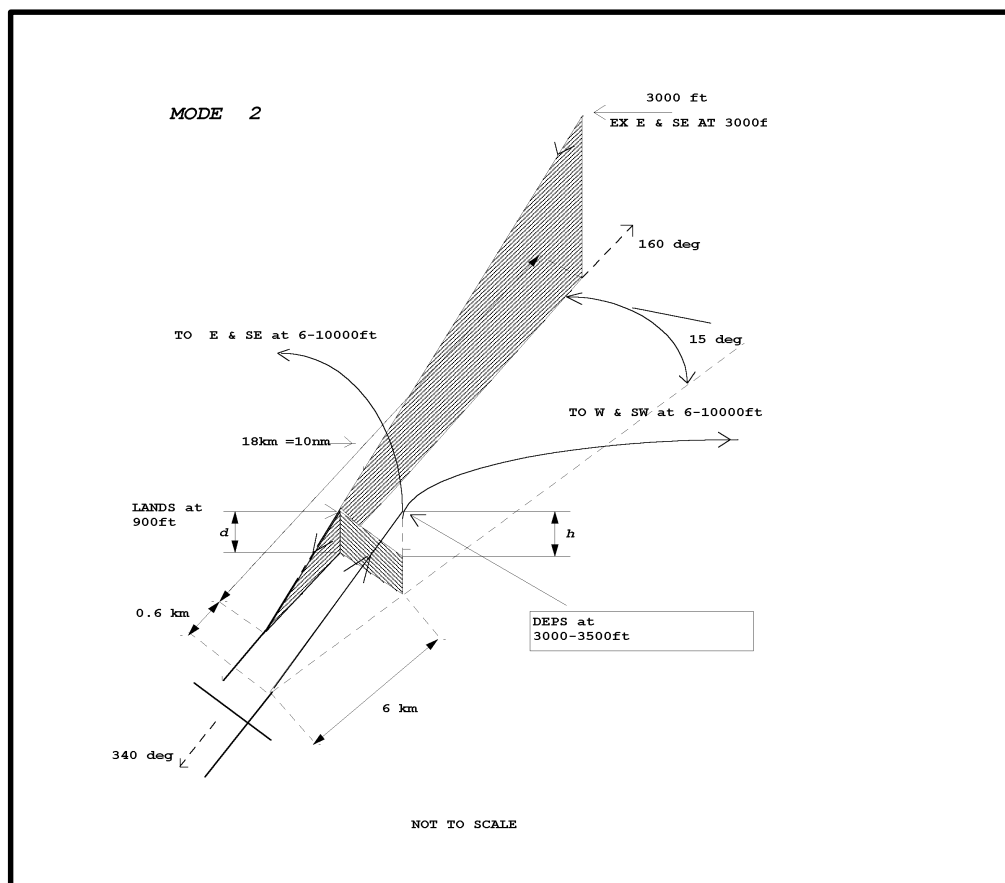
**SUMMARY FIGURE "G" - MAIN TEXT FIGURE 6.2.3 ORIGINAL LTOP PROPOSAL FOR OFFSHORE APPROACHES**

This Figure is reproduced and modified for the purposes of criticism and review pursuant to S. 41 of the Copyright Act (1968) from p. 62 Airservices Australia original LTOP Short Report [Dec. 1996] entitled: "The Long Term Operating Plan for Sydney (Kingsford Smith) Airport and Associated Airspace - Report Summary" to accommodate the adjusted flight path data from Figure 3.3 of the DOTARS LTOP Proponent's Statement June 1997.  
mode9\_p4.tif



Key: The White tracks in the above are those originally proposed by Airservices Australia in Dec. 1996. The Green ones are those subsequently approved by the Department of Transport in the Proponent Statement of June 1997 showing more circuitous routing around the Bennelong, Bradfield and Wentworth Electorates and a more acute right turn over Maroubra in the East.

**SUMMARY FIGURE "H" - MAIN TEXT FIGURE 6.3.2 THREE DIMENSIONAL PROJECTION OF SODPROPS MODE 2 SHOWING ADEQUATE CLEARANCES**



**SUMMARY FIGURE "I" - MAIN TEXT TABLE 6.3.1.6 A & B TYPICAL MIXED TRAFFIC THROUGHPUT CAPACITIES FOR SODPROPS MODE 2**

TABLE 6.3.1.6(A) ARRIVAL TRAINS

<b>MIXTURE</b>	<b>ASSUMED SEQUENCE</b> (Intervals in minutes) m = "medium weight" & h = "heavy-weight" aircraft	<b>AVERAGE INTERVAL</b>	<b>MOVE-MENTS/HOUR</b>
10% HEAVY <sup>#1</sup>	-(1.3)m-(1.3)m-(1.3)m-(1.3)m-(1.3)m-(2.0)h-(1.3)m-(1.3)m-(1.3)m-(1.3)m	1.37	43.8
20% HEAVY	-(1.3)m-(1.3)m-(2.0) h-(1.3)m-(1.3)m-(1.3)m-(1.3)m-(2.0)h-(1.3)m-(1.3)m	1.44	41.7
50% HEAVY	-(1.3)m-(2.0)h-(1.3) m-(2.0)h-(1.3)m-(2.0)h-(1.3)m-(2.0)h-(1.3)m-(2.0)h	1.65	36.4

