



COMMONWEALTH DEPARTMENT OF  
**TRANSPORT AND REGIONAL  
DEVELOPMENT**

# Property Values

Proposal for a Second Sydney Airport  
at Badgerys Creek or Holsworthy Military Area

# 4

**Technical Paper**

**EIS/AIRPORTS**  
**SYDNEY - 2<sup>nd</sup>**  
**BADGERYS CREEK**

**PPK**  
Environment & Infrastructure

Prepared for:



COMMONWEALTH DEPARTMENT OF  
**TRANSPORT AND REGIONAL  
DEVELOPMENT**

GPO Box 594  
Canberra ACT 2601

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**Technical Paper**

Prepared by:

**JLW Advisory**

Level 23 Grosvenor Place  
225 George Street  
Sydney NSW 2000

**PPK**

Environment & Infrastructure

ACN 078 004 798

A NATA Certified Quality Company

PPK House

PO Box 248

Concord West NSW 2138

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## **Explanatory Statement**

This technical paper is not part of the Draft Environmental Impact Statement (EIS) referred to in paragraph 6 of the Administrative Procedures made under the Environment Protection (Impact of Proposals) Act 1974.

The Commonwealth Government is proposing to construct and operate a second major airport for Sydney at Badgerys Creek. This technical paper contains information relating to the Badgerys Creek airport options which was used to assist the preparation of the Draft EIS.

The technical paper also assesses the impacts of developing a major airport at the Holsworthy Military Area. On 3 September 1997, the Government eliminated the Holsworthy Military Area as a potential site for Sydney's second major airport. As a consequence, information in this technical paper relating to the Holsworthy Military Area is presented for information purposes only.

## **Limitations Statement**

This technical paper has been prepared in accordance with the scope of work set out in the contract between Rust PPK Pty Ltd and the Commonwealth Department of Transport and Regional Development (DoTRD) and completed by PPK Environment and Infrastructure Pty Ltd (PPK). In preparing this technical paper, PPK has relied upon data, surveys, analyses, designs, plans and other information provided by DoTRD and other individuals and organisations, most of which are referenced in this technical paper. Except as otherwise stated in this technical paper, PPK has not verified the accuracy or completeness of such data, surveys, analyses, designs, plans and other information.

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## **Acknowledgments**

Data used to develop the figures contained in this document have been obtained and reproduced by permission of the Australian Bureau of Statistics, NSW Department of Land and Water Conservation, NSW National Parks and Wildlife Service (issued 14 January 1997), NSW Department of Urban Affairs and Planning and Sydney Water. The document is predominantly based on 1996 and 1997 data.

To ensure clarity on some of the figures, names of some suburbs have been deleted from inner western, eastern, south-eastern and north-eastern areas of Sydney. On other figures, only 'Primary' and 'Secondary' centres identified by the Department of Urban Affairs and Planning's Metropolitan Strategy, in addition to Camden, Fairfield and Sutherland, have been shown.

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### JLW Advisory Disclaimer

This report is confidential to the party to whom it is addressed for the specific purpose to which it refers. No responsibility is accepted to any third party and neither the whole of the report nor any part or reference thereto may be published in any document, statement or circular or in any communication with third parties without our prior written approval of the form and context in which it will appear.

We stress that the estimation of current and real estate prices and values is a problematical exercise which at best should be regarded as an indicative assessment of possibilities rather than absolute certainties. The process of making forward projections of such key elements involves assumptions respecting a considerable number of variables which are acutely sensitive to changing conditions, variations in any one of which may significantly affect the outcome and we draw your attention to this factor.

# Part A

Introduction



# CHAPTER 1 INTRODUCTION

## 1.1 INTRODUCTION

*This technical paper addresses the potential property value impacts identified as part of the previously proposed development of the Second Sydney Airport at either Badgerys Creek or the Holsworthy Military Area. It contains information used to prepare the Draft Environmental Impact Statement (EIS) which addresses the overall environmental impacts of the Badgerys Creek airport options.*

## 1.2 A BRIEF HISTORY

The question of where, when and how a second major airport may be developed for Sydney has been the subject of investigation for more than 50 years. The investigations and the associated decisions are closely related to the history of the development of Sydney's existing major airport, located at Mascot.

The site of Sydney Airport was first used for aviation in 1919. It was acquired by the Commonwealth Government in 1921, and was declared an International Aerodrome in 1935. In 1940 the first terminal building and control tower were opened.

In 1945 the airport had three relatively short runways. A major expansion began in 1947, and by 1954 the current east-west runway was opened. The north-south runway was first opened in 1954 and was extended to its current length in 1972. The present international terminal was opened in 1970.

Planning and investigations for a site for a second Sydney airport first started in 1946. A large number of possible sites both within and outside the Sydney Basin have been investigated.

The *Second Sydney Airport Site Selection Program Draft Environmental Impact Statement* (Kinhill Stearns, 1985) re-examined all possible locations for the second airport and chose 10 for preliminary evaluation. Two sites, Badgerys Creek and Wilton, were examined in detail and an EIS was prepared. In February 1986 the then Commonwealth Government announced that Badgerys Creek had been selected as the site for Sydney's second major airport.

The Badgerys Creek site, which is about 46 kilometres west of Sydney's Central Business District and is 1,700 hectares in area, was acquired by the

Commonwealth between 1986 and 1991. A total of \$155 million has been spent on property acquisition and preparatory works.

Since 1986, planning for Sydney's second airport has been closely linked to the development of the third runway at Sydney Airport. In 1989 the Government announced its intention to construct a third runway. An EIS was undertaken and the decision to construct the runway was made in December 1991.

At the same time as investigations were being carried out on the third runway, detailed planning proceeded for the staged development of the second airport at Badgerys Creek. In 1991 it was announced that initial development at Badgerys Creek would be as a general aviation airport with an 1,800 metre runway.

The third runway at Sydney Airport was opened in November 1994. In March 1995, in response to public concern over the high levels of aircraft noise, the Commonwealth Senate established a committee in March 1995 to examine the problems of noise generated by aircraft using Sydney Airport and explore possible solutions. The committee's report, *Falling on Deaf Ears?*, containing several recommendations, was tabled in parliament in November 1995 (Senate Select Committee on Aircraft Noise, 1995).

During 1994 and 1995 the Government announced details of its proposed development of Badgerys Creek, and of funding commitments designed to ensure the new airport would be operational in time for the 2000 Olympics. This development included a 2,900 metre runway for use by major aircraft

The decision to accelerate the development of the new airport triggered the environmental assessment procedures in the *Environment Protection (Impact of Proposals) Act 1974*. In January 1996 it was announced that an EIS would be prepared for the construction and operation of the new airport.

In May 1996, the present Commonwealth Government decided to broaden the environmental assessment process. It put forward a new proposal involving the consideration of 'the construction and operation of a second major international/ domestic airport for Sydney at either Badgerys Creek or Holsworthy on a site large enough for future expansion of the airport if required' (Department of Transport and Regional Development, 1996). A major airport was defined as one 'capable of handling up to about 360,000 aircraft movements and 30 million passengers per year' (Department of Transport and Regional Development, 1996).

The Government also indicated that 'Badgerys Creek at this time remains the preferred site for Sydney's second major airport, subject to the favourable outcome of the EIS, while Holsworthy is an option to be considered as an

alternative' (Minister for Transport and Regional Development, 1996). The two sites considered in this technical paper are shown in *Figure 1.1*.

Following the substantial completion of a Draft EIS on the Badgerys Creek and Holsworthy airport options, the Government eliminated the Holsworthy Military Area as a potential site for Sydney's second major airport. The environmental assessment showed that the Badgerys Creek site was significantly superior to the Holsworthy Military Area. As a result a Draft EIS was prepared which examines only the Badgerys Creek site. While this technical paper examines both the Badgerys Creek and Holsworthy airport options, only the parts of the assessment relating to the Badgerys Creek airport options were used to assist the preparation of the Draft EIS.

### 1.3 THE PROPOSAL

The Commonwealth Government proposes the development of a second major airport for Sydney capable of handling up to 30 million domestic and international passengers a year. By comparison, Sydney Airport will handle about 20 million passengers in 1997. The *Second Sydney Airport Site Selection Program Draft Environmental Impact Statement* anticipated the airport would accommodate about 13 million passengers each year (Kinhill Stearns, 1985).

A stated objective of the Government is the building of a second major airport in the Sydney region to a full international standard, subject to the results of an EIS. In the Government's view, Sydney needs a second major airport to handle the growing demand for air travel and to control the level of noise experienced by Sydney residents (Coalition of Liberal and National Parties, 1996).

Government policy (Coalition of Liberal and National Parties, 1996) indicates:

- that Sydney's second airport will be more than just an overflow airport and will, in time, play a major role in serving Sydney's air transport needs; and
- a goal of reducing the noise and pollution generated by Sydney Airport as much as possible and that the Government would take steps to ensure that the noise burden around Sydney Airport is shared in a safe and equitable way.

The assumptions made on how the Second Sydney Airport would operate and the master plans which set out the broad framework for future physical development of the airport are based on an operational limit of 30 million passengers a year. The main features include parallel runways, a cross wind

runway and the provision of the majority of facilities between the parallel runways.

Consideration has also been given to how the airport may be expanded in the future and the subsequent environmental implications. Such an expansion could not proceed, however, unless a further detailed environmental assessment and decision making process were undertaken by the Government.

Five airport options are considered, as well as the implications of not proceeding with the proposal. Three of the airport options are located at Badgerys Creek and two are located within the Holsworthy Military Area. Generally, the airport options are:

- Badgerys Creek Option A which has been developed to be generally consistent with the planning for this site undertaken since 1986. The airport would be developed within land presently owned by the Commonwealth with two parallel runways constructed on an approximate north-east to south-west alignment;
- Badgerys Creek Option B would adopt an identical runway alignment to Option A, but provides an expanded land area and also a cross wind runway;
- Badgerys Creek Option C would provide two main parallel runways on an approximate north to south alignment in addition to a cross wind runway. Again the land area required would be significantly expanded from that which is presently owned by the Commonwealth;
- Holsworthy Option A would be located centrally within the Holsworthy Military Area and would have two main parallel runways on an approximate north to south alignment and a cross wind runway; and
- Holsworthy Option B would be located in the south of the Holsworthy Military Area and would have two main parallel runways on an approximate south-east to north-west alignment and a cross wind runway.

To ensure that the likely range of possible impacts of the airport options are identified a number of different assumptions about how the airport options would be developed and operate have been adopted. These different assumptions relate to the number and types of aircraft that may operate from the airport, the flight paths used and the direction of take offs and landings.

The number of flights into and out of the proposed Second Sydney Airport would depend on a number of factors including the types of aircraft that would use the airport and the associated numbers of passengers in each aircraft. The

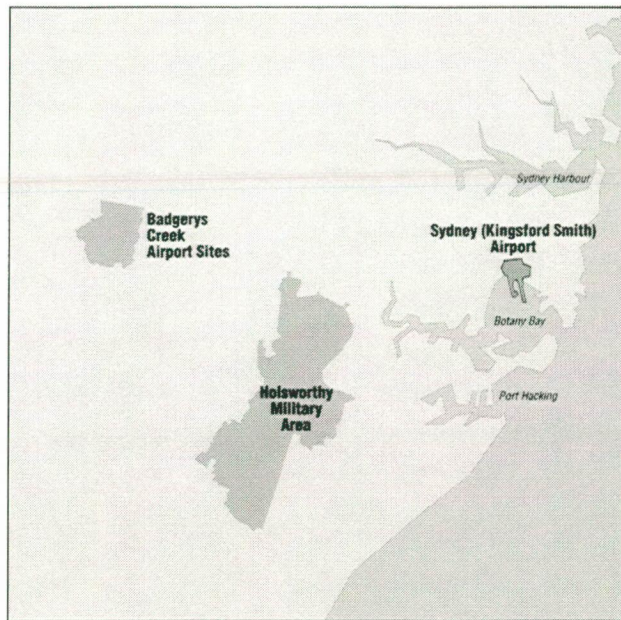
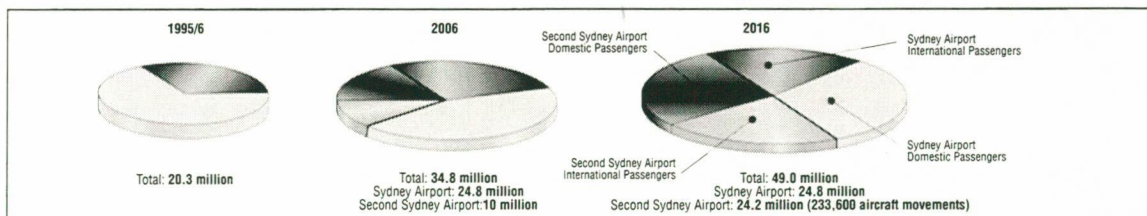


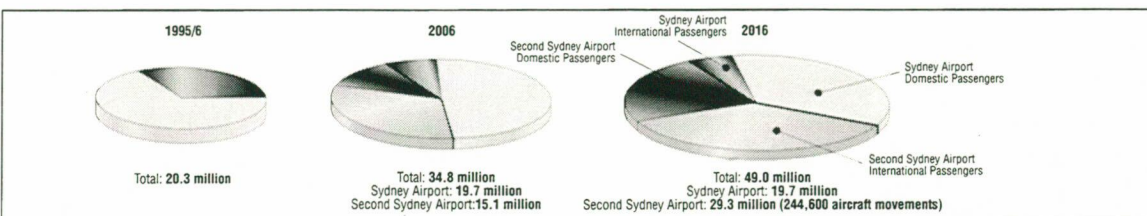
Figure 1.1  
**Potential Airport Sites Considered in the Draft EIS**



**Assumptions about Passenger Movements for Air Traffic Forecast 1**



**Assumptions about Passenger Movements for Air Traffic Forecast 2**



**Assumptions about Passenger Movements for Air Traffic Forecast 3**

Figure 1.2  
**Summary of Passenger Movement Forecasts Used for Environmental Assessment**

proposal put forward by the Government anticipates a major airport handling 30 million passengers and up to 360,000 aircraft movements per year.

Air traffic forecasts have been developed based on an examination of the number and type of aircrafts that would use the airport as it approaches an operating level of 30 million passengers per year. This examination has shown that if the airport accommodated about 245,000 aircraft movements each year, the number of air passengers would approach 30 million. This assumes a relatively high percentage of international flights being directed to the Second Sydney Airport. Therefore it is appropriate for this Draft EIS to assess the airport operating at a level of 245,000 aircraft movements per year, rather than the 360,000 originally anticipated by the Government. It has been assumed that this level of operation could be reached by about 2016.

#### 1.4 AIR TRAFFIC FORECASTS

Cities around the world which have developed second major airports have responded to their particular needs in different ways. For example, the original airport in Dallas, United States, is now used for short range traffic that does not connect with other flights. Second airports in New York and Washington serve as hubs for particular airlines. In Taipei, Taiwan, smaller domestic aircraft use the downtown airport and larger international flights use a newer airport 40 kilometres from the city.

It is clear that each metropolitan area around the world has unique characteristics and the development of multi-airport systems respond to particular local circumstances. The precise role and consequential staging of development of the Second Sydney Airport would be the subject of future Government decisions. To assist in developing a realistic assessment of the potential impacts of the Second Sydney Airport, three sets of air traffic forecasts for the airport were developed. Each forecast assumes a major airport would be developed, however, this may be achieved at different rates of growth.

The three potential air traffic scenarios considered for the Second Sydney Airport are shown in *Figure 1.2*. They are:

- *Air Traffic Forecast 1* where the Second Sydney Airport would provide only for demand which cannot be met by Sydney Airport. This is an overflow forecast, but would nevertheless result in a significant amount of air traffic at the Second Sydney Airport. The proportion of international and domestic air traffic is assumed to be similar at both airports;
- *Air Traffic Forecast 2* where the Second Sydney Airport would be developed to cater for 10 million passengers a year by 2006, with all

further growth after this being directed to the second airport rather than Sydney Airport. The proportion of international and domestic traffic is also assumed to be similar at both airports; and

- *Air Traffic Forecast 3* which is similar to Forecast 2 but with more international flights being directed to the Second Sydney Airport. This would result in the larger and comparatively noisier aircraft being directed to the second airport. It would accommodate about 29.3 million passengers by 2016.

## 1.5 OPERATION OF THE AIRPORT OPTIONS

At any airport, aircraft operations are allocated to runways (which implies both the physical runway and the direction in which it is used) according to a combination of wind conditions and airport operating policy. The allocation is normally performed by Air Traffic Control personnel.

Standard airport operating procedures indicate that a runway may not be selected for either approach or departure if the wind has a downwind component greater than five knots, or a cross wind component greater than 25 knots. If the runway is wet, it would not normally be selected if there is any downwind component. This applies to all aircraft types, although larger aircraft would be capable of tolerating relatively higher wind speeds. Wind conditions at the airport site therefore limit the times when particular runways may be selected. However, there would be a substantial proportion of the time, under low wind conditions, when the choice of runways would be determined by airport operating policy.

For the environmental assessment, the maximum and minimum likely usage for each runway and runway direction was estimated and the noise impact of each case calculated. The actual impact would then lie between these values and would depend on the operating policy which is applicable at the time.

The three airport operation scenarios were adopted for the environmental assessment, namely:

- *Airport Operation 1* shown in *Figure 1.3*. Aircraft movements would occur on the parallel runways in one specified direction (arbitrarily chosen to be the direction closest to north), unless this is not possible due to meteorological conditions. That is, take offs would occur to the north from the parallel runways and aircraft landing would approach from the south, travelling in a northerly direction. Second priority is given to operations in the other direction on the parallel runways, with operations on the cross wind runway occurring only when required because of meteorological conditions;

- *Airport Operation 2* shown in *Figure 1.4*. As for Operation 1, but with the preferred direction of movements on the parallel runways reversed, that is to the south; and
- *Airport Operation 3*. Deliberate implementation of a *noise sharing* policy under which seven percent of movements are directed to occur on the cross wind runway (equal numbers in each direction) with the remainder distributed equally between the two parallel runway directions.