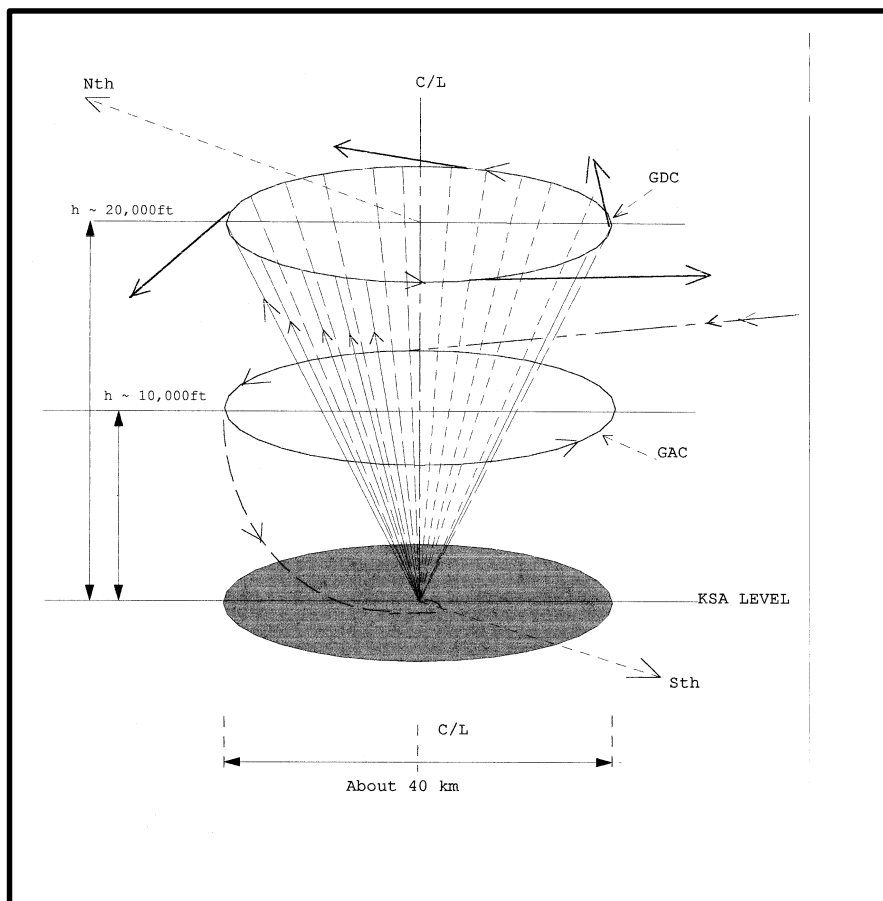
<sup>1</sup> For Sydney runway 34R this is limited to dry landing conditions, and possibly non-longhaul heavies due to limited runway length

TABLE 6.3.1.6(B) DEPARTURE TRAINS (OPTIMUM THROUGHPUT - DIVERGING TRACKS)

<b>MIXTURE</b>	<b>ASSUMED SEQUENCE</b> (Intervals in minutes) m = "medium weight" & h = "heavy-weight" aircraft	<b>AVERAGE INTERVAL</b>	<b>MOVEMENTS/HOUR</b>
10% HEAVY <sup>#1</sup>	-(1.0)m-(1.0)m-(1.0)m-(1.0)m-(1.0)m-(2.0)h-(1.0)m-(1.0)m-(1.0)m-(1.0)m	1.1	54.5
20% HEAVY	-(1.0)m-(1.0)m-(2.0) h-(1.0)m-(1.0)m-(1.0)m-(1.0)m-(2.0)h-(1.0)m-(1.0)m	1.2	50
50% HEAVY	-(1.0)m-(2.0)h-(1.0)m-(2.0)h-(1.0)m-(2.0)h-(1.0)m-(2.0)h-(1.0)m-(2.0)h	1.5	40

<sup>1</sup> For Sydney runway 16L this is limited to Heavy (eg. 747- type) aircraft under around 600,000lb ie no long haul heavies due to limited runway length.

**SUMMARY FIGURE "J" - MAIN TEXT FIGURE 6.5.4.1 THE CATHERINE WHEEL SEQUENTIAL DEPARTURE PROTOCOL.**



KEY: GAC - Great Arrival Circle  
 GDC - Great Departure Circle  
 C/L Centreline  
 KSA Level - Ground Level at KSA

**SUMMARY FIGURE "K" - MAIN TEXT TABLE 8.1.4.2 HOURLY AND DAILY NOISE EVENTS PRODUCING GIVEN ANEF LEVELS.**

	dB(A) max	50dB(A)	55dB(A)	60dB(A)	65dB(A)	70dB(A)	80dB(A)
EVENTS PER HR	N{Db(A)} PER DAY	ANEF	ANEF	ANEF	ANEF	ANEF	ANEF
	(= N70 for >=70dB(A))						
2	34	-6.94	-1.94	3.06	8.06	13.06	23.06
4	68	-3.93	1.07	6.07	11.07	16.07	26.07
6	102	-2.17	2.83	7.83	12.83	17.83	27.83
8	136	-0.92	4.08	9.08	14.08	19.08	29.08
10	170	0.05	5.05	10.05	15.05	20.05	30.05
20	340	3.06	8.06	13.06	18.06	23.06	33.06
30	510	4.82	9.82	14.82	19.82	24.82	34.82
40	680	6.07	11.07	16.07	21.07	26.07	36.07
50	850	7.04	12.04	17.04	22.04	27.04	37.04
60	1,020	7.83	12.83	17.83	22.83	27.83	37.83
80	1,360	9.08	14.08	19.08	24.08	29.08	39.08
120	2,040	10.84	15.84	20.84	25.84	30.84	40.84



## SUMMARY OF RECOMMENDATIONS

### 3. **COMPARISON OF LTOP AS IMPLEMENTED WITH LTOP AS CONCEIVED**

[Refer Section 3 of Main Text]

#### **Findings:**

The present manner of LTOP Mode implementation minimises movements over water, and maximises movements, departures and people affectation overland. This is contrary to the primary LTOP Principle.

The present implementation of LTOP has "turned the airport around " by maximising departure of noisy, fully fuel-laden, jets over land, preferencing northerly traffic flows over Sydney's major residential areas.

Although not included in LTOP as now implemented, the Botany Bay modes quite clearly provide the optimum opportunity for Airservices Australia to achieve the primary LTOP goal of maximising movements over water. Unfortunately the LTOP consultation process was hi-jacked from the beginning to eliminate this essential feature of the plan.