Since a cross wind runway is not proposed at Badgerys Creek Option A, only Operations 1 and 2 were considered for that option.



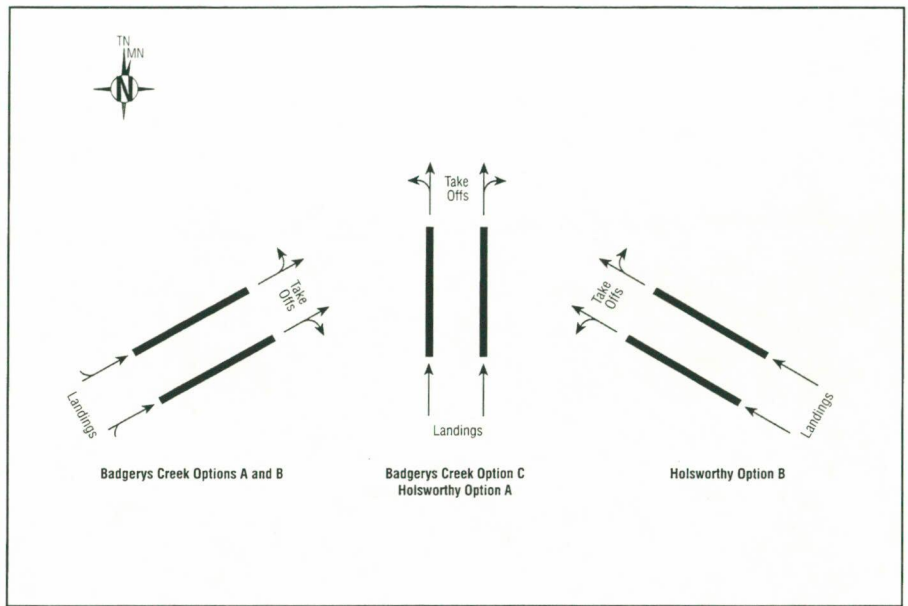


Figure 1.3  
**Predominant Directions of Movement of Aircraft  
 for Airport Operation 1**

Note: Cross wind runway used only when required  
 because of meteorological conditions

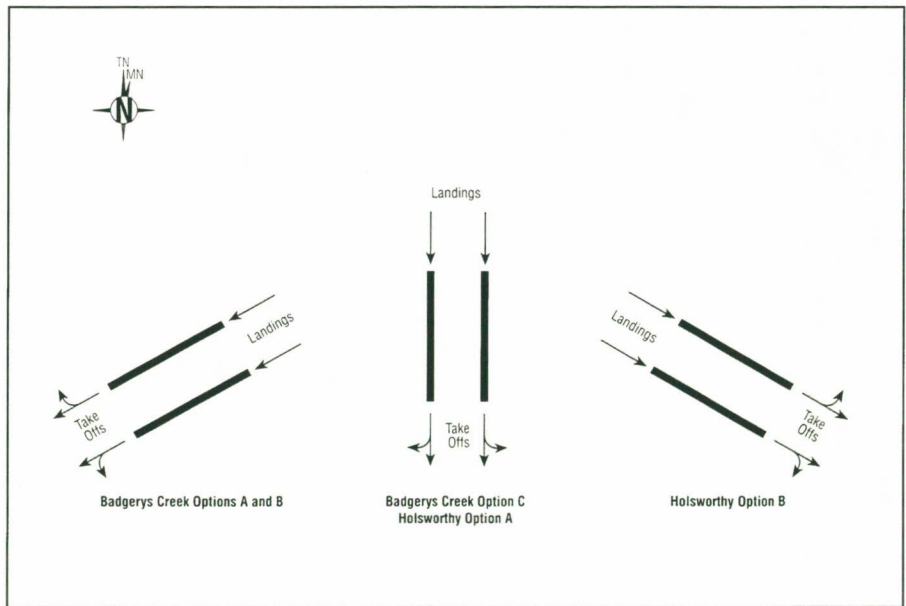


Figure 1.4  
**Predominant Directions of Movement of Aircraft  
 for Airport Operation 2**

Note: Cross wind runway used only when required  
 because of meteorological conditions

## CHAPTER 2 CONSULTATION

Preparation of this Draft EIS involved consultation with the community, other stakeholders, Commonwealth, State and local Governments and Government agencies.

### 2.1 COMMUNITY CONSULTATION

The primary role of the consultation process during the preparation of the Draft EIS was to provide accurate, up to date information on the proposals being considered and the assessment process being undertaken. From October 1996 to May 1997, ten separate information documents were released and over 400,000 copies distributed to the community. Four types of display posters were produced and 700 copies distributed. Over 140 advertisements were placed in metropolitan and local newspapers. Non English language documents were produced in 14 languages and over 20,000 copies distributed. Advertisements in seven languages were placed on ethnic radio.

Opportunities for direct contact and two way exchange of information with the community occurred through meetings, information days, displays at shopping centres, telephone conversations and by responding to written submissions. Through these activities over 20,000 members of the community directly participated in the consultation activities.

Written and telephone submissions received were incorporated into a database which grouped the issues in the same way as the chapters of the Draft EIS. The issues raised were progressively provided to the EIS study team to ensure that community input was an integral part of the assessment process.

Further details of consultation with the community and other stakeholders and its outcomes are contained in *Technical Paper No. 1 Consultation*.

### 2.2 OTHER CONSULTATION

Other consultation was also undertaken to assist in the preparation of this technical paper. The Valuer General's Department was consulted regarding existing property prices and various real estate agents were surveyed to qualitatively assess the importance of noise in affecting property values. Airservices Australia was also consulted to assist in interpreting ANEI data used for Sydney Airport.

## CHAPTER 3    **METHODOLOGY**

### **3.1    AIMS AND SCOPE OF WORK**

This paper discusses and assesses the impacts on residential property values due to aircraft noise from the five proposed options for the Second Sydney Airport.

The scope of work is to:

- review existing research and previous studies on the impacts of aircraft noise on residential property values;
- undertake a quantitative assessment of the effect of recent changes to noise levels around Sydney Airport on housing prices;
- undertake a qualitative assessment of noise effects on housing prices in lower noise locations (generally below ANEC 20); and
- estimate and forecast the impacts on residential housing values under proposed new flight zones associated with the five airport options.

The forecasts of housing values in this paper are approximate due to the difficulties associated with forecasting aircraft movements over a long period, the lack of precision in noise forecasts under a level of ANEC 20 and variability in housing markets and prices at the small area level. Furthermore, many of the areas which may experience aircraft noise from the proposed Second Sydney Airport may not have previously been subject to significant commercial aircraft over-flying. The estimation of aircraft noise impacts on property values is based on existing research undertaken for other cities and on research undertaken for the existing Sydney Airport flight paths.

The impact of aircraft noise on residential property has been the subject of numerous studies covering airports in North America, Western Europe and Australia. The remainder of this chapter examines the methods used for measuring aircraft noise related impacts on housing values, summarises the results of previous studies and describes the methodology adopted for this study.

### **3.2    MEASURING AIRCRAFT NOISE**

Aircraft noise is most commonly measured using the Noise Exposure Forecast (NEF) technique which was developed in the 1960s in the United States.

In 1979 the then Departments of Transport and Defence sponsored the National Acoustic Laboratories to undertake a major survey into community reaction to aircraft noise and an assessment of the adequacy of various noise indices (Hede and Bullen, 1982). The study concluded that 'equal energy indices' such as NEF were more highly correlated with community reactions to noise than other measures. The results of the study were used to refine the existing United States based NEF system. The refined system was renamed Australian Noise Exposure Forecast (ANEF).

The ANEF system takes account of the:

- intensity and duration of aircraft noise events;
- frequency of noise events; and
- distribution of take off and landing movements through the day and night.

The information is presented in the form of contours of equal noise exposure. The contours may represent:

- actual or historic exposure, termed Australian Noise Exposure Index (ANEI). This index is based on actual flight data from a previous year. It shows the average daily aircraft noise exposure for that year; or
- predicted exposure, termed ANEF or Australian Noise Exposure Concept (ANEC). ANEC is used to describe potential impacts of airport development and is based on indicative data on aircraft types and flight paths.

The NEF and ANEF/ANEC noise measurement systems have been used in virtually all previous studies examining the impact of aircraft noise on residential housing values.

This Draft EIS for the Second Sydney Airport provides a range of contours using the ANEC measure. These results have been used to indicate the impacts of the aircraft noise.

The potential noise impacts have been described as a possible range of impacts rather than a definitive noise impact for each community. This is because a future airport may operate in a number of different ways.

### 3.3 QUANTITATIVE STUDIES

The vast majority of research undertaken to date has been quantitative in approach, with relatively few qualitative analyses of any detail. A synopsis of relevant studies undertaken over the last 20 years is provided in *Appendix A*. The main approaches to these studies are discussed below.

#### 3.3.1 APPROACHES

##### *Hedonic Price Models*

Hedonic price models, in the form of multiple regression models, are commonly adopted. The value of a dwelling is assumed to be determined by a range of dwelling specific and locality related characteristics, such as the type of property, the number of bedrooms and rooms, the property's age, the distance to transport, socio-economic characteristics of the neighbourhood and environmental factors, such as noise. Following this logic, a multiple regression equation can be set up with the property's value as the dependant variable and the various characteristics as independent, explanatory variables.

The most common form of this regression equation is denoted as (Uyeno et al, 1993):

$$\ln H = b_0 + b_1 ANEC + \sum_{i=2}^n b_i X_i + u$$

where

$\ln H =$	the log of property value, H
$b_0 =$	a constant term
$b_1 =$	noise coefficient
$b_i =$	<i>i</i> th non-noise coefficient
$X_i =$	<i>i</i> th corresponding property characteristic
ANEC =	the measure of noise level most commonly used
$u =$	the error term

The coefficient attached to each independent variable/characteristic represents the hedonic or implied effect on price of the respective characteristic (BIS Shrapnel, 1990). Consequently, the coefficient attached to the independent variable determines how much a dwelling will change in value according to changes in each characteristic. This includes the impact of aircraft noise, as measured by ANEC.

The strength of this method is that it enables the specific contribution to values (positive and negative) of each housing characteristic to be isolated. Provided

that enough of the correct explanatory variables are included in the regression analysis and that they are accurately measured, the technique should be robust.

Weaknesses of the approach could include the following:

- it may be difficult to obtain accurate and consistent information for all the explanatory variables that are, and have to be, included in the regression model. In some cases these variables need to be approximated. There may also be a degree of subjectivity in the process of estimation, such as the “quality of a view”;
- if significant explanatory variables are not included in the regression analysis, for example because of a lack of information, then specification errors may arise where significant explanatory power is incorrectly attributed to other variables;
- the explanatory variables have to be truly independent. For example, neighbourhood characteristics can lead to problems of multi-collinearity. This may have a significant bearing on other descriptors such as the size and quality of housing; and
- if the impact of aircraft noise on values is low such as under ANEC 20, a statistically significant result may be difficult to achieve.

### *Time Series Analysis*

Where changes in noise exposure occurs between two points in time, such as in the case of the opening of the Sydney Airport third runway, movements in price indices can be used to assess the effects of aircraft noise on housing prices. This technique requires that movements in prices in the affected area be benchmarked against other unaffected areas which have similar housing characteristics. Other factors which may affect the change in median or average prices in an area such as new dwelling construction, alterations and additions activity or the opening of new roads may need to be accounted for. Also, differential growth rates may occur depending upon distance to the city centre and strength of housing sub markets.

Year on year changes in prices in small areas are likely to be more volatile than in larger benchmark areas due to the small number of sales. Also housing prices may move in anticipation of an impending change in aircraft noise (or other influence). Following a change in noise levels the market may ‘over-correct’ as existing owners sensitive to noise try to sell, leading to a relative over supply of stock. Hence time series analysis may be more appropriately undertaken for a period before and after the change in noise levels. In the case of the Sydney Airport third runway this might be an analysis of price

movements from the early 1990s, so long as other determinants of price movements can be acknowledged.

### *Repeat Sales*

In cases where before and after effects are being examined, repeat sales of the same dwelling can be used to price impacts. While the approach removes the need to adjust for basic dwelling characteristics and location factors, a reasonably large sample of dwellings may be needed. Ideally dwellings which have undergone significant capital improvements would be excluded or the value of improvements estimated. The difficulty with repeat sales analysis over short time periods is that the volume of sales is relatively low and a reasonably high proportion of sales involves substantial capital improvements.

### 3.3.2 REVIEW OF RESULTS

A summary of the results from quantitative studies undertaken in Australia and overseas is provided in *Table 3.1*. Comparisons are made by using movements in housing values per unit of NEF.

TABLE 3.1 STUDIES FOR WHICH AIRCRAFT NOISE WAS FOUND TO BE A SIGNIFICANT VARIABLE

Author	Year of Study	Location	Depreciation in Housing Value per unit NEF (%)	Comments <sup>1</sup>
<b>Australian Studies</b>				
Abelson	1977	Sydney Airport	0.4	Non-linear model. Limited to houses. Significantly greater than 25 ANEF in Marrickville
BIS Shrapnel	1990	Sydney Airport	0.4-0.6	Limited to houses. Minimum found for 20-25 ANEF range, maximum for 30-35 ANEF range - both in Marrickville
Poulsen	1990	Sydney Airport	0.86-1.1	Range for linear and non-linear models, northern flight path, applies greater than 30 ANEF
JLW Research and Consultancy	1993	Sydney Airport	0.5-1.0	Minimum found for less than 30 ANEF in Drummoyne, maximum found for greater than 35 ANEF in Sydenham

TABLE 3.1 CONTINUED

Author	Year of Study	Location	Depreciation in Housing Value per unit NEF (%)	Comments <sup>1</sup>
Burns and Associates	1990	Adelaide International Airport	0.36-0.39	Range applies to houses only in the 27.5-30 ANEF zone.
<b>Overseas Studies</b>				
Emerson	1969	Minneapolis	0.4	
McLure	1969	Los Angeles	1.6 <sup>2</sup>	
Paik	1972	New York (Kennedy)	2.0	
Roskill	1971	London (Gatwick) Medium-priced houses High-priced houses	1.6 <sup>2</sup> 2.6 <sup>2</sup>	Limited to houses and the two price brackets, as noted
Roskill	1971	London (Heathrow) Medium-priced houses High-priced houses	0.9 <sup>2</sup> 2.25 <sup>2</sup>	Limited to houses and the two price brackets, as noted
Colman	1972	Los Angeles	1.6 <sup>2</sup>	
Price	1974	Boston (Logan)	0.8	
Dygert	1973	San Francisco (San Mateo Country) San Jose (Santa Clara Country)	0.5 0.68	
Gautrin	1975	London (Heathrow)	0.5-0.68	
Nelson	1975-1978	Washington	1.0	
De Vany	1976	Dallas	0.58	Within two to three miles of the airport
Maser	1977	Rochester	1.1	
McMillan et al	1978	Edmonton	0.5	
Mieszkowski and Saper	1978	Toronto (Etobicoke, Mississauga)	0.3-1.3	Liner and non-linear models used. Limited to houses



TABLE 3.1 CONTINUED

Author	Year of Study	Location	Depreciation in Housing Value per unit NEF (%)	Comments <sup>1</sup>
Uyeno et al	1993	Vancouver	0.65-0.90	Non-linear model. Minimum detached houses, Richmond, greater than 25 ANEF, maximum units, Richmond, greater than 25 ANEF

Note: 1. Comments only noted where study reference was sighted and not referred to in another study.  
 2. Converted to NEF from alternative measurements.

Source: BIS Shrapnel (1990).

Studies indicate that changes in housing values range from a low of 0.3 percent per unit of NEF to a maximum of 2.6 percent. As would be expected the range is wide in overseas studies. The results from studies of Sydney Airport are more consistent, ranging from a minimum of 0.4 percent to a maximum of 1.1 percent per ANEF for a specific flight path.

However, the impact of aircraft noise on housing values is not found to be consistent. Several of the studies found that:

- higher value housing tends to experience greater rates of depreciation than lower value housing;
- property located in areas of higher noise levels suffer disproportionately higher rates of depreciation in comparison to areas with lower noise levels (JLW Research and Consultancy, 1993; Levesque, 1994); and
- the impact on property values from aircraft noise varies according to the type of property. Some of the studies have shown that the impact differs between housing types, such as home units, townhouses and detached houses (Uyeno et al, 1993).

### 3.3.3 PAST RESULTS FOR SYDNEY AIRPORT

The Property Values Working Paper for the *Draft Environmental Impact Statement for the Third Runway at Sydney (Kingsford Smith) Airport* (BIS Shrapnel, 1990) used a hedonic price model analysis of the influence of aircraft noise on detached and semi-detached houses in Botany, Marrickville and Rockdale.

The modelling covered a period between October 1987 and September 1988 and examined housing along the east-west and north-south runways. The

north-south model identified a negative relationship between house prices and aircraft noise levels across ANEC ranges from 20-25 to 30-35. This is shown in *Table 3.2*. Along the east-west flight paths no statistically significant negative relationship between house prices and aircraft noise levels could be identified below ANEC 30.

TABLE 3.2 ESTIMATES OF THE EFFECTS OF AIRCRAFT NOISE ON RESIDENTIAL VALUES - MARRICKVILLE

	Depreciation of House Values		
	20-25 ANEC	25-30 ANEC	30-35 ANEC
Estimated Impact	-9.8%	-14.3%	-17.9%
Confidence Interval (95%)	-5.9% to -13.6%	-8.6% to -19.6%	-10.9% to -24.3%

Source: BIS Shrapnel (1990).

House price depreciation factors along the north-south flight path as a result of a change in noise levels from one ANEC band to another were as follows:

Change in ANEC	House Price Impact
< 20 to 20/25	-9.8%
20/25 to 25/30	-5.0%
25/30 to 30/35	-4.2%
30/35 to > 35	-3.6%

Even though the total house price impact increases with ANEC level the percentage reduction reduces as ANEC rises. The reduction in values as noise levels rise to 20 to 25 ANEC from under 20 ANEC is the greatest at 9.8 percent. However this is likely to have been influenced by ANEC levels of houses sampled under 20. It may not be correct to assume that an increase from, say 17.5 ANEC to 22.5 ANEC would lead to a 9.8 percent reduction in values if the average ANEC level amongst houses sampled in the under 20 ANEC category were below 17.5.

In the *Environmental Assessment Report for the Draft Environmental Impact Statement for the Third Runway at Sydney (Kingsford Smith) Airport* prepared by the Department of the Arts, Sport, the Environment, Tourism and Territories (DASETT, 1991), criticisms of the analysis contained in the draft environmental impact statement were summarised. The major criticisms were:

- assuming that houses were not affected by aircraft noise below ANEC 20;
- suitability of the ANEC system as a measure of aircraft noise;

- allocating dwellings to the nearest ANEC band, that is, 20-25, when point estimates were possible to estimate; and
- using percentage depreciation rates derived for lower valued housing, such as in Marrickville, for other areas containing higher value housing when overseas studies have indicated that higher value properties may suffer a higher level of depreciation per ANEC unit.

As a result DASETT concluded that the effects of aircraft noise reported in the Draft Environmental Impact Statement could only be used as a general indication of those effects (DASETT, 1991).

An earlier analysis of the effects of aircraft noise on housing prices in the Marrickville and Rockdale areas was undertaken by Abelson (1981) using 1973 noise and sales data. The results showed that housing prices depreciated by around 0.4 percent per ANEI in Marrickville within the 25 ANEI. As with the *Draft Environmental Impact Statement for the Third Runway at Sydney (Kingsford Smith) Airport* (Kinhill, 1990), Abelson was not able to find a general price impact in the Rockdale area. However, the results were more significant for high priced houses over 30 ANEI.

#### 3.3.4 ISSUES

The responses to the forecasts prepared as part of the *Draft Environmental Impact Statement for the Third Runway at Sydney (Kingsford Smith) Airport* (Kinhill, 1990) highlighted many of the issues which are prevalent in the literature and research surrounding the impact of aircraft noise on property values.

##### *Neighbourhood Downgrading*

Despite the general evidence suggesting an inverse relationship between residential property values and aircraft noise, the relationships are by no means absolutely clear and the variability of results is wide. Some studies have found no relationship. A study by Pennington et al (1990) of Manchester International Airport in the United Kingdom is notable. The authors found that although aircraft noise was initially determined as a significant explanatory variable, when 31 additional variables representing neighbourhood characteristics, were added to the regression, the noise variable became statistically weak.

The limitation of Pennington et al's (1990) argument is causality. While it is feasible that aircraft noise may no longer be a determinant of property values in their study, noise may have been the cause of the change in neighbourhood characteristics that are now the most significant determinants of value. A long term change in property and neighbourhood characteristics as a result of

aircraft noise or other environmental issues may therefore affect property values and be disguised in hedonic modelling of areas which have been affected by aircraft noise for long periods.

This argument is supported by the findings in Poulsen (1990) for the eastern flight path at Sydney Airport, where no significant impact was found for any level of aircraft noise. The explanation given was that the impact of aircraft noise had been offset by the characteristics of the housing stock which were poor and had also been affected by airport related industry.

### *Short and Long Term Price Impacts*

There may be a difference between short term and long term impacts of aircraft noise. There are several possibilities:

- the first, as noted above, is for property values to be significantly affected by aircraft noise in the short term, but in the long term changes to the housing stock and residential amenity may increasingly dominate the explanation of residential property value levels;
- environmental perception and sensitivity may be highest immediately after a change in aircraft noise, particularly with publicity. As a result, markets may over adjust to the change in the short term, with prices moving back to 'equilibrium' levels in the longer term;
- buyers may not be fully informed. The ability of the market to fully factor aircraft noise into prices will be influenced by knowledge of the affectation or prior exposure. In some countries, any noise affectation is highlighted in the conveyancing process with noise emission rights or easements over relevant properties noted on land title; and
- community perceptions concerning environmental issues may vary between countries and over time. In recent years in Australia there has been an increased awareness and reaction to environmental issues in urban areas. As a result, reactions (and hence implications for housing markets) may be changing.

### *Low Levels of Aircraft Noise*

The results of the Australian National Acoustic Laboratories 1982 study (Hede and Bullen, 1982) provided information on the proportion of residents in ANEI bands who were considered to be moderately or severely affected by aircraft noise. While there was no cut-off point at which community reaction to noise increased sharply (Hede and Bullen, 1982), ANEI 20 was suggested as a level above which aircraft noise is a concern or considered as unacceptable in a residential area. At ANEI 20, 12 percent of residents surveyed were

considered to have been seriously affected by aircraft noise. This study (Hede and Bullen, 1982) therefore indicated that noise exposure in areas under ANEI 20 is not of significant concern and, therefore, it was assumed that the prices of housing would not be discounted to any measurable extent. However it is clear from Hede and Bullen (1982) that some residents did respond as being seriously or moderately affected by noise in the 15-20 ANEI zone. Therefore a cut off for housing price effects at 20 ANEI is, in theory, somewhat arbitrary and may understate price effects.

There are however practical limitations to measuring ANEI levels and house price effects below 20. Firstly, the precise measurement of ANEI contours at or below 20 is very difficult because of variations in aircraft flight paths, pilot operating techniques and meteorological conditions. Secondly, the statistical significance of hedonic model price impacts invariably diminish as ANEI levels approach or fall below 20. Estimates below 20 are likely to be very approximate. Nevertheless, it is acknowledged that housing price effects as a result of noise may occur below ANEI 20.

#### *Greenfield Airport Sites*

Virtually all of the studies to date have assessed the impact on housing and land in urban areas. Minimal study has been undertaken into the impact of aircraft noise on land values around greenfield airport sites.

### **3.4 QUALITATIVE STUDIES**

Despite the numerous quantitative studies of the impact of aircraft noise on residential property values and numerous interviews and commentaries on this matter, there are very few studies that have adopted a rigorous qualitative methodology. A review of the literature has found only three studies which assess the impact of aircraft noise on residential property values with a questionnaire/interview approach (Lucas, 1982; Frankel, 1991; JLW Research and Consultancy, 1993). Two of these studies were undertaken to provide additional material to support earlier quantitative studies.

The details of these qualitative studies are noted in *Appendix A* and the approaches used discussed below.

#### **3.4.1 APPROACHES**

Qualitative studies involve interviewing real estate agents, property valuers or property owners/occupiers. Only one study interviewed owner occupiers in the noise affected areas, whilst the other two surveyed real estate agents and valuers in the noise affected areas.

### *Occupier Surveys*

In a survey of property owners in Adelaide, Lucas (1982) attempted to assess whether the aircraft noise affected their choice of location. It also sought to illustrate how informed owners were of noise when purchasing, as well as their perception of its impact upon house prices. A number of identifiers, such as the age of the respondent, were used to analyse the responses and reveal any underlying perceptions.

### *Real Estate Agents and Valuer Surveys*

Frankel (1991) undertook surveys of real estate agents and valuers active in 35 suburbs near Chicago's O'Hare International Airport. A survey of real estate agents attempted to assess how informed purchasers were about aircraft noise, how their understanding affected their behaviour, and how the noise affected vendor behaviour. A further survey with agents and valuers attempted to establish the impact on property values associated with aircraft noise. In some cases this was achieved by comparing the sale price of 'like for like' properties in noise affected and noise unaffected areas, or by simply asking for an assessment of how much aircraft noise affected dwelling value in various areas, according to different levels of noise affectation.

## **3.4.2 REVIEW OF RESULTS**

### *Buyer and Seller Behaviour*

It was generally found that a change in aircraft noise levels in an area increased the supply of dwellings available for sale as disturbed owners chose to move on the demand side and some prospective buyers avoided noise-affected properties or sought price compensation (Frankel, 1991).

The studies produced mixed results in regard to how well informed purchasers were of the aircraft noise. Frankel (1991) found evidence of misjudged high bids that followed from a lack of information, while Lucas (1982) found evidence that purchasers were well informed about noise levels and sought price concessions.

### *Impacts on Residential Values*

All studies found a perception that residential property values were reduced by aircraft noise. The assessed impact upon value from the Frankel (1991) and JLV Research and Consultancy (1993) studies is summarised in *Table 3.3*.

The results using a qualitative methodology were generally in line, although slightly higher than those found from quantitative analysis. Frankel (1991) found that the results for low noise levels approximated the mean of the wide

range of regression studies reported in the literature for the airport in question (Chicago, O'Hare) whilst his results for high noise levels were towards the upper range found in these studies. The JLW Research and Consultancy (1993) qualitative assessment of property values in the Marrickville area of Sydney produced very similar results for the 25-30 ANEC zone, but estimated slightly higher depreciation rates for the zones above 30 ANEC, when compared to previous hedonic price modelling (BIS Shrapnel, 1990).

TABLE 3.3 RESULTS OF QUALITATIVE STUDIES<sup>1</sup>

Noise Level	Frankel (1991)		ANEC Zone: (Compared to < 20ANEC)	JLW Research and Consultancy (1993)	
	Median Assessed Reduction in Values (%)			Estimated Reduction in Property Values by Real Estate Agents	
	Real Estate Agents	Valuers		(\$)	(%)
Low	1.6%	1.2%	20 - 25	No consistent result	No consistent result
Moderate	5.5%	3.0%	25 - 30	\$10-15,000	6% - 7%
Substantial	13.0%	10.0%	30 - 35	\$25-30,000	15% - 19%
Severe	21.6%	16.5%	35 +	\$30-40,000	25%

Note 1. While the noise categories of the two studies are broadly similar, it should not be assumed that they are directly comparable.

Source: Frankel (1991), JLW Research and Consultancy (1993).

With regard to the type of property, multi-unit dwellings were perceived by both agents and valuers to have a consistently lower discount than houses. This was because attached or medium density housing is more likely to be rented, and hence owners may be less concerned about aircraft noise. Implicit in this argument is that renters are less sensitive to aircraft noise in terms of their willingness to pay a given level of rent in a noise affected locality. The relative mobility of these occupants, as opposed to home owners, may make them less attentive and/or less concerned about aircraft noise.

### 3.5 APPROACH ADOPTED FOR THIS STUDY

Given that the five proposed airport options would generate aircraft movements over areas previously never affected by major international or domestic airport operations, the assessment of noise impacts on housing and

land values has to be based on existing airport related research. Also, given the variability of results associated with overseas studies, these were not adopted for this analysis. In contrast, the results from studies of Sydney Airport were more consistent and directly comparable.

The opening of the Sydney Airport third runway provides a basis on which to test the results of previous research. It also allows for a 'before' and 'after' assessment of housing value changes at various points along the flight paths.

Large areas under the flight zones associated with the new airport options are below ANEC 25. The statistical significance of the results from previous studies at ANEC levels under 25 has been consistently very low. This was the case with both the BIS Shrapnel (1990) and Poulsen (1990) studies. The variability in the Poulsen (1990) analysis was very large, with the percent impact being in the order of 1.6 percent in the 15-20 ANEC zone on the northern flight path (compared to properties under 15 ANEC), rising to 7 percent along the western flight path. Both estimates were statistically insignificant. The author approximated the position of the 15-20 ANEC. It was not based on published levels.

Nevertheless it is important to establish, at least approximately, whether or not there is likely to be any level of price affectation below ANEC 20.

Therefore the approach adopted for this study involves:

- utilisation of results from previous research undertaken in the vicinity of Sydney Airport;
- analysis of price movements in selected areas under existing Sydney Airport flight paths, pre and post the opening of the third runway. This is undertaken at the macro level using data at postcode level and then using areas defined by ANEI levels;
- a qualitative analysis of perceptions of the impact of aircraft noise on property values in areas where ANEI levels are below 20, based on surveys of real estate agents and valuers; and
- applying the findings of noise impact derived from previous studies and the analysis of the Sydney Airport data to the estimates (forecasts) of noise affected dwellings for the five options for the Second Sydney Airport. An estimate of the net devaluation in residential property values in 2016 is then made.



# Part B

**Existing Environment**

## CHAPTER 4 EXISTING PROPERTY VALUES

### 4.1 DATA SOURCES

#### 4.1.1 NOISE EXPOSURE MEASUREMENTS

##### *Historic Analysis*

The existing noise analysis is based on ANEI estimates for Sydney Airport in 1992, 1993 and from November 1994 to November 1995. These were prepared by ERM Mitchell McCotter for use in this study. The choice of ANEI was to ensure compatibility with ANEC forecasts for the five airport options for the Second Sydney Airport and existing airport noise and property value impacts research.

#### 4.1.2 HOUSING PRICE DATA AND BENCHMARKS

A number of sources for housing price data are presently available for Sydney. They range from indices, such as those prepared by the Real Estate Institute of Australia, Residex and the NSW Office of State Revenue to individual sales and small area data. A description of each data source is contained in *Appendix B*.

### 4.2 NOISE ZONES

#### 4.2.1 BASE HOUSING AND LAND VALUES

Property values for residential land use categories have been estimated for each Community Assessment Area. These areas are described in *Technical Paper No. 3*. They are summarised in *Table 4.1*. Values are largely based on calendar year 1995 sales. At the time of compilation only part of 1996 sales were available. The assumptions and method of data collection are described below.

##### *Assumptions and Method of Data Collection*

##### *Houses/Strata Titled Dwellings*

The median house prices for each community assessment area were sourced from the postcode data in the 1996 edition of Real Estate Year Book (see *Appendix B*). They are based on all transfers registered with the Land Titles

Office up to and including 31 January 1996 as issued by the Valuer General of NSW.

Figures shown in italics have been estimated by JLW Advisory because the Community Assessment Areas did not correspond with postcodes. The estimates are based on Land Titles data at the suburb level and discussions with local real estate agents and valuers employed by the Valuer General responsible for the relevant areas.

TABLE 4.1 COMMUNITY ASSESSMENT AREAS - LAND AND HOUSING PRICES (1995)

Area No.	Postcode	Main Suburb	Other Suburbs	Houses \$'000	Rural Residential Dwelling \$'000	Strata Titled Dwellings \$'000
1	2749	Castlereagh	Cranebrook	125.3	n/a	n/a
2	2747 - 1	Llandilo	ADI	n/a	n/a	n/a
3	2760 - 2	St Marys	Dunheved	106.0	n/a	n/a
4	2770 - 1	Lethbridge Park		94.9	n/a	84.6
5	2761	Glendenning		124.2	n/a	n/a
6	2767	Doonside		129.3	n/a	n/a
7	2148 - 2	Blacktown	Kings Park, Marayong	128.6	n/a	132.4
8	2148 - 1	Blacktown		128.6	n/a	132.4
9	2766 - 2	Rooty Hill		126.4	n/a	n/a
10	2770 - 2	Mt Druitt		94.9	n/a	84.6
11	2760 - 1	St Marys		114.4	n/a	78.1
12	274 7-2	Werrington		123.3	n/a	120.7
13	2750 - 1	Penrith		133.3	n/a	95.8
14	2750 - 2	Emu Plains		143.0	n/a	n/a
15	2745 - 1	Glenmore Park	Mulgoa	160.9	384.2	148.5
16	2748 - 1	RAAF 1 CAMD Orchard Hills		n/a	200.6	n/a
17	2748 - 3	Luddenham	Badgerys Creek	140.0	200.6	n/a
18	2748 - 2	Orchard Hills		150.0	200.9	n/a
19	2747 - 3	Kingswood		123.3	n/a	120.7
20	2759 - 1	St Clair		138.9	n/a	n/a
21	2766 - 1	Eastern Creek		100.0	n/a	n/a

TABLE 4.1 CONTINUED

Area No.	Postcode	Main Suburb	Other Suburbs	Houses \$'000	Rural Residential Dwelling \$'000	Strata Titled Dwellings \$'000
22	2164	Wetherill Park	Horsley Park, Cecil Park	146.5	303.0	n/a
23	2165	Fairfield		135.0	135.0	107.6
24	2176	Bossley Park	Edensor Park, Abbotsbury	164.4	164.4	124.5
25	2171 - 4	Cecil Park		n/a	413.8	n/a
26	2759 - 2	Mt Vernon	Capital Hill	n/a	271.8	n/a
27	2171 - 10	Kemps Creek		n/a	309.1	n/a
28	2171 - 9	Kemps Creek	Austral	n/a	309.1	n/a
29	2171 - 3	Cecil Hills	Hoxton Park	240.0	421.0	n/a
30	2177	Bonnyrigg		146.4	n/a	n/a
31	2166	Cabramatta		129.9	n/a	90.6
32	2170 - 1	Chipping Norton		230.0	230.0	n/a
33	2170-6	Liverpool	Mt Pritchard	142.0	142.0	n/a
34	2168	Hinchinbrook	Busby, Green Valley	125.9	125.9	145.3
35	2171 - 7	Hoxton Park	West Hoxton	160.4	634.7	n/a
36	2171 - 7	Austral		160.4	288.0	n/a
37	2171 - 1	Rossmore		n/a	303.7	n/a
38	2171 - 2	Badgerys Creek	Bringelly	n/a	306.4	n/a
39	2745 - 2	Luddenham	Wallacia, Greendale	140.0	200.6	n/a
40	2752 - 4	Warragamba		122.4	122.4	n/a
41	2752 - 2	Silverdale		124.0	182.0	n/a
42	2745 - 3	Greendale	Bents Basin	n/a	278.6	n/a
43	2171	Bringelly		n/a	339.5	n/a
43	2570 - 5	Cobbity		149.6	339.5	n/a
44	2171 - 6	Catherine Field	Oran Park	n/a	289.9	n/a
45	2171 - 5	Leppington		n/a	319.9	n/a
46	2171	Edmondson Park		160.4	346.5	n/a
46	2174	Ingleburn Military Camp		160.4	n/a	n/a