#### **SUMMARY OF RECOMMENDATIONS SECTION 3**

**Recommendation 3.2.1 :** That LTOP be redesigned to include all the available modes having regard to their functional capacity, safety and *per person affectation*. Given that a principal objective of LTOP was "*to maximise movements over the water*", the excluded SODPROPs Modes 2 & 3 and the little-used Mode 10 should be reinstated with operational priority in the order (1) SODPROPs , (2) Mode 10. [SS. 3.2; 3.4 ] Only in this way can the original LTOP northerly movement targets be approximated.

**Recommendation 3.2.2 :** That the runway-end "compass-point" movement targets as expressed in LTOP be abandoned. There must first be a serious attempt to maximise movements over the sea, followed by a genuine attempt to calculate the requirements for equitable sharing of totally unavoidable overland movements . An initial minimalist approach to reducing noise impacts over residential areas given the current LTOP is to transfer all jet departures from 34L & R to 16 L & R, thus raising Bayside movements to their "LTOP" target level of at least 55%. [S. 3.2]

**Recommendation 3.3 :** That Airservices Australia be instructed forthwith to redesign the LTOP including all available Modes to fully implement the plan with maximum overwater movements. All departing jets should be instructed to use Bay-side modes whenever possible. [S. 3.3]. The practical result of LTOP has been to maximise the use of residential overflights for the noisiest jet departures. This maximises noise over residential areas and utterly contradicts the Ministerial Direction for the Plan.

### 4. **THE DEFICIENCIES OF LTOP WITH REFERENCE TO STATED OBJECTIVES**

[Refer Section 4 of Main Text]

#### **Findings**

The simple runway-end target measure for the success of LTOP led to its early corruption and the failure of the "LTOP task-force" to optimally address what was meant by "equitable distribution" or even "fairness".

Refusal to maximise movements over the water is key to the fundamental failure of the plan overall , and has resulted in the current decline of the process into one by which movements are becoming progressively more concentrated over land.

The failure of equity results from there being no quantitative dosage system to ensure that the overland distribution of aircraft is fair . The "Australian Noise Exposure Forecast" [ ANEF ] was never intended for this use by itself. No effective principle is employed by Airservices Australia at Sydney consistent with its obligation under the Airservices Act to minimise the environmental impact from the operation of overflying aircraft.

Flight track spreading, though espoused in LTOP for arrival tracks from the north, and implemented cursorily across the near north west, is not universally applied. The evidence suggests that the failure of spreading in the east and parts of the north west may reflect political pressures. This is contrary to the politically stated principle of "*putting people first.*" If there must be sharing, then it must be applied without fear or favour, for the benefit of all Sydney residents. Given that departing aircraft produce more noise during takeoff than arriving aircraft on a "glide path" , then spreading must be employed for departing aircraft too.

The LTOP does not espouse any principle to ensure that aircraft noise is minimised on the ground. The prevalence of low-altitude turns near the airport , instead of the originally promised ICAO noise abatement procedures make noise minimisation impossible for suburbs closest to KSA.

The required monitoring of acoustic impact on newly affected areas was not carried out. Monitoring was concentrated in areas of maximal representation on the Implementation and Monitoring Committee, or of the Government SACF.

The complaints line system is being abused, not by the public, but by those politicians and bureaucrats who persist in pretending that it offers a scientific and objective means of gauging public opinion.

No metric was proposed in LTOP to accurately and objectively gauge noise impact in order to ensure equity of noise share.

The community consultation for the LTOP implementation was carried out in bad faith by minimising representation of newly affected areas both on the government SACF and IMC. This omission breached the Environment Minister's conditions for exempting the LTOP from the need for an EIS. It further breached the principles of equity, "fair sharing" and "putting people first" upon which the "Fair Share Noise Plan" was supposed to have been based. The most significant management failure addressed is Airservices utter inability to develop guidelines ensuring compliance with the Transport Ministers Directive to maximise movement over water.

#### **SUMMARY OF RECOMMENDATIONS SECTION 4**

**Recommendation 4.1.1:** That the early abandoned goal in the LTOP Reports of defining what is meant by "equitable distribution" be revisited. The instrument for determining "noise equity" should cease to be stated in terms of "runway end" percentage movements. These do not reflect the true distribution of the resulting noise. A "people events metric", different from the ANEF, which truly reflects whether equity is being achieved, must be devised.

**Recommendation 4.1.2:** That "true equity" in noise distribution should be approached at KSA by radical redesign of Sydney airspace [S. 6.2, S. 6.5.1], maximising movements over water through the use of SODPROPs Modes 2 & 3 [See S. 6.3], and mandating maximum permissible aircraft noise levels for overflying residential areas [S. 8.2].

**Recommendation 4.1.3:** That the arrival overflying ceilings presently inhibiting steepest possible takeoffs to cruising altitude over residential areas in Modes 7, 8 and 9 be abolished forthwith and arrival tracks re-routed to comply with the LTOP over-water routings as originally proposed.

**Recommendation 4.1.4:** That changes to Bankstown Airspace needed to avoid flight path concentrations in the west and northwest be mandated by Government, and the hopeless environmental status of Bankstown as a 24 hour commercial airport recognised and a curfew introduced.

**Recommendation 4.2:** That SODPROPs Modes 2 and 3 be reinstated into LTOP and re-examined by Airservices Australia to ensure maximum permissible over-the-water operations at KSA.

**Recommendation 4.4.1:** That departure flight path spreading be employed wherever possible to minimise the continuous nature of the noise disruption to any individual residential location under the take-off flight paths.

**Recommendation 4.4.2:** That a time-sequenced continuously variable bearing strategy should be adopted to ensure that in any given day no residence is exposed to departing aircraft noise on more than one occasion per hour as proposed in S. 6.5.