TABLE 4.1 CONTINUED

Area No.	Postcode	Main Suburb	Other Suburbs	Houses \$'000	Rural Residential Dwelling \$'000	Strata Titled Dwellings \$'000
46	2565	Denham Court		n/a	375.5	n/a
47	2170 - 2	Prestons		160.0	n/a	n/a
48	2170 - 3	Liverpool	Lurnea, Casula	146.9	n/a	98.8
49	2170 - 4	Moorebank		172.0	n/a	n/a
50	2214	Milperra		192.3	n/a	n/a
51	2213	Panania	East Hills, Picnic Point	191.8	n/a	194.8
52	2171 - 8	Pleasure Point	Voyager Point	n/a	160.0	n/a
53	2170 - 5	Hamondville		150.0	n/a	n/a
54	2173 - 2	Holsworthy		136.0	n/a	n/a
55	2173 - 5	Wattle Grove		139.8	n/a	n/a
56	2173 - 3	Chatham Village (military land)		n/a	160.0	n/a
57	2167	Glenfield		138.9	n/a	87.0
58	2564 - 1	Macquarie Fields		126.9	n/a	96.1
59	2564 - 2	Long Point		n/a	350.0	n/a
60	2565 - 2	Ingleburn		137.1	n/a	103.1
61	2565 - 1	Varroville		n/a	160.0	103.1
62	2570	Cobbitty		n/a	339.5	n/a
63	2570	Theresa Park		n/a	213.5	n/a
64	2752 - 1	Silverdale	Linns Hill	n/a	182.0	n/a
65	2570 - 2	Werombi		n/a	160.0	n/a
66	2570 - 6	Orangeville		n/a	281.4	n/a
67	2570 - 4	Camden	Elderslie	149.6	223.9	121.3
68	2567	Narellan	Mt Annan, Currans Hill	136.2	n/a	n/a
69	2566 - 3	Raby		130.6	n/a	n/a
70	2558	Eagle Vale	Eschol Park, Kearns	124.0	n/a	112.7
71	2566 - 1	Bow Bowing		130.6	n/a	n/a
72	2566 - 2	Minto		130.6	n/a	94.4
73	2566	Minto Heights		130.6	n/a	94.4

TABLE 4.1 CONTINUED

Area No.	Postcode	Main Suburb	Other Suburbs	Houses \$'000	Rural Residential Dwelling \$'000	Strata Titled Dwellings \$'000
74	2560 - 2	Kentlyn		n/a	268.1	n/a
75	2560 - 3	Bradbury	Airds, Ruse	123.5	n/a	n/a
76	2560 - 4	Woodbine	Campbelltown	120.0	n/a	96.7
77	2559	Claymore	Blairmont	113.0	n/a	n/a
78	2560	Campbelltown		117.0	n/a	96.7
79	2560 - 5	Campbelltown		115.0	n/a	n/a
80	2560 - 6	Glen Alpine	Ambarvale	170.0	n/a	n/a
81	2560	Wedderburn		n/a	271.2	n/a
82	2173 - 1	Holsworthy Military Area		136.0	n/a	n/a
83	2234	Illawong	Menai, Lucas Heights	266.1	n/a	203.6
84	2230 - 1	Bundeena		328.9	n/a	n/a
85	2233	Audley	Royal National Park	n/a	160.0	n/a
86	2233	North Engadine	Yarrawarra	216.4	n/a	188.6
87	2233	Engadine	Heathcote	216.4	n/a	188.6
88	2233	Waterfall		200.0	n/a	n/a
89	2173 - 4	Waterfall		200.00	n/a	n/a
90	2508	Helensburgh		180.8	n/a	155.0
91	2560	Appin		120.0	n/a	n/a
92	2560 - 9	Appin		120.0	257.7	n/a
93	2560 - 7	Gilead		120	n/a	n/a
94	2568	Menangle		n/a	303.0	n/a
95	2569	Douglas Park		130.0	n/a	n/a
96	2570	Mt Hunter		160.0	n/a	n/a
97	2570 - 7	Glenmore		160.0	n/a	n/a
98	2570 - 8	The Oaks		126.0	n/a	n/a
99	2573 - 1	Thirlmere		150.2	n/a	n/a
100	2571 - 2	Wilton		105.0	n/a	n/a
101	2571 - 3	Picton		121.8	n/a	n/a
102	2573 - 2	Tahmoor		123.4	n/a	n/a

TABLE 4.1 CONTINUED

Area No.	Postcode	Main Suburb	Other Suburbs	Houses \$'000	Rural Residential Dwelling \$'000	Strata Titled Dwellings \$'000
103	2173	National Park		160.0	n/a	n/a
104	2515, 2516	Thirroul		204.0	n/a	161.3
105	2517, 2518	Corimal		172.1	n/a	128.5
106	2519 - 2	Mt Ousley		171.8	n/a	140.8
107	2777	Springwood	Winmalee, Valley Heights	148.6	n/a	n/a
107	2774	Blaxland	Warrimoo, Mt. Riverview	156.9	n/a	n/a
108	2773	Glenbrook	Lapstone	176.6	n/a	n/a

#### *Rural and Rural Residential Dwellings*

Rural and rural residential dwellings comprise dwellings zoned non-urban and occupying land greater than 2,000 square metres. Some of this relates to land which is expected to remain as larger parcels (40 hectares or larger) with improvements associated with agricultural uses, whilst other areas may be capable of further subdivision for residential purposes. The median sale price for each Community Assessment Area was based on all transfers registered with the Land Titles Office.

## CHAPTER 5 PRICE EFFECTS ON HOUSING

### 5.1 HOUSING PRICES AND CHANGES UNDER SYDNEY AIRPORT FLIGHT PATHS

The opening of the Sydney Airport third runway in November 1994 represented the first major change in aircraft operations in Sydney for several decades. ANEI levels changed as a result of increased north-south operations on the existing runway and the new runway, and the closure of the east-west runway.

The analysis undertaken of these changes involves an examination of housing price changes under the flight paths of Sydney Airport as a result of changed aircraft operations in 1994/1995. The approach used is as follows:

- establish general housing price trends in the Sydney region;
- test for differences in aggregate price movements between areas under flight paths and not under flight paths; and
- examine house price movements in ANEI zones under the flight paths, and in similar control areas away from the flight paths.

Mean or median price movements will be volatile in small areas due to the variability of stock. To minimise year on year variability changes to prices are averaged over the 1992 to 1995 period. This also allows price changes in anticipation of the opening of the third runway to be captured. It is stressed that since the opening of the third runway, aircraft operations have not been uniform. The east-west runway was re-opened for general use in April 1996, and a new system for 'spreading' noise impacts is now operating. Therefore noise impacts have been changing and community uncertainty is likely to be high. As a result housing price movements may be partly influenced by current ANEI levels and partly by the level of uncertainty surrounding future ANEI levels.

#### 5.1.1 SYDNEY METROPOLITAN AND REGIONAL HOUSING PRICE TRENDS

Median house and strata titled dwelling values are provided in detail in *Appendix B* and changes are summarised in *Table 5.1*. The data in *Table 5.1* were compiled from NSW Valuer General records of transactions and is based on exchange of contract dates.



TABLE 5.1 MEDIAN PRICE MOVEMENTS - SYDNEY REGION

	Annual Change <sup>1</sup> 1992-96	Total Change 1992-1996	Change 1994 -1995	Local Government Areas
<b>Houses</b>				
Sydney Region	3.1%	11.9%	0.5%	Excludes Gosford, Wyong, Blue Mountains and Wollondilly
Northern	3.9%	15.4%	-2.8%	Ku-ring-gai, Ryde, Hornsby, Hunters Hill, Lane Cove, Willoughby
Inner west	5.3%	21.2%	-3.3%	Leichhardt, Marrickville, Drummoyne, Concord, Burwood, Ashfield
Eastern	7.4%	30.8%	-6.8%	Botany, Randwick, Woollahra, Waverley
Southern	3.8%	14.9%	0.4%	Hurstville, Rockdale, Kogarah, Sutherland
<b>Multi-Unit Dwellings</b>				
Sydney Region	3.4%	13.3%	1.8%	Excludes Gosford, Wyong, Blue Mountains and Wollondilly
Northern	3.7%	14.7%	0.0%	Ku-ring-gai, Ryde, Hornsby, Hunters Hill, Lane Cove, Willoughby
Inner west	4.0%	15.7%	3.2%	Leichhardt, Marrickville, Drummoyne, Concord, Burwood, Ashfield
Eastern	8.0%	33.5%	0.0%	Botany, Randwick, Woollahra, Waverley
Southern	2.0%	7.6%	0.0%	Hurstville, Rockdale, Kogarah, Sutherland

Note 1. Average annual change - December 1992 to September 1996.  
Source: Allen Consulting, JLW Advisory.

Between December 1992 and September 1996 median annual growth rates for houses and units were in the three percent to 3.5 percent range for the Sydney region as a whole.

There are however clear regional differences in growth rates. The following patterns are evident:

- prices increased most in the eastern region which covers the eastern suburbs excluding the City of Sydney. Median prices for houses and units increased by 7.4 percent and eight percent per annum respectively;
- the inner west region also grew strongly, by 5.3 percent per annum for houses and four percent for units (strata titled dwellings); and
- much lower growth was experienced in 1995 in all regions reflecting the slow down in the housing market as a whole in that year. The largest fall was in the eastern region, where house prices fell by 6.8 percent in 1995.

The number of sales across the Sydney region fell in 1995 by 17 percent following a peak in activity in 1994. The slowdown in activity in the metropolitan area can be seen in *Table 5.2* which compares sales levels.

TABLE 5.2 SALES VOLUMES - SYDNEY REGION<sup>1</sup>

	1992	1993	1994	1995
Houses	34,150	37,700	43,700	37,150
Units	18,300	21,100	25,200	20,250
<b>Total</b>	<b>52,450</b>	<b>58,800</b>	<b>68,900</b>	<b>57,400</b>

Note 1. Excludes Gosford/Wyong, Blue Mountains and Wollondilly. Year to December.  
Source: Allen Consulting.

### 5.1.2 AGGREGATE PRICE IMPACTS OF THE OPENING OF THE THIRD RUNWAY (SYDNEY AIRPORT)

Previous research suggests that the opening of the third runway at Sydney Airport would have reduced housing prices in areas under existing and new flight paths to the north of the airport, and possibly increased values in areas affected by the east-west runway because of its closure in late 1994.

Under the northern flight paths, ANEI levels in 1995 increased by an average of approximately four units (see *Table 5.4*). Under the east-west approaches ANEI levels fell to nominal levels as operations ceased in all but extreme wind conditions. On the basis of previous research (BIS Shrapnel, 1990) house values under the northern approaches would be expected to have fallen by

between two percent and four percent assuming that values fell between 0.5 percent and one percent per unit rise in ANEI.

To test whether this was the case, house price movements at the postcode level between 1994 and 1995 were compared between areas under the approaches from the north (based on a funnel to the north to Hornsby), approaches from the east and west, and all other postcodes in the Sydney region.

The hypothesis was that movements in values in each postcode category would be as follows:

- average house price growth across postcodes under the northern flight paths would be less than those not under any flight path; and
- average house price growth across postcodes under the approaches to the east-west runway would be higher than those postcodes not under any flight path.

*Table 5.3* summarises the results of this analysis.

TABLE 5.3 HOUSE PRICE MOVEMENTS 1994/95

Postcode Group (Sydney Airport)	Average Change in Prices	Change in Prices (Standard Deviation)	T Statistic @ 95% Against Not Under Approaches	Number of Postcodes
Under Northern Approaches	-1.16%	5.33%	1.75	24
Not under Approaches	1.74%	7.85%	-	172
Under East/West Runway Approaches	1.55%	4.10%	0.11	20

The results suggest that in postcodes under the northern approaches house values on average fell by 1.16 percent between 1994 and 1995, compared to an average increase of 1.74 percent across areas not under flight paths. This difference was significant at the 95 percent confidence level. Therefore there was a divergence in average price growth of 2.9 percent which is broadly consistent with previous airport noise impact research for Sydney Airport (BIS Shrapnel, 1990).

Under the east-west runway approaches the difference between the means was not significant at the 95 percent confidence level. In fact the results are counter-intuitive because if the reduction in noise levels had been priced into housing a much larger increase in values would have been expected. There

are two possible reasons. Firstly, buyers may have believed that the closure was not permanent. Secondly, the postcode data does not precisely fall under flight paths. They were included if the postcode was only partly under the runway approaches. Hence the results would not be expected to be precise.

Notwithstanding the limitations of postcode data, the results suggest that the increases in aircraft noise between 1994 and 1995 did have a statistically significant negative impact on house prices under the northern approaches. The results are therefore broadly consistent with previous Australian research.

### 5.1.3 MEDIAN PRICE TRENDS UNDER THE NORTHERN FLIGHT PATH FOR SYDNEY AIRPORT

To further explore the effects of the changed aircraft noise levels at Sydney Airport at the small area level, ANEI levels were estimated along the north-south flight path to the north of the airport for 1992, 1993 and from November 1994 to November 1995. Cross sections at 90 degrees to the north-south runway axis were made at nine points as follows:

- Enmore;
- Leichhardt/Annandale;
- Drummoyne;
- Hunters Hill;
- Lane Cove/Boronia Park;
- East Ryde/Chatswood West;
- North Ryde/West Lindfield;
- West Pymble/Gordon; and
- Pymble/South Turramurra.

These cross sections are illustrated in *Figures 5.1* and *5.2*. Also shown are ANEI levels for 1995 and the approximate change in ANEI between 1992/1993 and 1995, at ANEI 10, 15, 20, 25 and 30.

Points corresponding to ANEI 10, 15, 20, 25 and 30 were joined between cross sections to define geographic units or 'housing areas' corresponding to ANEI levels.

The housing areas are set out in *Table 5.4*, together with the ANEI band in 1995 and the approximate change in ANEI between 1992/1993 and 1995. It should be stressed that the ANEI changes were quite variable along each cross section.

TABLE 5.4 SUBURBS UNDER NORTHERN FLIGHT PATH - SYDNEY AIRPORT

<b>Suburb/Locality</b>	<b>ANEI Band 1995</b>	<b>ANEI Change 1992/3 to 1995</b>
Marrickville	30+	2-3.5
Marrickville/Stanmore	25-30	2.4-4.3
Enmore/Stanmore/Leichhardt	25-30	2.4-4.2
Leichhardt	25-30	2.4-4.3
Petersham, Enmore, Lilyfield, Leichhardt	20-25	2.8-7.1
Enmore, Lilyfield	20-25	3.6-7.1
Petersham, Leichhardt	20-25	2.8-5.4
Newtown/Annandale/Lilyfield	15-20	3.8-7.1
Drummoyne	20-25	3.1-4.6
Glebe/Balmain (Control)	Under 10	-
Croydon/Ashfield (Control)	Under 10	-
Hunters Hill	20-25	3.2-5.2
Hunters Hill/Boronia Park	15-20	4.3-5.9
Gladesville	10-15	3.3-6.5
Hunters Hill	10-15	3.2-4.3
West Lane Cove	15-20	4.0-5.3
East Ryde	15-20	4.0-6.5
West Lane Cove/Riverview	10-15	2.9-4.3
East Ryde	10-15	4.6-5.5
West Lindfield/West Pymble	10-15	2.4-3.4
St Ives/East Lindfield (Control)	Under 10	-
Putney/Ryde (Control)	Under 10	-

# ANEF Cross Sections - North of Parramatta River

Upper Figures - Approximate Change in ANEF from 1992/93 to 1994/95  
 Lower Figures - ANEF Levels Nov 1994 to Nov 1995

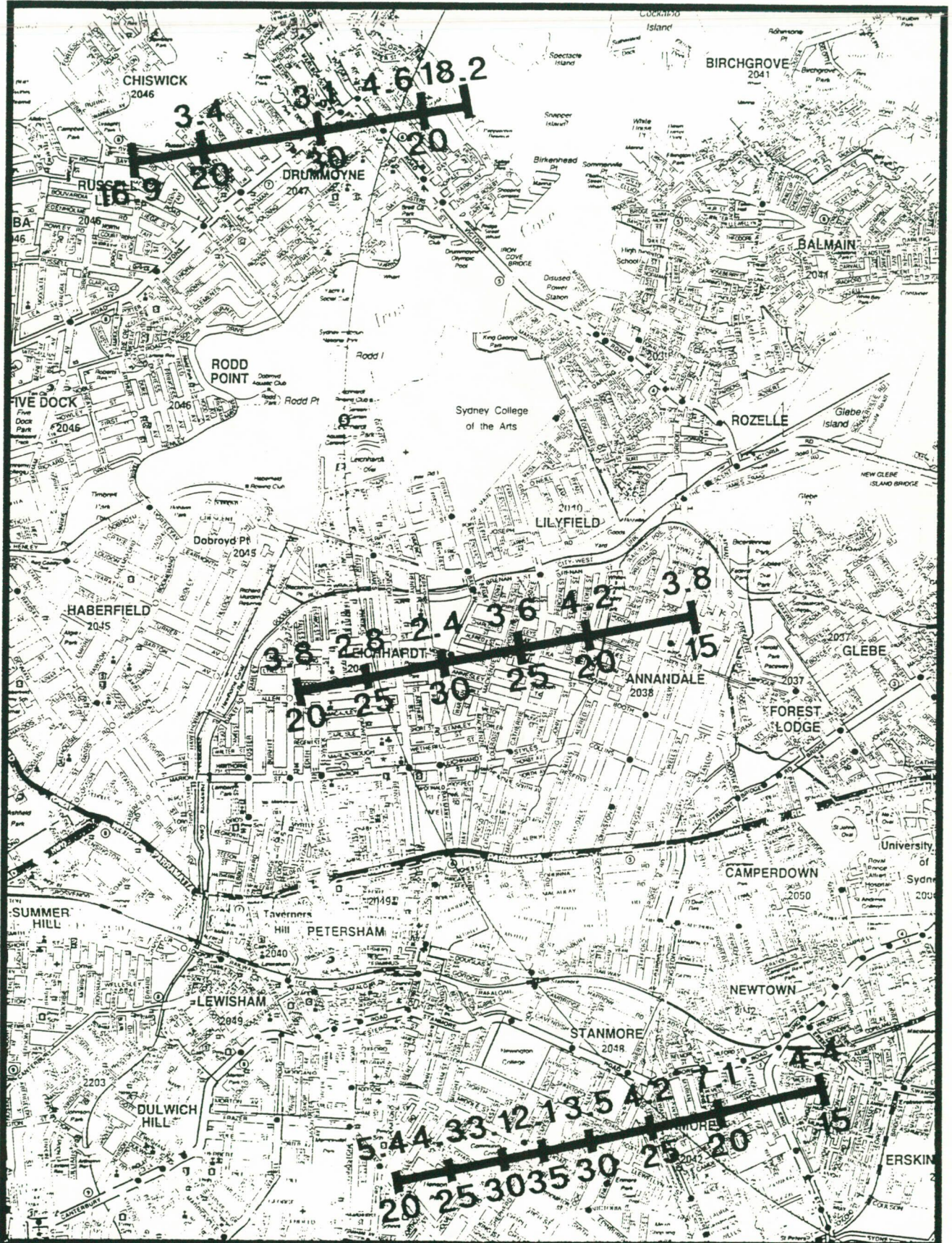


Figure 5.1

# ANEF Cross Sections - North of Parramatta River

Upper Figures - Approximate Change in ANEF from 1992/93 to 1994/95

Lower Figures - ANEF Levels Nov 1994 to Nov 1995



Figure 5.2

The largest increases in ANEI occurred in areas such as Enmore and Lilyfield which are under the approaches to the new third runway or between both runway approaches, and in the Boronia Park, Gladesville, East Ryde and West Lane Cove areas.