**Recommendation 4.5:** That low altitude turns be abolished for jet departures at KSA. Low altitude turns are inefficient in terms of permitting aircraft to optimise altitude gain and thus result in greater noise intensity over residential areas around the airport. At least ICAO-A (or equivalent as stated in AIP ENR 1.5 para 11.1.6) noise abatement departure profiles should be enforced out of KSA as envisaged in the LTOP Reports, and the ignored 1998 Ministerial Directive. SACF Inc however, prefers a more imaginative approach such as that employed by Calgary or Canberra Airports with turns over residents at not less than 6500 and 4700 feet, respectively.

**Recommendation 4.6:** That LTOP "Recommendations 23, 25 and 26", and the Environment Minister's Directive of 24 July 1997, be fully implemented in all the areas newly affected by the LTOP.

**Recommendation 4.7:** That a population census -based statistic be developed to provide a dynamic dose-metric for aircraft noise received by residents so as to ensure that the environmental impact distribution of flight paths employed by Airservices Australia is equitable and fair.

**Recommendation 4.8:** That the complaints line (NEU) be used strictly for the provision of accurate information to the public; not as a media tool of Government. It is unscientific and irresponsible to portray the Noise Enquiry  
r/ExeSumWF.sacfinc

Unit as a means of testing public opinion about the LTOP.

**Recommendation 4.9.1:** That Airservices Australia be held responsible for the organisational, design and implementational failures of LTOP as only this organisation had the ostensible skills to fashion an airspace design system for Kingsford Smith for truly minimising the environmental impact of the airport over residents.

**Recommendation 4.9.2:** That the Community Consultation process be reviewed to ensure that all noise-affected areas are represented and that particular area community interests are not permitted to dominate outcomes. Community Consultation should not be viewed as a "one time event". There should be repeated opportunities for the broadly affected community to express its views, as early public understandings of politically-stated objectives [eg. "fairly sharing noise" ], may not be borne out in practice.

**Recommendation 4.9.3:** That the IMC should be reformed to represent all affected areas of the Sydney Basin .

**Recommendation 4.10:** That the no-reciprocity principle should be strictly adhered to in order to maximise "respite".

## 5. SAFETY IMPLICATIONS AND DANGERS OF LTOP

[Refer Section 5 of Main Text]

### Findings

Analysis of crash accident risk worldwide shows that the risk of non-ticket-payer and third party property damage is greatest for takeoffs overland and over residential areas . Also some aircraft types are more prone to crashing during takeoff than during landing. Fully fuel-laden jet aircraft with up to 160 tonnes of Avgas <sup>#3</sup> on board crashing during takeoff cause the greatest third party property and personal injury harm to both ticket payers and non-ticket payers alike.

Given the residential locale of KSA , the heavy fuel loads of departing long-medium-haul jets should make it imperative that , whenever there is an available Botany Bay departure mode , it should be employed.

The LTOP Proponent Statement Recommendations for an independent CASA review of the safety of the LTOP flight tracks were never implemented. From a risk-management perspective , the current LTOP implementation is entirely opposite to that put forward in the Proponent Statement by its maximising movements and departures overland.

The LTOP Proponent Statement promised the creation of an LTOP "*Safety Review Committee*" in addition to an independent CASA review. This promised safety review committee has never been appointed and has not met.

Specific and unnecessary dangers inherent in the present implementation of LTOP include the Departure Overflying Regime [S. 5.3.1] , the Conflicting Missed Approach Regime [ S. 5.3.2] and the problems for Sydney Airspace resulting from additional complexities such as the proposed jets to Bankstown plan and the consequences of opening a "Sydney West Airport" as close as Badgerys Creek [S. 5.3.3].

### SUMMARY OF RECOMMENDATIONS SECTION 5

**Recommendation 5.1.1:** That for safety reasons LTOP should be redesigned to ensure the primary over-the-water flight path objective of the plan. Where possible, the predilection of a given aircraft type to crash at take off rather than landing and its fuel load should be allowed for taken in choosing its departure route .

**Recommendation 5.1.2:** That Australia adopt the ICAO -recommended practice of creating uninhabited crash zones along major flight routes to all its airports. For KSA, this should mean that an alternative airport site outside the metropolitan residential area should be sought as soon as possible.

**Recommendation 5.1.3:** That determination of preferred runway use at any given time be based on the well-recognised fact that takeoffs over residential areas involve greater risk of third-party property loss and mortality than takeoffs over water . If there is an available over-the-water mode which can be used, then it must be used rather than blindly trying to equalise noise among heavily populated residential suburbs. All available over-the-water modes, including Modes 2 and 3 should be included.

**Recommendation 5.1.4:** That aircraft departure routes should be designed to minimise the risk of conflagration over residential areas in the ultimately inevitable event of a crash over a residential area.

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<sup>3</sup>

This will double with the largest Airbus A380 models now in the pipeline.  
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**Recommendation 5.1.5:** That SODPROPs traffic modes to- and from- KSA which maximise use of over-the-water operations should be employed to the maximum extent possible - as originally envisaged by the LTOP - not to the token extent employed at present.

**Recommendation 5.2.1:** That takeoffs over Botany Bay should be maximised because of the horrendous third party casualties, including burn victims, which will be caused by crashing heavily laden fuel-packed passenger jets into residential areas . The responsible authorities must do everything possible to ensure that non-passenger casualties are minimised .

**Recommendation 5.2.2:** That there be a comprehensive review of risk management in connection with the conduct of the LTOP at Sydney (Kingsford Smith) Airport [KSA]. The so-called "watchdog", CASA, must be ordered immediately to implement the carefully chosen safety review aspects of the LTOP which were promised by the Department of Transport in the LTOP Proponent Statement (1997) .

**Recommendation 5.2.3:** That the proposed LTOP Safety Review Committee be immediately convened and airspace radically redesigned to maximise movements over the water, thus ensuring both optimum safety together with noise minimisation for overland jet departures . CASA and ATSB should immediately be instructed to carry out an in-depth safety audit of the LTOP SIDs, STARs and intermodal use.

**Recommendation 5.2.3:** That a truly independent expert report be contracted forthwith because CASA and Airservices Australia have demonstrated themselves to be incapable of being independent of political direction.

**Recommendation 5.3.1:** That Government and the aviation industry rethink Sydney's airports arrival and departure tracks (including KSA and Bankstown) to reduce dangerous overflying practices. These are statistically more likely to give rise to an air disaster over densely populated areas of Sydney than those over the extensive surrounding water areas.

**Recommendation 5.3.2:** That all presently used northerly flow departure SIDs be carefully scrutinised by CASA for potential conflicts with arrival missed approach tracks from the south. In addition , the increased risk created by low-altitude turns in the departure tracks should be eliminated.

**Recommendation 5.3.3:** That simple-to-implement improvements be effected forthwith. These include the immediate restoration of the originally planned LTOP Modes 8 & 9 offshore arrival routes and removal of the acute low-altitude right and left turning SIDs from Departure and Arrival Procedures [DAPs] for Sydney (Kingsford Smith) Airport. These would provide an immediate enhancement for both operational safety and environmental management by Airservices Australia.

**Recommendation 5.3.4:** That no further consideration be given to any nearby "in-basin" second airport or to the expansion of Bankstown without a careful initial review of options for the radical reform of Sydney [KSA and Bankstown] airspace. The airspace of Sydney is already too complex for safe operations at KSA and Bankstown.

## **6 TOWARDS MORE EQUITABLE AIRSPACE MANAGEMENT**

*[Refer Section 6.1-6.5 of Main Text]*

### ***Findings***

#### **Existing Sydney Airspace**

A comprehensive review of Existing Sydney Airspace shows that there are several actual and/or potential problems which need to be addressed if the overland Departure Overflying Regime [S. 5.3.1] is to be avoided. The first problem is the extent to which Military "Prohibited, Restricted and Danger" zones [PRDs] are constraining current air-traffic plans around Sydney Kingsford Smith Airport. PRDs potentially affect altitude gain parameters for the Richmond Track to the north west , and may also affect the ability of arriving aircraft from north and south to track wide and high over the ocean in the approaches to Botany Bay, causing the current low "bunching" over residential areas, both west and to the northeast and east of the city [S. 6.2] .

## ***SUMMARY OF RECOMMENDATIONS SECTION 6.1 - 6.2***

### **6.2 EXISTING SYDNEY AIRSPACE**

**Recommendation 6.2.1:** That Air Traffic Control deviate all the northerly arriving traffic to a track at , say 10 km off shore, at around the latitude of the Hawkesbury, at about 3000 feet. Then easterly departing aircraft could gain at least 7000 feet at maximum climb rate prior to crossing the southerly arrival train and would then be safely above it. Similarly, north-westerly departing aircraft could then gain significantly greater altitude immediately after

takeoff thus minimising ground noise for the entire Sydney Basin. This was the original LTOP plan.

**Recommendation 6.2.3:** That ICAO or AIP "*Noise Abatement Departure Protocols*" be reinstated over residential areas both east and north west . That all the non-ICAO-A (NADP-2) SIDs in Airservice's "DAP East" be removed and all existing low-altitude turns be abandoned for all SIDs. ICAO-A -class or better Noise Abatement Procedures should be implemented according to the Transport Minister's Direction of August 1998.

**Recommendation 6.2.4:** That the Richmond Track PRD problem be resolved, following the San Francisco /Canberra model, by aircraft climbing as high as practicable [to at least 8000 ft] before turning, and then vectoring all northwest - heading aircraft out high over Katoomba, with a following north-west turn at a point well beyond the Richmond Military Zone PRD wedge.

**Recommendation 6.2.5:** That LTOP Recommendation 31 should be immediately implemented to prevent conflicts with PRDs, ie : "*That Airservices Australia and the Australian Military Forces enable implementation of the in principle agreements for changes to military airspace surrounding Sydney through the Air Coordinating Committee.*"

If this objective cannot be achieved then new high-level in-and outbound tracks should be devised which completely bypass Richmond Airspace.

**Recommendation 6.2.6:** That any unrepealed regulatory impediment to the implementation of full SODPROPs operations and the maximisation of over-the-water modes be immediately removed .

**Recommendation 6.2.7:** That the original LTOP proposal for north and north-westerly arrivals in Modes 7 , 8 & 9 should be immediately implemented by making them sweep out widely in a south-easterly direction over the ocean north of the vicinity of West Head . Similarly southerly and south-westerly arrivals should be swept north easterly to the ocean across the Royal National Park.

**Recommendation 6.2.8:** That it is unacceptable for Airservices Australia to plead excessive track miles when the residential environment of Sydney is at stake.

### 6.3 MAXIMISATION OF OVER WATER MOVEMENTS

[Refer Section 6.3 of Main Text]

#### Findings

##### Botany Bayside Operations

Given the Ministerial Direction for LTOP to "maximise movements over water", insufficient effort was made to ensure this objective is achieved. Instead, ever decreasing percentages of movements now take place over water. Analysis of the currently unused LTOP Modes 2 & 3 employing "Simultaneous Opposite Direction Parallel Runways Operations" SODPROPs shows that these Modes were dismissed without adequate justification in the Reports leading to the LTOP Proponent's Statement.

Detailed examination of the SODPROPs aircraft movement potential shows that Modes 2 and 3 could be optimised for independent segregated operations. This requires Secondary Surveillance Radar and/or Precision Radar Monitoring [PRM] radar which were not apparently available at the inception of LTOP in 1996. Given that such radars are now in place , greater estimates of movement capacity are possible than forecast in the LTOP Reports.

A survey of historically available wind-direction data shows that, rather than Mode 2 & 3 SODPROPs only being available in off-peak hours (from 40-60% of the time) , as represented, they are potentially available for from 73 to 94.5% of the time depending on the selected "*downwind noise abatement*" wind speed . The following recommendations are made with the above considerations in mind.