Price movements for each suburb together with a range of 'control' areas were extracted from NSW Valuer General records for the period from January 1992 to September 1996. Several localities such as Hunters Hill containing housing within the 20-25 ANEI in 1995 contained too few sales for meaningful analysis. Where possible these have been amalgamated with other areas. House sales were used because in most areas there were too few unit sales. Also new unit developments had a tendency to skew the results because they (or other forms of new strata titled dwellings) typically sold for higher prices than the existing stock.

*Table 5.5* provides a summary of house price movements to the north of Sydney Airport between 1992 and 1996. For each area the total price movement by quartile is shown together with the mean price movement. Median and mean house price movements in 1994 and 1995 are also shown together with the change in house sales volumes. Several points can be drawn from the table as follows:

- Marrickville, containing houses at ANEI levels above 30 in 1995 experienced a significant reduction in median and mean prices in 1995, compared to 1994, though the volume of sales was relatively low. However, for the whole 1992 to 1996 period, median and mean price growth was not significantly different to that of the inner west as a whole. The ANEI change from 1992/3 to 1995 was between two and 3.5;
- Marrickville/Stanmore and the Petersham, Enmore, Lilyfield and Leichhardt areas (being in the 25-30 and 20-25 ANEI in 1995) showed price movements very similar to the control areas (inner west, Glebe/Balmain and Croydon/Ashfield). There was a reasonably consistent pattern of price growth (1992-1996). Growth rates fell with distance from the City centre. While Marrickville/Stanmore did experience lower overall price growth between 1992 and 1996 than other areas in the inner west, there was no reduction in prices in 1995.

It was possible that the eastern parts of Marrickville/Stanmore and the Petersham, Enmore, Lilyfield and Leichhardt areas being between the existing northern flight path and that of the new third runway would have experienced a more significant price change compared to western parts of these areas. To test this, these areas were split into western and eastern components. The results did not confirm the hypothesis. In fact properties on the eastern shoulder of the main north-south runway appreciated at least as much or more than those on the western shoulder. Stronger price growth closer to the City centre may have contributed to this;



- Newtown/Annandale/Lilyfield is under the flight path of the third runway and experienced a relatively large rise in ANEI in 1995 (between 3.8 and 7.1). The area was in the 15-20 ANEI band in 1995. Median price growth between 1992 and 1996 and in 1994/95 was very similar to the Glebe/Balmain control area to the east;
- Boronia Park and Hunters Hill experienced a significant drop in sales activity in 1995. Median and mean price growth was well under growth for the northern Sydney region. Middle and upper quartiles grew very little. Sales price movements on the Hunters Hill peninsula are volatile and heavily influenced by waterfront sales;
- a clearer pattern emerged when areas to the north of the Parramatta River were grouped according to the 1995 ANEI level. In the 15-20 ANEI band (Hunters Hill/Boronia Park; West Lane Cove and East Ryde) median and mean price movements were well below the northern Sydney region control area. Sales volumes were also down 24 percent compared to minus 10 percent in the northern control area;
- once areas in ANEI 10-15 were aggregated any third runway price effect possibly evident in some suburbs disappeared. Median and mean price growth was at least equal to northern Sydney region and no fall in medians or means were evident in 1995, even though northern Sydney region as a whole fell three percent on both measures; and
- even though Lane Cove West/Riverview appeared to experience a significant fall in median and average values in 1995, median and mean price growth was around 30 percent for the 1992 to 1996 period, well in excess of the northern Sydney region growth rates.

TABLE 5.5 HOUSE PRICE TRENDS FOR NORTHERN FLIGHT PATH (SYDNEY AIRPORT)

Suburb/Locality	ANEI 1995	House Sales Per Annum	House Price Change 1992-1996			House Price Change 1994-1995			Change in Number of House Sales	Median 1995 \$'000	Comment
			Percent Lower Quartile	Percent Median	Percent Upper Quartile	Percent Mean	Percent Median	Percent Mean			
Marrickville	30-35	76 <sup>a</sup>	17	21	18	20	-17	-25	-17%	201.5	
Marrickville/ Stanmore	25-30	308	22	22	22	22	-1	1	-20%	225.0	
Enmore/Stanmore/ Leichhardt	25-30	178	30	32	25	25	0	2	-10%	235.0	
Leichhardt	25-30	142	20	12	13	19	0	-3	-32%	211.25	
Petersham/Enmore/ Lilyfield/Leichhardt	20-25	324	31	25	19	26	-2	1	-30%	230.0	
Enmore/Lilyfield	20-25	153	27	27	18	21	7	7	-36%	259.0	
Petersham/ Leichhardt	20-25	133	34	27	25	39	-5	-5	-20%	207.5	
Newtown/ Annandale/Lilyfield	15-20	237	39	36	27	29	-1	1	-18%	235.5	
Drummoyne	20-25	83 <sup>1</sup>	18	25	20	17	-9	-4	-24%	290.0	
Hunters Hill/ Boronia Park	15-20	83 <sup>1</sup>	23	6	6	6	-7	4	-40%	447.5	

TABLE 5.5 CONTINUED

Suburb/Locality	ANEI 1995	House Sales Per Annum	House Price Change 1992-1996				House Price Change 1994-1995			Median 1995 \$'000	Comment
			Percent Lower Quartile	Percent Median	Percent Upper Quartile	Percent Mean	Percent Median	Percent Mean	Change in Number of House Sales		
Gladesville	10-15	94 <sup>1</sup>	36	25	20	25	2	6	-26%	297.5	
West Lane Cove	10-15	90 <sup>1</sup>	36	31	28	29	-9	-5	-31%	330.0	
East Ryde	10-15	54 <sup>1</sup>	22	18	17	11	0	4	0%	233.5	
West Lindfield/ Pymble	10-15	117	6	7	3	1	2	3	+14%	335.0	
<b>Grouped Areas</b>											
Hunters Hill/West Lane Cove/East Ryde	15-20	130	22	9	-5	3	-15	-5	-24%	340.0	
West Lane Cove/ East Ryde/West Lindfield/Hunters Hill	10-15	374	21	24	18	16	1	4	-9%	321.8	
Marrickville - Leichhardt	15 - 35	665	24	24	25	25	-1	-3	-29%	225.0	
<b>Control Areas</b>											
St Ives/East Lindfield		201	9	7	0	4	-1	3	-20%	429.0	Control for West Lindfield/Pymble

TABLE 5.5 CONTINUED

Suburb/Locality	ANEI 1995	House Sales Per Annum	House Price Change 1992-1996				House Price Change 1994-1995			Median 1995 \$'000	Comment
			Percent Lower Quartile	Percent Median	Percent Upper Quartile	Percent Mean	Percent Median	Percent Mean	Change in Number of House Sales		
Putney/Ryde/ Marsfield		233	20	20	22	26	2	3	-13%	264.0	Control for Hunters Hill/ Boronia Park; Gladesville; and East Ryde
Glebe/Balmain		306	26	33	30	28	-1	-1	-16%	296.0	Control for Marrickville; Marrickville/ Stanmore; Petersham, Enmore, Lilyfield, Leichhardt and Newtown/ Annandale/Lilyfield
Croydon/Ashfield		421	17	24	21	18	0	-1	-17%	253.0	Control for Marrickville; Marrickville/ Stanmore; Petersham, Enmore, Lilyfield, Leichhardt and Newtown/ Annandale/Lilyfield

TABLE 5.5 CONTINUED

Suburb/Locality	ANEI 1995	House Sales Per Annum	House Price Change 1992-1996			House Price Change 1994-1995			Change in Number of House Sales	Median 1995 \$'000	Comment
			Percent Lower Quartile	Percent Median	Percent Upper Quartile	Percent Mean	Percent Median	Percent Mean			
- Northern		5,352	15	15	15	14	-3	-3	-10%	310.0	See <i>Table 4.3</i>
- Inner west		3,577	21	21	22	19	-3	-5	-10%	232.0	See <i>Table 4.3</i>
- Sydney Region		38,178	8	12	13	10	0	0	-15%	220.0	See <i>Table 4.3</i>

Note 1. Small number of sales.

#### 5.1.4 PRICE TRENDS UNDER THE EASTERN AND WESTERN FLIGHT PATHS FOR SYDNEY AIRPORT

Even though the Sydney Airport's east-west runway has been re-opened, the intention at the time of developing the third runway was to substantially reduce east-west landings and take offs. Between November 1994 and April 1996 the volume of aircraft movements using the east-west runway was very low.

Table 5.6 describes aircraft noise levels in areas under the western and eastern approaches to Sydney Airport. ANEI levels in 1992/93 were used to select each area and the extent of each area is shown on Figures 5.3 and 5.4. Control areas were chosen on either side of the affected suburbs.

TABLE 5.6 SUBURBS UNDER EASTERN AND WESTERN FLIGHT PATHS - SYDNEY AIRPORT

Suburb/Locality	ANEI Band 1992/3	ANEI Change 1992/3 to 1995
Kingsford/South Coogee	20-25	10 to -15
Matraville/Maroubra (Control)	Under 10	-
Randwick/Bronte (Control)	Under 10	-
Rockdale	25-30	10 to -15
Penshurst	20-25	10 to -15
Peakhurst/Mortdale	15-20	Over -10
Kingsgrove (Control)	Under 10	-
Blakehurst/South Hurstville (Control)	Under 10	-

Price movements in each area between 1992 and 1996 are described in Table 5.7.

TABLE 5.7 HOUSE PRICE TRENDS FOR EAST-WEST FLIGHT PATHS (SYDNEY AIRPORT)

Suburb/Locality	ANEI 1992/3	House Sales Per Annum	House Price Change 1992-1996				House Price Change 1994-1995			Median 1995 \$'000	Comment
			Percent Lower Quartile	Percent Median	Percent Upper Quartile	Percent Mean	Percent Median	Percent Mean	Change in Number of House Sales		
Kingsford/South Coogee	20-25	173	27	26	24	27	6	7	-3%	353.0	
Rockdale	25-30	100	26	33	34	33	10	16	8%	220.0	
Penshurst	20-25	76 <sup>1</sup>	26	25	26	17	-1	-3	-20%	246.0	
Peakhurst/Mortdale	15-20	71 <sup>1a</sup>	27	29	25	27	-1	-3	-13%	203.0	
<b>Control Areas</b>											
Matraville/ Maroubra	Under 15	135	15	16	14	12	-4	-5	6%	297.0	
Randwick/Bronte	Under 15	152	41	63	76	59	14	15	-30%	444.8	
Kingsgrove	Under 15	184	14	13	16	15	1	-3	-13%	270.0	
Blakehurst/South Hurstville	Under 15	134	15	21	13	13	-1	1	-24%	245.5	
- Eastern	-	2,143	30	31	31	30	-7	-9	5%	345.0	See Table 5.1
- Southern	-	4,249	17	15	13	14	0	1	-9%	241.0	See Table 5.1
- Sydney Region	-	38,178	8	12	13	10	0	0	-15%	220.0	See Table 5.1

Note 1. Small number of sales.





# Eastern Flight Path Zones

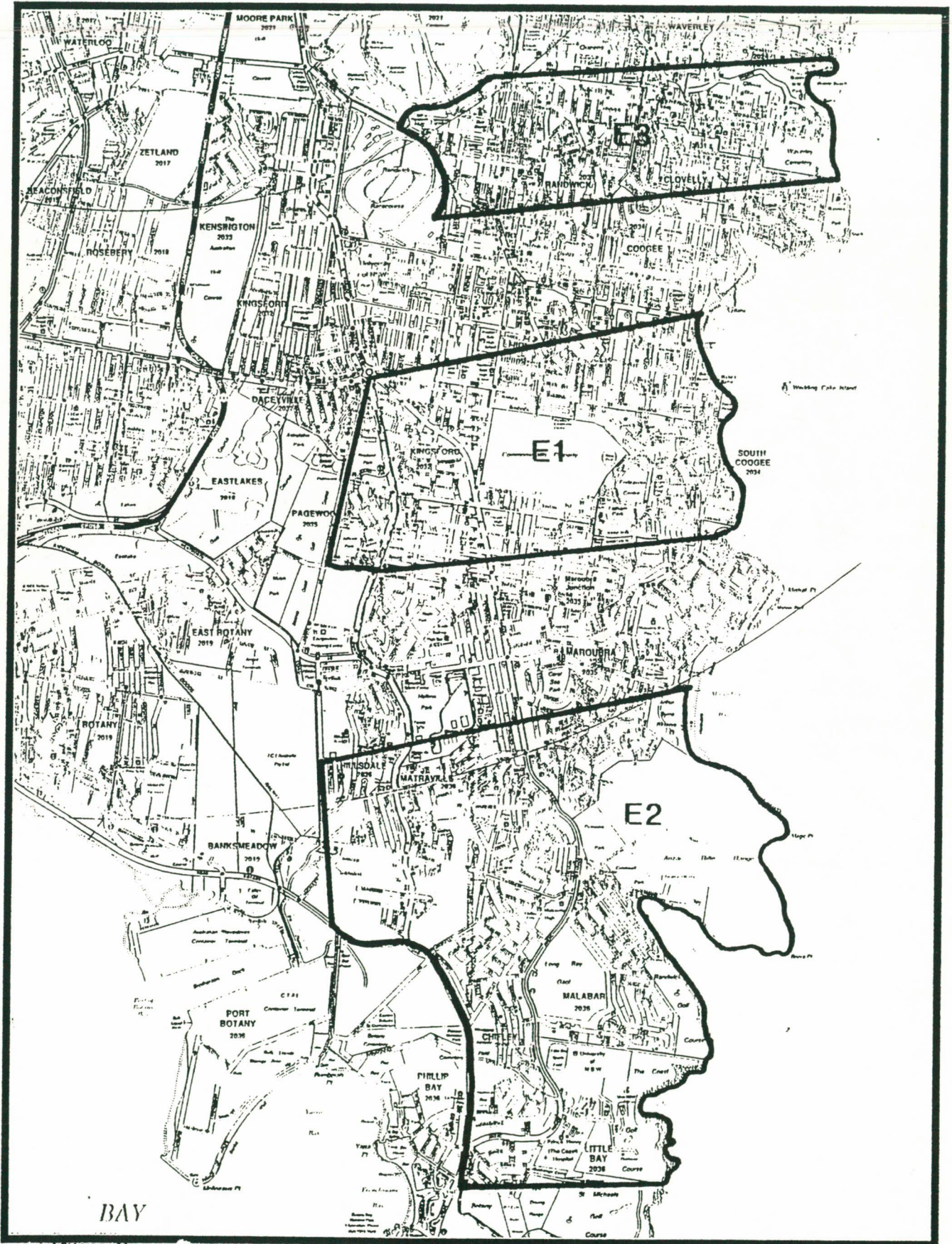


Figure 5.4

Houses in areas west of Sydney Airport which had previously been under the flight path (Rockdale; Penshurst; and Peakhurst/Mortdale) experienced median price increases of between 25 percent and 33 percent for the 1992 to 1996 period. However only Rockdale which was in the 25-30 ANEI in 1992/3 experienced a rise in prices in the year following the closure of the east-west runway. Control areas to the north (Kingsgrove) and south (Blakehurst) experienced lower overall growth rates.

Median house prices in Kingsford/South Coogee increased by 26 percent between 1992 and 1996 and six percent in 1995. However there were substantial differences between the control areas to the north and south. To the north, median house price growth in Randwick/Bronte was very high, up 63 percent over the same period. Price growth to the south was much lower at 16 percent.

It could not be concluded that median price growth in Kingsford/South Coogee was a direct result of the reduction in aircraft noise. Rather, growth is consistent with wider house price trends in the area over the period being examined.

#### **5.1.5 OTHER INFLUENCES ON HOUSING VALUES UNDER FLIGHT PATHS**

Apart from general influences on housing markets such as interest rates, other factors which may have changed housing values in those areas affected by changes in aircraft noise are discussed below.