### SUMMARY OF RECOMMENDATIONS SECTION 6.3

**Recommendation 6.3.1:** That LTOP Recommendation 3 [*discontinuance of the 5 knot downwind noise abatement rule for southerly arrivals and departures*] be abandoned. This is because it is inconsistent with the principal LTOP objective of maximising movements over water (ie away from residents) . It is also recommended that the 5 knot rule be increased to ten (10) knots , as used at Brisbane Airport, and that the downwind noise abatement requirement be employed to favour over-the-water operations whenever meteorological conditions permit safe operations.

**Recommendation 6.3.2:** That a system of precision scheduling should be employed by Airservices Australia, in conjunction with Secondary Surveillance Radar, to optimise Mode 2 & 3 SODPROPs operations over Botany Bay.

**Recommendation 6.3.3:** That any adverse influence of these proposals on Kurnell be fully compensated by the

provision of totally effective noise insulation for this suburb . This is a far better and less costly proposition than inflicting continually increasing noise on ever widening areas of the Sydney Basin as far away as Hornsby and Winston Hills, and to an even greater extent on heavily populated suburbs to the immediate north of KSA.

**Recommendation 6.3.4:** That Airservices Australia, or some suitable airspace management consultant be immediately contracted to draw up plans for the optimisation of the full SODPROPs over-the-water modes, for maximum possible exploitation in all weather conditions at Sydney Kingsford Smith Airport.

#### **6.4 SYSTEMATISING THE MEASUREMENT OF DOSE-RESPONSE**

##### ***Findings***

No systematic logic is behind "noise sharing" implementation in the LTOP. It proposes no quantitative measure by which the "noise dose" suffered by all *necessarily exposed* sub-populations can be equalised in the interests of fairness and equity. The section proposes a means employing local community population census statistics by which the noise dose exposure can be compared among geographical sectors and discusses functional modifications of the ANEF parameter to make the noise dose measure more sensitive to the actual perception of noise impact.

#### **SUMMARY OF RECOMMENDATIONS SECTION 6.4**

**Recommendation 6.4.1:** That a system employing quantitative methods be employed for ensuring the equitable distribution of noise from aircraft forced to depart and land over residential areas and that a modification of the ANEF, coupled with census population statistics be employed which better reflects the immediate noise impact over residential zones. It is proposed that such a system be coupled with an automated time-sequenced methodology for spreading departure movements such as that proposed in S. 6.5.

#### **6.5 TIME-SEQUENCED CATHERINE-WHEEL DEPARTURE PROTOCOL**

##### ***Findings***

The present airspace arrangements permit extensive seemingly random overflying of departures by arrivals (especially in northerly winds). These arrivals prevent departing jets gaining cruising altitude optimally across Sydney's residential hinterland. This is caused by the practice of bringing arriving aircraft in to fixed "vectoring points" close to the airport from where it is determined whether to land from the north or over Botany Bay.

For southerly approaches, arriving aircraft coming from the north and west at 3000 ft cross more or less directly over the eastern suburbs coastline towards the procedure turn point off Botany Bay. In northerly winds such aircraft tend to intersect with then currently departing jets leaving KSA to the north, northwest and east. Similarly, when the wind direction changes from north to south, aircraft approaching from the south join low-altitude processions across the city towards the opposing vectoring point approximately over Kuringai. This produces a morasse of intersecting tracks across Sydney's residential hinterland.

The proffered Catherine -Wheel proposal applies a more disciplined approach, with arriving and departing aircraft each traversing their own "great circles" at the outer perimeter of the city. These circles are placed at significantly different altitudes in the sky. A "great departure circle" is proposed at an altitude of 20,000 feet and a "great arrival circle" is set at around 10,000 feet at about 20km [10 n mi] from KSA-centre. Progression around the circles is always unidirectional.

In the proposal, each successive departing jet proceeds along a different specified climb trajectory towards its "Great Departure Circle", which is intersected along a time-sequenced different radial. This equitably spreads the noise from each departing jet over a different residential hinterland from that traversed by its predecessor in time. This results in a three-dimensional conical "catherine wheel" departure pattern. The "great circle" system ensures that departing aircraft are always at a higher altitude than aircraft approaching to land, resulting in no intersection between arrival and departure tracks across residential Sydney.

#### **SUMMARY OF RECOMMENDATIONS SECTION 6.5**

**Recommendation 6.5.1:** That Airservices Australia implement a reorganisation of the airspace above Sydney Kingsford Smith Airport to eliminate the practice of departing aircraft being required to fly below arrival routes, and implement a system of departure track rotational sequencing so that no single point on the ground in any residential area hears more than one aircraft movement per hour during daylight hours.

**Recommendation 6.5.2:** That a Catherine Wheel pattern system be employed in conjunction with a quantitative methodology for monitoring the dose of noise impacts across residential areas which reflects the perception of impact by residents, but with the overall objective of minimising aircraft noise.

**Recommendation 6.5.3:** That trajectory- time-sequenced (Catherine Wheel/clockhand) departures for *unavoidable* residential overflying be adopted for the 15 -30% of movements which cannot be sent across Botany Bay.

## **7. PERMISSIBLE USES OF PRM - HISTORY AND IMPLEMENTATION**

*[Refer Section 7 of Main Text]*

### **Findings**

Precision Radar Monitoring or PRM caused a furore when introduced for ILS-PRM arrivals from the north. At its introduction SACF Inc was mainly concerned that it was not employed to raise the "movement cap" at Sydney Airport, and that it would only be employed in bad weather to enhance safety and enable the maintenance of "normal arrival flows."