##### *Housing Supply and Improvements*

###### *Dual Occupancy Housing*

In December 1991 *State Environmental Planning Policy No. 25* was amended to permit Torrens title subdivision across all local government areas in Sydney. This permitted subdivision down to 230 square metres. As a result, development of dual occupancy dwellings increased significantly in local government areas such as Ryde and Lane Cove where existing lot sizes were relatively large.

In May 1995 the subdivision clause was removed and meant that dual occupancy developments could then only offer separate title in areas permitting strata titled dwellings to be constructed.

Intensive dual occupancy development activity has the potential to influence price movements over the short term if this type of dwelling is a typical of a suburb or is priced above or below the median. Also acquisition of houses by developers may be at higher prices reflecting the subdivision potential.

### General Supply

Housing markets across Sydney experienced a large increase in new construction in the period from 1992 to 1994. In middle ring and inner suburbs medium density housing construction was relatively high. Surges in new dwelling construction have the potential to change median and average prices if the balance between older and new sales shifts.

Dwelling construction volumes are summarised in *Table 5.8*.

TABLE 5.8 NUMBER OF DWELLINGS COMMENCED BY LOCAL GOVERNMENT AREA

Local Government Area	1993	1994	1995	1996 to June	House Starts as a Percent of Stock <sup>1</sup>	Total Starts as a Percent of Stock <sup>1</sup>
Leichhardt	133	149	545	292	0.14%	1.03%
Marrickville	326	331	158	53	0.05%	0.87%
Drummoyne	37	139	153	82	0.19%	0.84%
Hunters Hill	48	55	50	32	0.79%	1.22%
Lane Cove	113	89	139	40	0.35%	0.95%
Ryde	658	484	696	387	0.45%	1.72%
Ku-ring-gai	177	384	268	123	0.46%	0.82%
Randwick	582	484	760	510	0.24%	1.30%
Botany	79	72	90	71	0.13%	0.62%
Hurstville	259	409	635	369	0.30%	1.79%
Kogarah	172	207	429	71	0.56%	1.50%
Rockdale	219	493	373	143	0.30%	1.09%

Note: 1. Average annual commencements 1993-1995 against housing stock in 1991.  
Source: Australian Bureau of Statistics.

Annual dwelling commencements as a proportion of existing housing stock varied from around 0.6 percent to almost 1.8 percent in the local government areas containing the housing areas under the flight paths. House starts include new houses and detached dual occupancy dwellings on Torrens titles. House starts in Leichhardt, Marrickville and Drummoyne were very low, in part reflecting the limited opportunities for new house construction due to existing densities of development. Development is more likely to be in the form of medium density housing. As a result these areas would be less influenced by

new house sales. New house construction was relatively high in local government areas north of the Parramatta River and in Kogarah.

#### *Alterations and Additions to Dwellings*

Alterations and additions to dwellings in relevant local government areas costing over \$10,000 are provided in *Table 5.9*. Average annual expenditures are shown in nominal dollar terms and as a dollar value per dwelling (based on 1991 census counts). Expenditure levels are highest in areas with higher median house prices such as in Hunters Hill and may in part reflect the size of dwellings. Expenditure in Leichhardt and Drummoyne was noticeably higher than in Marrickville and may be an indicator of a 'gentrification' trend. It should also be noted that parts of Marrickville and Leichhardt have been part of the *Sydney Aircraft Noise Insulation Program*.

TABLE 5.9 DWELLINGS ALTERATIONS AND ADDITIONS

<b>Local Government Area</b>	<b>Average Value 1993-1996 \$'000 per annum</b>	<b>Average Annual Value of Additions per Dwelling</b>
Leichhardt	23,239	\$867
Marrickville	11,961	\$384
Drummoyne	9,980	\$765
Hunters Hill	8,241	\$1,968
Lane Cove	15,461	\$1,287
Ryde	19,106	\$535
Ku-ring-gai	50,688	\$1,499
Randwick	24,916	\$532
Botany	5,245	\$407
Hurstville	9,600	\$395
Kogarah	12,506	\$695
Rockdale	10,745	\$323

Source: Australian Bureau of Statistics, 1991.

### *Road Infrastructure*

Major road infrastructure changes in the Sydney region since 1990 include:

- Gore Hill Freeway and Harbour Tunnel opened in August 1992. This has improved travel times into the city from the north shore/north-west and reduced congestion on Epping Road, benefiting areas such as Lane Cove and Ryde;
- Glebe Island Bridge and Arterial opened in December 1995. This has improved accessibility into the city from the inner west and north-west by reducing peak hour congestion on Victoria Road east of Drummoyne; and
- the M2 Motorway linking Ryde to Baulkham Hills in 1997. Reductions in traffic congestion on Epping Road are predicted, though community uncertainty surrounds the future upgrading of Epping Road between North Ryde and the Gore Hill Expressway.

### *Sydney Olympics*

Awarding of the year 2000 Olympic Games to Sydney in October 1993 has possibly had a positive influence on the housing market in inner west regions.

### *Industry*

Apart from areas around Marrickville, the North Ryde and Lane Cove industrial areas are the only major concentrations of industry in the vicinity of the housing in the areas being examined under the northern flight paths for Sydney Airport. West Lane Cove has traditionally had lower housing prices as a result of its proximity to industry. While there was no change in the status of the areas over the 1992 to 1996 period, any gentrification trends may be less evident than in areas away from industry.

#### **5.1.6 CONCLUSIONS AND DIRECTIONS FOR THIS STUDY**

The analysis of changes in property values in areas under Sydney Airport flight paths between 1992 and September 1996 as a result of aircraft noise does not provide a basis for firm conclusions. It does however provide some evidence as to what level of aircraft noise (ANEC) provides a reasonable cut off point for estimating any likely impact on housing values. Based on the above analysis some conclusions can be drawn as follows:

- the opening of the Sydney Airport third runway and resulting changes to aircraft operations on the northern approaches increased ANEI levels by between 2.0 and 7.1 units. There was a high level of variability in

the results at the small area level due in part the heterogeneity of the housing stock, relatively small number of sales and the influence of other factors such as the increasing popularity of inner suburbs in recent years. Also, 1995 coincided with a general housing market slow-down;

- several areas such as Marrickville (1995 ANEI 30-35) and Drummoyne (1995 ANEI 20-25) displayed a significant housing price shift between 1994 and 1995. However nearby areas such as Marrickville/Stanmore (1995 ANEI 25-30) and Petersham, Enmore, Lilyfield and Leichhardt did not appear to suffer any housing price impact in 1994/95;
- the analysis does suggest that an ANEC 20 cut-off for housing price impacts may be too high, especially in areas with higher priced housing. A price effect was evident between 15 and 20 ANEI following the opening of the third runway.

Once areas at ANEI 15-20 in 1995 to the north of the Parramatta River were grouped the difference in house price growth in 1994/95 and between 1992 and September 1996 was more reliable. Compared to the northern Sydney region as a whole, price growth in areas subject to ANEI 15-20 (1995) was around six percent down based on medians for the 1992-1996 period.

This result assumes that movements in the housing markets in these areas accurately reflected the long term effects on prices assuming runway operations prevailing in 1995 had continued. What effect, if any, the publicity surrounding the opening of the third runway had on the market at the time cannot be established with any accuracy. The interviews with real estate agents undertaken for this study assisted in this interpretation; and

- the results do support previous research that higher priced areas are more likely to suffer a greater percentage price affect from changes in aircraft noise. This may assist in explaining why Drummoyne experienced a nine percent fall in house values in 1995 over 1994 whereas in a nearby area (Leichhardt) median prices fell by two percent. Median house values in Drummoyne were \$286,000 in 1995, compared to \$230,000 in Petersham, Enmore, Lilyfield, and Leichhardt and \$220,000 for Sydney as a whole.

To the north of Parramatta River median prices are higher. Areas in 15-20 ANEI in 1995 including parts of Hunters Hill, Boronia Park and West Lane Cove had median values of \$340,000 in 1995. These areas were the most severely affected.

## 5.2 SURVEY OF REAL ESTATE AGENTS

### 5.2.1 OBJECTIVE OF SURVEY

The purpose of this survey was to further assess the possible impact upon residential property values of aircraft noise and over flying in areas below the 20 ANEC level, given the inconsistent results obtained from quantitative research. The questionnaire used for the survey is included in *Appendix C*.

### 5.2.2 SURVEY APPROACH

Face to face interviews were undertaken with 28 real estate agents, covering six areas under the northern flight path of Sydney Airport from Hunters Hill to West Pymble. Real estate agents were asked to compare identical dwellings in two nearby areas; one under the flight path within the 10-15 or 15-20 ANEI (1995) and another area below 10 ANEI which was used as a control area. The comparison areas are shown in *Figures 5.5* and *5.6* and summarised below in *Table 5.10*.

TABLE 5.10 AREAS SURVEYED<sup>1</sup>

Interview Area	Comparison Areas		Number of Real Estate Agents Surveyed
	Subject Area (A)	Control Area (B)	
1	Hunters Hill	Woolwich	4
2	Boronia Park	Gladesville	4
3	East Ryde	Ryde	4
4	West Lane Cove	Lane Cove	6
5	West Lindfield, Killara	East Lindfield	6
6	West Pymble	Pymble, St Ives	4

Note. 1. Interview areas 2 and 3 were not included in the price analysis because of difficulties associated with the delineation of contributing factors.

### 5.2.3 QUESTIONNAIRE

The questionnaire was divided into two parts:

- the first part required real estate agents to establish the price differential for an identical house (block size and house) in each pair of areas being compared (see *Table 5.11*), and then assess a range of environmental and amenity characteristics which would contribute to any differential

# Real Estate Agent Survey - Subject and Control Areas

## Ryde/Hunters Hill/Lane Cove

Subject Areas - A

Control Areas - B

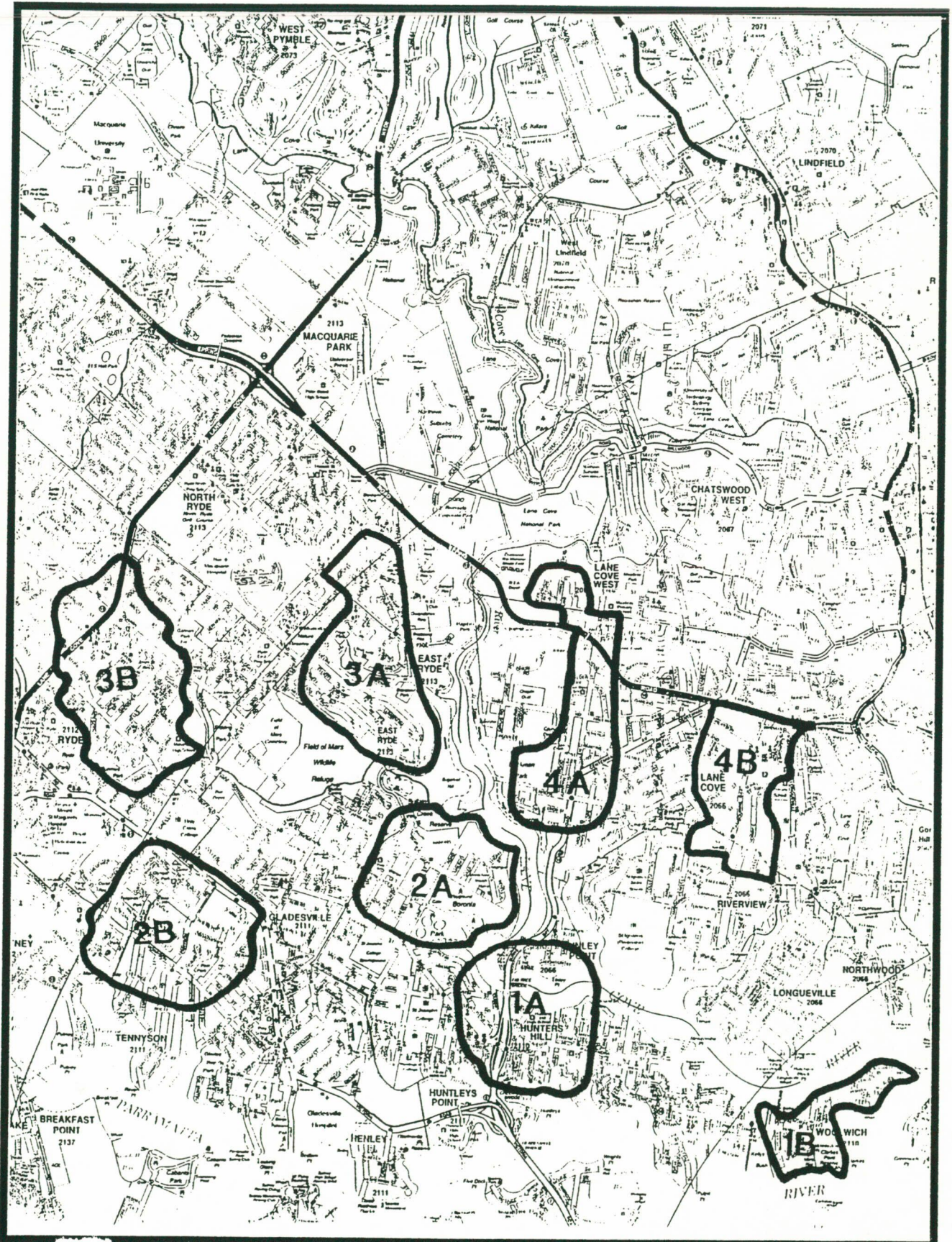


Figure 5.5



# Real Estate Agent Survey - Subject and Control Areas

## Pymble/Lindfield

Subject Areas - A

Control Areas - B

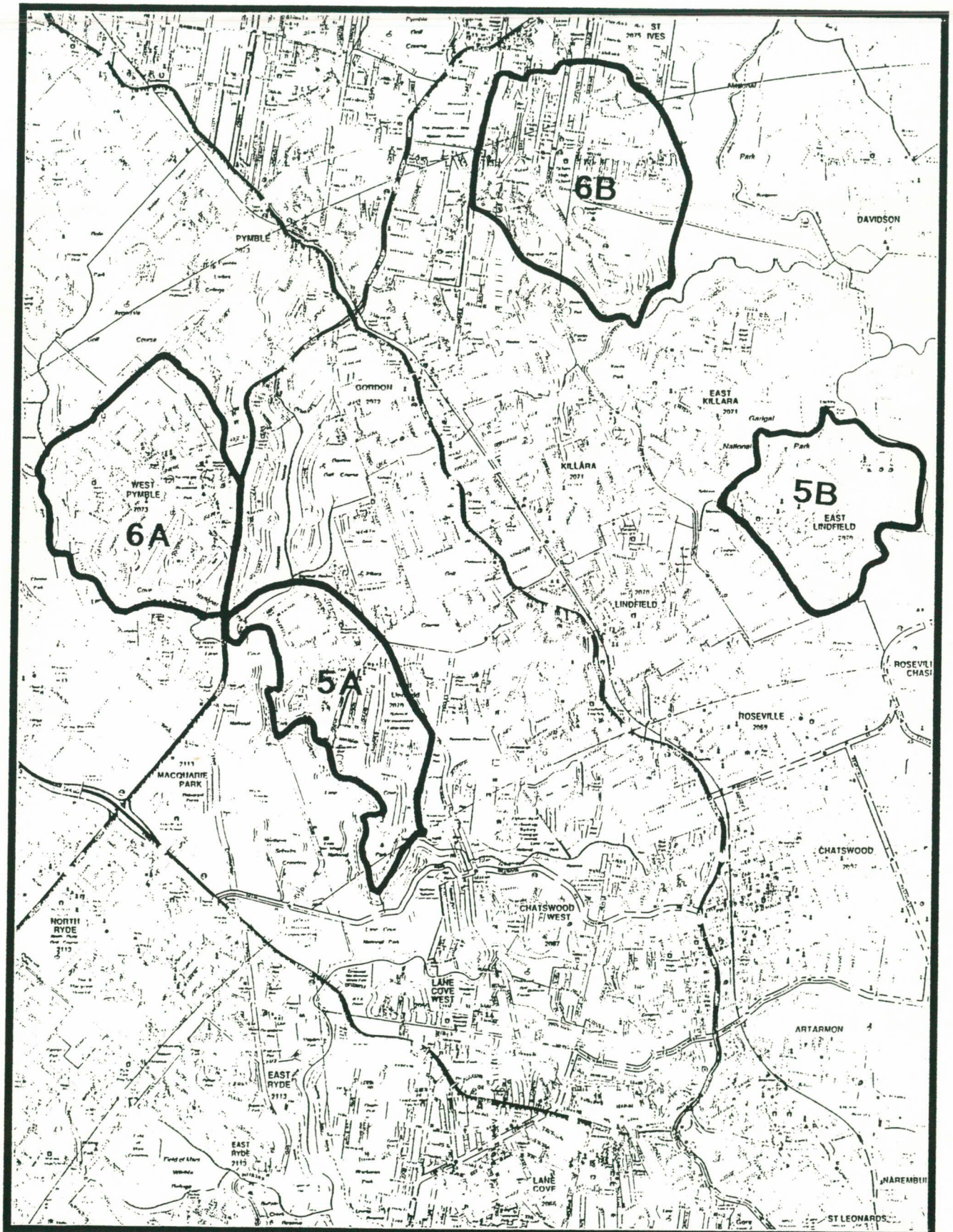


Figure 5.6

in price. The houses and the assumptions of house characteristics for each interview area are included in *Appendix C*.

Real estate agents were then required to estimate the contribution of these environmental and amenity factors towards the differential in price between an identical house in the two areas; and

- if aircraft over flying and noise was identified as a significant factor affecting housing prices, real estate agents were then asked a series of questions about how buyer behaviour may have been altered. Any changes in behaviour between the period after the opening of the third runway when the east-west runway was closed for general use and its subsequent re-opening was also sought.

#### 5.2.4 BIAS AND SURVEY ISSUES

Bias is a possibility with all types of surveys. With an issue as contentious as aircraft noise there is always the possibility that personal biases of interviewees may cloud their responses, particularly given the level of publicity about airport issues recently.

To ensure respondents did not intentionally bias the results, the precise purpose of the survey was not revealed until the last part of the questionnaire. Any change in response was noted at this point. Furthermore, in the first part of the survey the issue of aircraft noise and over-flying was given no more or less emphasis than other environmental or amenity factors. Interviewers were instructed to point out verbally all the environmental and amenity factors for ranking, so as to ensure respondents did not miss factors. Also, the order in which they were set out to respondents was varied for each interview.

Before commencing an interview, respondents were 'qualified' by confirming that they had worked in the localities under investigation since the early 1990s and would be in a position to reflect on market conditions and purchaser behaviour since 1994.

The interviews were conducted in December 1996 and January of 1997. Despite some refusals and the summer holidays, 76 percent of the real estate agencies approached were interviewed, with a minimum of four surveys completed in each interview area (see *Table 5.10*).

#### 5.2.5 RESULTS

A survey of this type cannot provide results in a precise statistical form because in each locality there were only a few real estate agents. Hence the results are not intended to be definitive, but rather provide further input to the analysis, and put the median and mean price analysis into context.

### *Significance of Aircraft Noise in each Locality*

When asked to rank each locality against a range of environmental and amenity characteristics, *Aircraft Noise and Over Flying* was clearly seen as a negative attribute for each subject area, in comparison to the control areas. *Table 5.11* summarises the average ratings provided for aircraft noise in each interview area on a scale of '5 - Not an Issue' to '1 - A Big Problem'. An average of 1.5 (Hunters Hill) indicates that agents believe that purchasers have seen aircraft noise as a significant negative characteristic.

TABLE 5.11 SIGNIFICANCE OF AIRCRAFT NOISE IN EACH LOCALITY (AVERAGE)<sup>1</sup>

Interview Area	Subject Area		Control Area	
	Rating (Average)	ANEI	Rating (Average)	ANEI
1	1.50	20-25	4.50	< 15
2	2.75	15-20	4.25	< 10
3	2.25	15-20	3.25	< 10
4	2.00	15-20	3.50	< 10
5	2.40	10-15	3.40	< 10
6	2.00	10-15	4.25	< 10
<b>Total</b>	<b>2.15</b>		<b>3.81</b>	

Scale:

- 1 - A Big Problem.
- 2 - Of Some Concern.
- 3 - Satisfactory, but an issue.
- 4 - Of Little Concern.
- 5 - Not an Issue.

### *Impact of Aircraft Noise and Over-flying on Property Values*

*Table 5.12* summarises the range of responses from the survey. Given identical properties in the subject and control areas, the majority of real estate agents believed the impact of aircraft noise explained between zero percent and 25 percent of the difference in property values. In Interview Areas 2 and 3, the value of dwellings in the subject area was higher than in the Control Area and housing stock was quite different. As a result respondents found it difficult to be confident about the singular influence of aircraft noise and overflying. Hence Interview Areas 2 and 3 were precluded from the following results.

TABLE 5.12 ASSESSED IMPACT OF AIRCRAFT NOISE ON PROPERTY VALUES

Interview Area	Average Assessed House Value		Assessed Impact of Aircraft Noise (\$) on Subject Area House		Assessed Impact of Aircraft Noise (%) on Subject Area House	
	Subject Area	Control Area	Minimum	Maximum	Minimum	Maximum
1	\$656,250	\$847,500	\$0	\$24,400	0	3.1
4	\$350,000	\$395,000	\$0	\$9,000	0	2.8
5	\$368,333	\$407,500	\$2,000	\$6,000	0.5	1.7
6	\$408,000	\$463,000	\$0	\$15,000	0	3.3

There was considerable variation in the estimated impact of aircraft noise in each interview area. Maximum impacts were generally below three percent. In many areas at least one agent believed noise had no effect on relative values. If selected at all, aircraft noise and over-flying was never the most important contributor to house price differences.

Results for Interview Area 1 (Hunters Hill) and Interview Area 4 (Lane Cove West) are surprising given that the preceding median price analysis showed a much more significant price effect in 1994/95. The small impact found in the survey may be because the respective control areas were quite close to the flight path of the third runway and therefore not totally noise free.

These results suggest that there may be a price discount for houses in the 10-15 and 15-20 ANEI ranges, but it is quite small.

#### *Purchaser Knowledge and Behaviour*

Agents believed that purchasers looking in 1994/95 were thoroughly aware of aircraft noise, raising the issue frequently. While it is still a common question, the frequency of concern has declined since the reopening of the east-west runway at Sydney Airport. The level of concern impacted upon the housing market activity with many purchasers refusing to consider properties under the flight paths.

#### *The Impact According to Property Type or Value*

Other purchaser behaviours demonstrated by the survey included the following:

- young couples with no children were less concerned about aircraft noise when purchasing a property. Couples with young children and

the elderly were more concerned about the issue when purchasing. To the extent that these demographics apply to particular types of property and areas, then it might be expected that aircraft noise would have a disproportionate impact upon housing markets in some areas;

- houses were perceived to be generally affected in a consistent manner in each area, although purchasers of houses in the upper price levels in each area appear to be more sensitive to aircraft noise. The price range varies. Buyers in the \$400,000 plus range in Lane Cove were more sensitive to noise whereas buyers in the \$1,000,000 plus market in Hunters Hill were more price sensitive; and
- apartments or townhouses were perceived to be less affected than houses. Units, not positioned on the top floor, were seen to benefit from a degree of noise insulation from the apartments both above and adjacent to them.

### 5.3 DEVALUATION ESTIMATES

The body of research conducted in Australia and overseas points to a significant negative influence of aircraft noise and overflying on housing values. However, the results of previous research and that undertaken in the preparation of this paper are highly variable.

The housing price devaluation rates adopted for this analysis were based on several considerations. The major factors being the following:

- following the opening of the Sydney Airport third runway there was considerable public awareness of issues associated with aircraft noise. Purchasers are likely to be better informed about flight paths than in the past;
- past research in Sydney has been conducted in areas which have been affected by aircraft noise for many years. As a result the level of investment in the housing stock may have been lower than comparable unaffected areas, leading to an indirect form of devaluation not reflected in the ANEI. A more extreme example occurs on busy roads where house stocks more often are run down;
- any estimates of noise effects on housing values below 20 ANEC can only be approximate. Any price impacts are likely to be greater in higher priced areas, or amongst higher priced dwellings in an area;
- the median price analysis demonstrated that housing price movements at the small area level are highly variable; and

- past research on Sydney Airport has revealed that housing price impacts at a given ANEC are greater under the northern flight path. Devaluation rates under the eastern and western approaches to Sydney Airport were lower in most studies (Abelson, 1981; BIS Shrapnel, 1990 and Poulsen, 1990). Hence the impacts under the northern approaches may be considered maximums. Therefore noise impacts on housing prices under 'secondary' flight paths or those which experience lower use levels may not be as great at each ANEC level.

The assumed housing price devaluation rates used in this study to determine the forecast change in property values as a result of the proposed Second Sydney Airport are summarised in *Table 5.13*.

TABLE 5.13 HOUSING PRICE DEVALUATION FACTORS

ANEC Band <sup>1</sup>	Devaluation Range	Assumed Devaluation <sup>2</sup>
Under 15	Nil	Nil
15-20	0 to -6%	-3%
20-25	-5.9% to -13.6%	-8%
25-30	-8.6% to 19.6%	-15%
30-35	-10.9% to -24.3%	-20%

- Note:
- No devaluation estimates for ANEC > 35 because dwellings located in this noise level are assumed to be acquired.
  - Compared to under 15 ANEC.

The assumed devaluation factors above 30 ANEC are slightly higher than those previously adopted in the *Draft Environmental Impact Statement for the Sydney (Kingsford Smith) Airport Third Runway* (Kinchill, 1990). A higher devaluation factor close to the airport was used because analysis undertaken by JLW Research and Consultancy (1993) showed house prices were more seriously affected within very close proximity to the airport. There was also a more significant fall in prices between 1994 and 1995 in these areas. This suggests a higher sensitivity to increased noise events very close to the airport.

In the 20-25 and 25-30 ANEC ranges, assumed devaluation factors compared to unaffected areas (sub ANEC 10) are eight percent and 15 percent respectively. These are in line with previous analysis (BIS Shrapnel, 1990).

Under ANEC 20 any price impacts are likely to be quite low and highly variable depending upon the locality. The results from the analysis show that some areas of Sydney such as West Lane Cove experienced a fall in housing prices in 1995 following the opening of the Sydney Airport third runway, but

prices recovered in 1996. In other areas under the 20 ANEI the increase in aircraft noise in 1995 had no apparent impact on prices. The survey of real estate agents also revealed a wide spectrum of opinions but provided support for some price impacts below 20 ANEI. It is also recognised that areas that are proposed to be overflown in western Sydney as a result of the proposed Second Sydney Airport would be under flight paths for the first time and community awareness of aircraft noise is likely to be very high. Hence a three percent price reduction is assumed for properties in the 15 to 20 ANEC.

The devaluation factors are assumed to apply uniformly across all types of housing stock. Vacant residential land value discounts would be greater. This is because the actual dollar price discount for a house should be applied to vacant residential lots because it is the value of the land that is being discounted, not the improvements.

# Part C

**Assessment of Impacts**



## CHAPTER 6 IMPACTS OF AIRPORT OPTIONS

### 6.1 APPROACH TO IMPACT ASSESSMENT

The effect of aircraft noise and overflying on residential property values has been estimated for each airport option. The analysis is based on Air Traffic Forecast 3 and the results are summarised as a range, representing the potential effects of different airport operating scenarios. For each airport option, the devaluation estimates described previously were applied to dwelling values in areas within noise exposure of ANEC 15-20, 20-25, 25-30 and 30-35. No devaluation has been included for dwellings with noise exposure above 35 ANEC as it is assumed that such dwellings would be acquired at the market value prevailing without the noise impact. An allowance for the costs of such acquisition is included within the assessment in *Technical Paper No. 3* and in various chapters of the Draft EIS. The total net devaluation for each airport option as at 2016 was then derived by applying total dwelling forecasts for 2016. The output for each airport option is the aggregate net devaluation on residential dwellings for 2016.

The following assessment procedure has been adopted:

- the number of dwellings and multi dwellings in each noise zone for each affected Community Assessment Area as at 1996 has been estimated by PPK based on photogrammetry (as described in *Technical Paper No. 2*);
- the number of dwellings and multi dwellings in each noise zone for each Community Assessment Area has been estimated at 2016 for each option, based on current numbers of dwellings and expectations of future urban development, taking into account the particular airport option (as described in *Technical Paper No. 2*);
- the current (1996) average value of a typical dwelling and multi dwelling in each Community Assessment Area has been estimated from sale prices as set out in *Chapter 4*. It should be noted that for rural and rural residential areas, sales may include a larger land component than for urban areas although those which reflect purely land sales have been excluded. For areas where insufficient sales data is available average house prices have been interpolated from surrounding areas. Where information for multi dwellings is unavailable, values have been estimated as a proportion of the estimated average house value based on the average relationship for areas with both sets of information;

- the devaluation factor for each noise zone derived in *Chapter 5 (Table 5.13)* has been applied to the average price of dwellings in each Community Assessment Area; and
- the aggregate price discount on existing and forecast dwellings has been calculated for each airport option based on the number of affected dwellings, the average current dwelling price and the assumed price devaluation factor.

The analysis provides a basis for comparing the effects on dwelling values between the airport options. However, it is not intended to provide a precise measure of noise impacts for individual properties.

The outputs for each option, each traffic forecast and each operating mode are provided in *Appendix D*. Each table in *Appendix D* details:

1. The estimated number of houses under each noise contour ANEC > 15 in 2016 in each Community Assessment Area.
2. The estimated number of multi dwellings under each noise contour ANEC > 15 in 2016 in each Community Assessment Area.
3. The estimated (1996\$) average value of a house in each noise affected Community Assessment Area (ANEC > 15).
4. The estimated current (1996\$) average value of a multi dwelling in each noise affected Community Assessment Area (ANEC > 15)
5. The estimated average aggregate value of houses in each noise contour, in each noise affected Community Assessment Area (1996\$) in 2016.
6. The estimated average aggregate value of multi dwellings in each noise contour, in each noise affected Community Assessment Area (1996\$) in 2016.
7. The devaluation of dwelling prices, based on the devaluation rate applicable to each noise contour for 2016.
8. The estimated net aggregate devaluation for each airport option.

The value of dwellings and the aggregate devaluation have been analysed at constant 1996 prices to avoid possible distortions which could result from the application of differential growth rates.

## 6.2 IMPACTS OF AIRPORT OPTIONS

The results of the analysis are summarised in *Table 6.1*.

TABLE 6.1 ESTIMATED NET DIRECT PROPERTY DEVALUATION FOR EACH AIRPORT OPTION

Airport Location	Option	Airport Operation	Net 2016 Devaluation (ANEC 15-35) \$ million
Badgerys Creek	A	1	\$66.6
Badgerys Creek	A	2	\$49.2
Badgerys Creek	B	1	\$52.0
Badgerys Creek	B	2	\$56.4
Badgerys Creek	B	3	\$60.5
Badgerys Creek	C	1	\$25.4
Badgerys Creek	C	2	\$31.4
Badgerys Creek	C	3	\$28.3
Holsworthy	A	1	\$121.0
Holsworthy	A	2	\$115.6
Holsworthy	A	3	\$107.9
Holsworthy	B	1	\$148.7
Holsworthy	B	2	\$122.3
Holsworthy	B	3	\$138.3

Note: 1. All outputs are in real 1996 dollars and exclude any property acquisition or insulation costs.

The costs of noise attenuation for new or existing housing over 20 ANEC is not included. To include a cost would amount to double counting.

The analysis undertaken addresses the direct impact on dwellings in areas potentially affected by aircraft noise greater than 15 ANEC. There is also likely to be valuation impacts on the future development potential of land located in urban release areas that are potentially affected by aircraft noise. For all of the airport options this mostly applies to noise levels between 15 and 20 ANEC and therefore the depreciation factor is relatively low. The analysis does not however attempt to assess the potential reduction in 'hope' value which might occur as a result of noise affected rural or rural residential lands (above 20 ANEC) being precluded from future residential development. The assumption in the assessment of land use and planning impacts is, however, that some new residential development would shift to areas unaffected by noise, thereby resulting in a likely increase in property values in those areas. Where this occurs outside of identified urban release areas, the property value increases could be substantial. Similarly, urban development attracted to the areas

surrounding the proposed rail line for Badgerys Creek options is likely to increase property values in these areas.

Land values in the areas surrounding each airport option may also potentially increase as a result of employment and transportation improvements. Employment lands may develop adjacent to the airport sites and in other areas with good transport links to the airport. This would have a positive impact on land values.

# Part D

**Environmental Management**

## CHAPTER 7 ENVIRONMENTAL MANAGEMENT

Potential management measures that could be implemented to reduce the impact of aircraft noise and hence the impact of aircraft noise on property values have been described in *Technical Paper No. 3* and *Chapter 14* of the Draft EIS.

To mitigate property devaluation impacts, consideration could be given to compensating land holders in noise affected zones. This type of compensation was considered in detail by the *Draft Noise Management Plan for Sydney Airport* (Mitchell McCotter and Associates, 1994). It was found to present a number of implementation problems and does not form part of current Government policy.

Other management methods to reduce the noise impact associated with aircraft overflying include:

- adoption of a nighttime curfew;
- selecting preferred airport operations or flight paths; and
- acquisition and acoustical treatment of buildings.

These are discussed in detail in *Technical Paper No. 3* and *Chapter 14* of the Draft EIS.

# Part E

**Summary of Property Value  
Impacts**

## CHAPTER 8 SUMMARY OF PROPERTY VALUE IMPACTS

The assessment of the effects of aircraft noise on property values provides a basis for comparing the effects on dwelling values between the airport options. It does not provide a precise measure of noise impacts for individual properties.

The analysis undertaken addresses the direct impact on dwellings in areas potentially affected by aircraft noise greater than 15 ANEC. There is also likely to be valuation impacts on the future development potential of land located in urban release areas that are potentially affected by aircraft noise. Land values in the areas surrounding each airport option may also potentially increase as a result of employment and transportation improvements.

The costs of potential noise attenuation for new or existing housing have not been taken into account for this analysis. To include an additional cost (above any housing price discount) may amount to double counting.

The results of the analysis are summarised in *Table 8.1*. As shown, total estimated property devaluation in 2016 is the greatest for Holsworthy Option B. Badgerys Creek Options A and B impact similarly on property values.