At the insistence of member community groups, SACF Inc has since further researched PRM. This acknowledges that owing to the procedures involved, much low flying is involved in the PRM approach procedures across Sydney's north west and east, prior to commencing descent along the ILS-PRM glide path. The problem for residences below these approach paths is (1) the aircraft are at low altitude (3000 feet above sea level) and under continuous power, and (2) ground level at these locations is from 700- 1000 feet above sea level. This makes the actual height of aircraft over land only around 2000 feet. Review of the requirements and specifications for PRM has led to the following recommendations.

### **SUMMARY OF RECOMMENDATIONS SECTION 7**

**Recommendation 7.1:** That Airservices investigate the possibility of using steeper ILS glide path approaches from the north than the presently used three (3) degrees. That a study be carried out to investigate whether a glide path of up to 4 ° gradient could be tolerated by the capabilities for typical customer aircraft, as practiced at Marseille and at Ostende for the Illushin II-76.

**Recommendation 7.2:** That Airservices Australia examine the capabilities of the range of aircraft using KSA and carry out a feasibility study on the possibility of introducing steeper glide paths [of up to 4.0 degrees], with higher intersection altitudes for aircraft approaching the localiser beams for Runways 16L & R.

**Recommendation 7.3:** That "Continuous Descent Approach" (CDA) be given early consideration for reducing noise impacts from arriving aircraft across residential suburbs.

**Recommendation 7.4:** That Airservices should employ an airspace consultant to evaluate the feasibility of increasing the glide path descent angle to the parallel runways at KSA. This assumes that CDA may not apply in all weather conditions, and that a form of ILS-PRM may continue to be necessary.

**Recommendation 7.5:** That Options involving greater altitude approaches be considered for ILS -PRM in order to reduce the noise impact on residents from descending aircraft closer to the airport.

**Recommendation 7.6:** That Airservices Australia continue to investigate ways, using new technology if necessary, for the implementation of "Trident"-like spreading approaches to all overland arrivals.

## 8. **PROPOSED IMPROVEMENTS TO LTOP NOISE MANAGEMENT**

[Refer Section 8 of Main Text]

### **Findings**

#### An Ineffective Legislative Foundation

A fundamental problem with the present environmental management regime at Sydney Airport is that no organisation with direct public accountability is responsible for the downstream effects of aircraft noise and pollution over residents outside the airport boundaries. At Sydney Airport, Airservices Australia is currently required to work with the government appointed Sydney Airport Community Forum [SACF] to determine "noise sharing" among residential areas over which the aircraft which it controls should fly. In turn, this forum appears satisfied to consider the geographic spread of flight paths, only, not the actual noise and pollution impacts on the ground.

Similarly the sum of current Commonwealth Legislation exempts airports, airlines and Airservices Australia from any need to comply with State "Land Use" regulations which are available to control aircraft noise and gaseous emissions. Moreover, even the National Environment Protection Council [NEPC] through its governing legislation, is not permitted to develop rules (National Environment Protection Measures -NEPMs) in consultation with the States which may effectively control aircraft environmental impacts on the ground. There appears to be no common sense or reason for this, other than it is supposedly "in the National Interest" [National Environment Protection (Measures) Act (1998)].

#### Australian Standard AS2021-2000

The only system of "rules" currently operational in this area Australia-wide is the Australian Standard AS 2021-2000 [Acoustics - Aircraft Noise Intrusion -Building Siting and Construction]. AS2021 prescribes the ANEF system used by airports with "stable" flight path configurations to predict future noise levels affecting neighbouring buildings. AS2021 also determines whether a building site is suitable for various uses, such as residential habitation. Airports must produce "Australian Noise Exposure Forecasts" [ANEFs] in their Master Plans for areas around the airport subject to aircraft noise, yet ultimately they do not control how aircraft noise is distributed.

AS2021 is applied by Local Councils in aircraft noise areas in granting building approvals, but otherwise the Standard [though otherwise based on verifiable scientific data] has no force of law. Airservices Australia cannot be sued if someone's home suddenly becomes subjected to interior noise levels greater than the AS2021 recommended 50 dB(A). The ANEF is also used to determine whether aircraft affected homes qualify for government subsidised insulation. This is not at the 50 dB(A) interior level, however, and is not retrospectively applied to newly affected existing buildings.

Thus AS 2021 potentially plays an important role in mitigating aircraft noise impacts, and providing guidance to residents finding themselves now subject to noise not present when they bought their homes. The Role of DOTARS in promoting changes to the existing AS 2021 must be rigorously scrutinised to ensure that residential community interests are not compromised.

#### Effective Noise Minimisation

The above - described regulatory vacuum could be solved if Airservices Australia were to adhere to strict "noise minimisation targets" in flight path design near airports. Hence appropriate noise abatement departure procedures should be developed for all jet departures wherever movements over residential areas are strictly unavoidable. A Survey of other airports both nationally and internationally shows that many apply "noise critical altitudes" for aircraft movements over residential areas. The following recommendations are made with these considerations in mind.

### **SUMMARY OF RECOMMENDATIONS SECTION 8**

#### **A. AN INEFFECTIVE LEGISLATIVE FOUNDATION**

**Recommendations 8.1 & 8.11:** That politicians grasp the regulatory nettle and develop Noise Impact Regulations under the Air Services Act 1995, which independently of "operational requirements" [Cf. Senator Hill's Letter] provide adequate protection of the human environment from the disturbances created by gratuitous aircraft noise; always having due regard for safety. These regulations should stipulate maximum permissible "normally acceptable" noise levels which the community should be expected to bear.

**Recommendation 8.11:** Alternatively the Federal Government should relinquish its prerogative over existing State land-use laws in respect of aircraft noise and pollution impacts and permit relevant State industrial noise policy guidelines to aircraft noise over residents.

**Recommendation 8.12:** That in addition to noise limits which provide realistic protection of the urban residential environment, the Government should enact world's best practice enforceable penalties for breaches of quantifiable

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noise offences, such as those in place at Boston Logan and Washington National airports in the USA.

**Recommendation 8.2:** That noise insulation be provided to homes and home units exposed to more than 75 dB(A) twenty times per day using the "Light General Aviation Guidelines" of Table C1 of AS2021-2000.

**Recommendation 8.3:** That alternatively all flight paths imposing such noise levels on homes and homes units be redesigned to minimise their noise impact.

*B AUSTRALIAN STANDARD AS 2021*

**Recommendation 8.4:** That the level of 50 dB(A) max recommended for relaxing and sleeping rooms in homes be retained in Australian Standard AS 2021, and that it should not be "relaxed" to a higher level to accommodate transport interests. Research should be carried out to ascertain whether the Standard should be strengthened to accommodate the more stringent international guidelines summarised in Table 8.1.3.4. [S. 8.1.3.2]

**Recommendation 8.5:** That Chairmanship of the Standards Australia Committee EV/11 responsible for developing standards of architectural acceptability and measurements for representing aircraft noise to affected residential communities be independent of any corporation or public authority which may stand to benefit from any relaxation of those standards.

**Recommendation 8.6:** That the Australian government redefines its criterion of eligibility for subsidised noise insulation to comply at least with the US 65 DNL (or 25 ANEF) level.

**Recommendation 8.7:** That all State Governments demand that the Federal Government impose aircraft noise environmental outcomes not worse than the current NSW EPA and World Health Organisation recommendations laid down in the WHO "Community Noise" and the NSW EPA "Industrial Noise Policy" documents, ie. no more than 45, 50 and 60 dB(A) Maximum levels inside suburban residents for night, evening and daytime, respectively.

**Recommendation 8.8:** That given the significant expansion of Sydney airport operations put forward in its July 2003 Draft Master Plan, serious consideration be given by the environmental authorities to implementation of the more strict human health-determined US EPA guidelines for residential noise insulation [55 Dnl; ca. 15 ANEF] and that the Airport Corporation be made liable for any resulting costs.

**Recommendation 8.9:** That the present Airservices Australia environmental goal for the impact of overflying aircraft at the 60 dB(A)  $L_{eq}$  level is unacceptable. A more reasonable standard is that of the US Environmental Protection Agency (1974) at the DNL 55 equivalent level for daytime application. Evening and Night-time activity should be reduced to the NSW EPA guideline  $L_{Aeq}(T)$  of 45 and 40 dB(A), respectively, for each period (T) of activity.

**Recommendation 8.10:** That the practice of averaging of events over twenty-four hours, or even a year, when no events occur for a significant part of that time, be abolished as recognised by the Department of Defence in submissions to the Standards Committee EV11. This will produce a level of ANEF which is far more realistic having regard to the actual impact of noise, annoyance and health and welfare of residents.

**Recommendation 8.13:** That moves to implement the N70 as the primary means of communicating noise information to the public should be resisted because it is inherently misleading and does not provide any means of implementing a regime of community noise regulation based on objective standards for noise impacts on community health. If the " $N\{dB(A)\}$ " format is to be adopted for more detailed reporting, then the reports should include the full spectrum of recorded levels [eg. 65 - 100 dB(A)] in 5dB(A) steps as superimposed areal contours, so that concerned residents can fully appreciate the extent to which they are, or are likely to be, noise exposed.

*C EFFECTIVE NOISE MINIMISATION*

**Recommendation 8.14:** That Airservices Australia be instructed to revise its arrival and departure SIDs to ensure that in addition to "noise sharing", noise will also be minimised over residential areas, where compatible with safe flying procedure.

**Recommendation 8.15:** That the use of the ICAO-A /NADP 2/AIP ENR 1.5 para 11.1.6 noise abatement procedures be mandated and, if possible, procedures better than these should be custom developed by Airservices Australia if KSA is to become "human-environment friendly" and remain Australia's premier international gateway.

**Recommendation 8.16:** That a high non-emergency "noise critical altitude" should be defined for Sydney, and noise penalties introduced for exceeding specified maximum sound level limits. SACF Inc recommends 70 dB(A) beyond 3 km from take-off.

**Recommendation 8.17:** That in northerly winds Airservices Australia be instructed to remove the departure ceiling across Sydney by directing all arrivals from north and west to track well clear of the departure tracks and at a lower altitude bringing them in to a point north of West Head and then tracking 5 n. mi off shore southwards until in position for the final procedure turn for a Botany Bay approach to Sydney Airport as per the original LTOP Plan. Similarly, aircraft arriving from the south and south west should likewise be tracked well south of Bundeena, across the Royal National Park, prior to approach over Botany Bay and Wanda. This was the proposed LTOP plan.

**Recommendation 8.18:** That in northerly winds Airservices Australia be instructed to maximise jet aircraft departure climb rates over residential areas in a manner consistent with safe operational requirements for each aircraft and so as to permit sufficient early optimal altitude gain, with possible later turns, for ground noise to be minimised over residential areas outside the airport boundaries.

**Recommendation 8.19:** That Airservices Australia be instructed to trial Continuous Descent Approach STARs for arriving aircraft over land and to compare the noise outcomes with pre-PRM conditions.

## **9. COMPENSATION FOR SEVERELY AFFECTED RESIDENTS:**

*[Refer Section 9 of Main Text]*

### ***Findings***

It is shown that given proper attention in airspace planning to over-the-water modes, Kurnell may suffer marginally greater affectation than at present. However, given proper attention to flight path configurations across Wanda, Cronulla need not experience any additional noise. A consequence of truly maximising over-the-water operations as proposed will be that significantly fewer northern hinterland residences will be demanding noise insulation, and that the expense of insulation [or voluntary relocation] will be confined to the relatively smaller number of residences at Kurnell [around 700].

## **SUMMARY OF RECOMMENDATIONS SECTION 9**

**Recommendation 9:** That the issue of what is appropriate compensation on “just terms” for loss of amenity due to aircraft impacts should be addressed by a Parliamentary Select Committee and an Airport Impacts (Residential) Compensation Bill should be enacted.