TABLE 8.1 ESTIMATED NET DIRECT PROPERTY DEVALUATION FOR EACH AIRPORT OPTION<sup>1</sup>

Airport Option	2016 Net Devaluation (\$ million) <sup>2</sup>
Badgerys Creek Option A	\$49 to \$67
Badgerys Creek Option B	\$52 to \$60
Badgerys Creek Option C	\$25 to \$31
Holsworthy Option A	\$108 to \$121
Holsworthy Option B	\$122 to \$149

- Notes
1. All results are expressed in real 1996 dollars.
  2. Figures rounded to nearest \$ million



# References

## REFERENCES

- Abelson, P.W. (1975), *A Survey of the Policy Problems and Economics of Aircraft Noise*, Research Paper No. 73, School of Economic and Financial Studies, March.
- Abelson, P.W. (1977), *The Impact of Environmental Factors on Relative House Prices*, Bureau of Transport Economics Occasional Papers, AGPS, Canberra.
- Abelson, P.W. (1981), 'Costs of Noise Nuisance from Aircraft', *International Journal of Environmental Studies*, Vol.17; p225-232.
- Airservices Australia (1994), *Year 2010 Australian Noise Exposure Forecast System and Associated Land Use Compatibility Advice for Areas in the Vicinity of Airports*.
- Airservices Australia (1996), *The Long Term Operating Plan for Sydney (Kingsford Smith) Airport and Associated Airspace - Report Summary*, Commonwealth of Australia, Canberra.
- Allan, J. (1996), *Real Estate Yearbook - 1996 Edition*.
- BIS Shrapnel (1990), *Third Runway Proposal Draft Environmental Impact Statement Sydney (Kingsford Smith) Airport: Impact on Property Values, Working Paper*, prepared for Kinhill Engineers, Sydney.
- Building Owners and Managers Association of Australia Limited (1990), *EIS for the Third Runway, Speakers Papers, Special Four O'Clock Forum*, 16 October.
- Burns and Associates (1990), *The Socio-economic Impact of Adelaide International Airport*, Flinders University, Adelaide.
- Burns and Associates (1993), *Adelaide International Airport: Socio-economic Impact 1993*, Flinders University, Adelaide.
- Coalition of Liberal and National Parties (1996), *Putting People First, Coalition Policy on Sydney Airport and Sydney West Airport*, Commonwealth of Australia, Canberra.
- Commonwealth of Australia (1995), *Falling on Deaf Ears: Report of the Senate Select Committee on Aircraft Noise in Sydney*, Canberra.
- Dames and Moore (1990), *Supplement to the Melbourne Airport Strategy Draft Environmental Impact Statement*, September (prepared for the Federal Airports Corporation).
- Department of the Arts, Sport, the Environment, Tourism and Territories (DASETT) (1991), *Environmental Assessment Report: Proposed Third Runway, Sydney (Kingsford-Smith) Airport*, Canberra.

Department of Transport and Regional Development (1996), *Location and Development of the Second Sydney Airport, The Proposal*, 5 August 1996, Sydney West Airport Taskforce, Canberra.

De Vany, A.S. (1976), "An Economic Model of Airport Noise Pollution in an Urban Environment", *In Theory and Measurement of Economic Externalities*, ed. S.A.Y. Lin, 205-214. New York, Academic Press.

Dyger, P.K. (1973), *Estimation of the Cost of Aircraft Noise to Residual Activities*, Ph.D. diss, University of Michigan.

Emerson, F.C. (1969). *The Determinants of Residential Value with Special Reference to the Effects of Aircraft Nuisance and Other Environmental Features*. Ph.D. diss., University of Minnesota.

Federal Airports Corporation (1993), *Town Planning for Airports*, Federal Airports Corporation, Sydney.

Frankel, M. (1991), 'Aircraft Noise and Residential Property Values: Results of a Survey Study', *Appraisal Journal*, January; p96-110.

Hamilton, S.W. and Uyeno, D. (1991), 'The Effect of Airport Noise on Housing Prices in an Unstable Market', Unpublished RULE Working Paper, University of British Columbia

Hede, AJ and Bullen, RB (1982), *Aircraft Noise in Australia: A Survey of Community Reaction*, National Acoustics Laboratories, Commonwealth Department of Health Report No. 88, February, AGPS, Canberra.

Holsman, A.J. and Aleksandric, V. (1977), 'Aircraft Noise and the Residential Land Market in Sydney', *Australian Geographer*, Vol.13.

Institute of Transport Studies (1993), *Economic Significance of Sydney (Kingsford Smith) Airport*, Final Report Graduate School of Business, The University of Sydney (for the Federal Airports Corporation), September.

JLW Research and Consultancy (1993), *The Effect of Aircraft Noise on Residential Property Values*, JLW Research and Consultancy, Sydney.

Kinhill Stearns (1985), *Second Sydney Airport Site Selection Programme Draft Environmental Impact Statement and Supplement to the Draft EIS*, prepared for the Department of Aviation.

Kinhill (1990), *Proposed Third Runway, Sydney (Kingsford Smith) Airport: Draft Environmental Impact Statement* prepared for the Federal Airports Corporation.

Kinhill (1991), *Proposed Third Runway: Environmental Impact Statement Supplement* Vol. 1, and Vol. 2 Submissions prepared for the Federal Airports Corporation.

Levesque, T.J. (1994), 'Modelling the Effects of Airport Noise on Residential Housing Markets: A Case Study of Winnipeg International Market', *Journal of Transport Economics and Policy*, Vol.28 No.2, May, p199-210.

Lucas, A. (1982), 'Influence of Adelaide Airport and Associated Jet Aircraft Noise on Surrounding Residential Property Values', *Valuer*, Vol.27, July; p247-251.

McMillan, M.L., B.G. Reid, and D.W. Gillen (1978). *An Approach Towards Improved Estimates of Willingness to Pay for Public Goods from Hedonic Price Functions. A Case of Aircraft Noise*, University of Alberta.

Mieszkowski, P. and Saper, A.M. (1978), 'An Estimate of the Effects of Airport Noise on Property Values' *Journal of Urban Economics* 5; p425-440.

Minister for Transport and Regional Development (1996), *Media Release*, 'Environmental Impact Statement for Holsworthy', 21 May 1996.

Mitchell McCotter and Associates Pty. Ltd. (1994), *Sydney (Kingsford Smith) Airport Draft Noise Management Plan*, Volume 2 - Technical Report.

Nelson, J.P. (1978a). 'Airports and Property Values', *Journal of Transport Economics and Policy*, 14(1):37-52.

Nelson, J.P. (1978b). *Economic Analysis of Transportation Noise Abatement*, Cambridge, Mass:Ballinger.

Nelson, J.P. (1978c). 'Residential Choice, Hedonic Prices, and the Demand for Urban Air Quality', *Journal of Urban Economics* 5 July:257-369.

Nelson, J.P. 'Measuring Benefits of Environmental Improvements: Aircraft Noise and Hedonic Prices', in *Advances in Applied Micro-Economics*, ed. V.K. Smith. Greenwich, Conn, JAL Press.

Paik, I.K (1972), *Measurements of Environment Externality in Particular Preference to Noise*, Ph.D. diss, Georgetown University.

Papsidero, V. (1992), *Airport Noise Regulations*, Planning Advisory Service Report No. 437, American Planning Association, May.

Pennington, G., Topham, N. and Ward, R. (1990), 'Aircraft Noise and Residential Property Values Adjacent to Manchester International Airport', *Journal of Transport Economics and Policy*, Vol.24 No.1, January; p49-59.

Poulsen, M.F. (1990), *Impact of Aircraft Noise on Property Values*, Consultancy Report for the Airport TaskForce submitted for the Proposed Third Runway at Sydney Airport Environmental Impact Assessment.

Price, I. (1974), *The Social Cost of Airport Noise as Measured by Rental Charges: The Case of Logan Airport*. Ph.D., Diss., Boston University.

Roskill (1971), *Report of the Commission on the Third London Airport*, HMSO.

Rust PPK (1996), *Adelaide International Airport Runway Extension Environmental Impact Statement* (for the South Australian Department of Transport).

Senate Select Committee on Aircraft Noise in Sydney (1995), *Falling on Deaf Ears? Report of the Senate Select Committee on Aircraft Noise in Sydney*, Commonwealth of Australia.

Standards Association of Australia (1985), *Acoustics - Aircraft Noise Intrusion - Building Siting and Construction*, AS 2021 - 1985, SAA, Sydney.

State Pollution Commission (1987), *Environmental Noise Control Manual*.

Uyeno, D., Hamilton, S. and Biggs, A. (1993), 'Density of Residential Land Use and the Impact of Airport Noise', *Journal of Transport Economics and Policy*, Vol.27, Issue 1, January; p3-18.

# **Appendices**

## **Appendix A**

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Summaries of Previous Studies

## Appendix A

### Summaries of Previous Studies

#### Australian Studies

##### Sydney (Kingsford Smith) Airport

**Report/Title:** 'The Impact of Environmental Factors on Relative House Prices'

**Author:** P.W.Abelson

**Date:** 1977

**Period Covered:** 1972 - 1973

**Airport:** Sydney (Kingsford Smith) Airport

**Study Areas:** Municipalities of Rockdale and Marrickville

**Method:** Hedonic price index with 30 variables (including noise) to identify the implicit price attached to each variable by the house buyer

**Results:**

- A significant relationship between house prices in Marrickville and aircraft noise was found where the NEF was > 25.
- Property values in Marrickville were found to fall by an average of 0.4 percent per NEF.
- The relationship was non-linear with depreciation per NEF increasing with the level of aircraft noise.
- In Rockdale depreciation per NEF was found to be greater for higher income households.

**Report / Title:** 'Aircraft Noise and the Residential Land Market in Sydney'

**Author:** A. J. Holsman and V. Aleksandric

**Date:** 1977

**Period Covered:** 1959 - 1973

**Airport:** Sydney (Kingsford Smith) Airport

**Study Areas:** Botany, Ashfield, Rockdale, Canterbury

**Method:** Hedonic price index measuring time, and using dummy variables for properties inside and outside the flight path.

**Results:**

- It was argued that in the short run, adverse effects on the sale prices of residences were high in the airport areas.
- In the longer term, prices displayed a similar trend in both airport and non-airport areas.
- Areas respond differently to noise impacts according to their socio-economic character.

**Report / Title:** 'Third Runway Proposal: Draft EIS Sydney (Kingsford Smith) Airport: Impact on Property Values'

**Author:** BIS Shrapnel

**Date:** 1990

**Period Covered:** October 1987 - September 1988

**Airport:** Sydney (Kingsford Smith) Airport



Study Areas:	Botany, Marrickville, Rockdale Municipalities
Method:	Hedonic price model, including: <ul style="list-style-type: none"> <li>- time;</li> <li>- street (noise and quality);</li> <li>- aircraft noise;</li> <li>- suburb;</li> <li>- land area;</li> <li>- frontage;</li> <li>- brick construction (dummy);</li> <li>- tiled roof;</li> <li>- rated value;</li> <li>- number of bedrooms;</li> <li>- number of bathrooms;</li> <li>- dining room;</li> <li>- other rooms; and</li> <li>- garage.</li> </ul>
Results:	<ul style="list-style-type: none"> <li>▪ The model indicated that the average negative effect of aircraft noise on house values in Marrickville (as opposed to the value of those exposed to less than 20 ANEF) ranged from:                 <ul style="list-style-type: none"> <li>- approximately 10 percent (95 percent confidence interval of +/- 4 percent) at the mid-point of the 20-25 ANEF;</li> <li>- approximately 14 percent (95 percent confidence interval of +/- 5 percent) at the mid-point of the 25-30 ANEF; and</li> <li>- approximately 18 percent (95 percent confidence interval of +/- 7 percent) at the mid-point of the 30-35 ANEF.</li> </ul> </li> <li>▪ The model also indicated that the average effect of aircraft noise on house values in Botany and Rockdale ranged from:                 <ul style="list-style-type: none"> <li>- approximately 8 percent (95 percent confidence interval of +/- 5 percent) at 30 ANEF; and</li> <li>- approximately 9 percent (95 percent confidence interval of +/- 6 percent) at 35 ANEF.</li> </ul> </li> <li>▪ An aggregate net impact of plus \$24 million was predicted on residential property values, given the calculated growth in values produced by the cessation of flights on the east-west runway.</li> </ul>

<b>Report / Title.</b>	<b>Impact of Aircraft Noise on Property Values</b>
Author:	M. F. Poulsen
Date:	1990
Period Covered:	October 1987 - September 1988
Airport:	Sydney (Kingsford Smith) Airport
Study Areas:	Botany, Marrickville, Rockdale Municipalities
Method:	Extensive critique of the BIS Shrapnel study. Hedonic pricing model with 32 variables including those representing: <ul style="list-style-type: none"> <li>- property descriptors;</li> <li>- neighbourhood characteristics;</li> <li>- land value;</li> </ul>

- Results:
- nature of land parcel; and
  - environmental factors (include. noise).
  - For the northern flight path the variable representing greater than 30 ANEF, was significant. This corresponded to a depreciation per unit of ANEF between 0.86 percent and 1.1 percent.
  - The variable representing below 20 ANEF was statistically insignificant for all flight paths.
  - Under the eastern flight path the impact of aircraft noise was offset by the characteristics of the local housing stock. The price paid for dwellings equated to the wider market value, with no discount for aircraft noise. This may illustrate the long term cyclical decline of heavily affected areas.
  - An aggregate net impact of -\$411 million was calculated for the Third Runway proposal.
  - The 1988 level of impact from the model was -12.15 percent. By 2005/2010 the increase in air traffic, may make this at least -17.81 percent.

**Report / Title: The Effects of Aircraft Noise on Residential Property Values**

Author: JLW Research and Consultancy

Date: 1993

Period Covered: 1991 and 1992

Airport: Sydney (Kingsford Smith) Airport

Study Areas: Sydenham, Marrickville, Leichhardt, Drummoyne, Erskineville, Dulwich Hill/Lewisham, Leichhardt West, Russell Lea/Five Dock

Method: Paired sales analysis, after standardising for:

- residential amenity;
- approximate dwelling and lot size;
- construction of external walls and roof;
- general state of repair;
- off street parking; and
- socio-economic status of the immediate area (ABS).

- Results:
- In Sydenham (35 ANEF), the depreciation was calculated to be 1 percent per unit of ANEF.
  - In Marrickville, the depreciation was calculated to be 0.8 percent per unit of ANEF.
  - In Leichhardt and particularly Drummoyne, the effect on prices, below 30 ANEF, was found to be slight at less than 0.5 percent depreciation per unit of ANEF.
  - Qualitative surveys suggest that residential prices were discounted by around 6 percent to 7 percent in Leichhardt. Discounting for aircraft noise was not clearly apparent in Drummoyne.
  - Housing prices were heavily discounted close to the airport in Tempe, even if they were located outside of the 25 ANEF contour. The market discount appears to be abnormally great for areas very close to the airport.

## Other Australian Airports

**Report / Title:** 'Influence of Adelaide Airport and Associated Jet Aircraft Noise on Surrounding Residential Property Values'

**Author:** A. Lucas

**Date:** 1982

**Period Covered:** 1980

**Airport:** Adelaide Airport

**Study Areas:** Brooklyn Park, West Richmond, Richmond and Cowandilla

**Method:** Hedonic price model, including the variables:

- purchase price;
- number of main rooms;
- number of bedrooms;
- existence of a separate dining room;
- existence of a family/rumpus room;
- external condition;
- age of improvements;
- garage;
- external appearance;
- living area;
- noise cone (ie applicable NEF contour);
- distance to the flight path; and
- distance to the airport.

**Results:**

- Found a significant negative relationship between aircraft noise and residential property values in Brooklyn Park.
- The qualitative analysis found that homes in high-noise areas generally take longer to sell than homes in unaffected areas.

**Report / Title:** **The Socio-Economic Impact of Adelaide International Airport**

**Author:** Michael E. Burns and Associates

**Date:** 1990

**Period Covered:** January to December 1988

**Airport:** Adelaide Airport

**Study Areas:** North Glenelg, Glenelg, Thebarton, Netley, West Richmond, Mile End, West Beach, Brooklyn Park, Torrensville, Marleston and Hilton.

**Method:** Hedonic price approach, including:

- number of rooms;
- building area;
- NEF contours;
- unemployment rate; and
- swimming pool (dummy variable).

**Results:**

- The NEF 20 and 25 contours were found to be statistically insignificant.
- The NEF 30 contour proved significant. It was found that on average, a house that lies in the 27.5-30 NEF range would be 10.7 percent lower in price than if it was located outside the 27.5 NEF contour.

- The aggregate effect on existing property values was estimated to be less than \$30 million.

## Overseas Studies

**Report / Title:** **An Estimate of the Effects of Aircraft Noise on Property Values**

**Author:** P. Mieszkowski and A. M. Saper

**Date:** 1978

**Period Covered:** January 1969 to June 1973 (relatively stable property market)

**Airport:** Toronto International Airport

**Method:** Hedonic price model, regression includes 46 variables.

- Results:**
- Houses located within the various noise contours do sell at a statistically significant discount.
  - Depreciation per unit of NEF ranges from 0.3 percent to 1.3 percent.
  - Discounts are estimated to reach 15 percent for houses located in contours NEF 35 or higher.
  - There was some inconsistency with discount figures not clearly following the NEF contours.

**Report / Title:** **Aircraft Noise and Residential Property Values adjacent to Manchester International Airport**

**Author:** G. Pennington, N. Topham and R. Ward

**Date:** 1990

**Period Covered:** April 1985 - March 1996

**Airport:** Manchester International Airport

**Method:** Hedonic price model, including 25 variables. The physical characteristics of the houses were incorporated as dummy variables, in preference to continuous variables.

- Results:**
- Found the impact of noise on property values to be negligible and insignificant when alternative environmental characteristics of the respective neighbourhoods are taken into consideration.

**Report / Title:** **Density of Residential Land Use and the Impact of Airport Noise**

**Author:** D. Uyeno, S. W. Hamilton and A. J. G. Biggs

**Date:** 1993

**Period Covered:** 1987-88

**Airport:** Vancouver International Airport

**Method:** Hedonic regression model, including 44 variables. A linear form was used for dummy variables to reduce specification errors, and a logarithmic or a linear form was used for continuous variables.

- Results:**
- An increase of one ANEF resulted in a decrease of approximately 0.65 percent in the property value of detached houses.
  - An increase of one ANEF resulted in a decrease of approximately 0.90 percent in the value of condominiums.
  - Vacant land values were found to be approximately 16 percent lower for properties exposed to a ten-decibel incremental NEF level.

- The impact of noise upon vacant land prices was significantly higher (statistically speaking) than for family houses or condominiums.

**Report / Title: Modelling the Effects of Airport on Residential Housing Markets: A Case Study of Winnipeg International Airport**

Author: T. J. Levesque

Date: 1994

Period Covered: January 1985 to December 1986

Airport: Winnipeg International Airport

Method: Hedonic pricing model. The decomposition of residential property prices by regression, with variables including:

- property type;
- number of rooms;
- number of bedrooms;
- number of bathrooms;
- total area;
- total number of houses;
- fireplace;
- family rooms;
- recreation rooms;
- plot size;
- distance to nearest school; and
- time.

The physical characteristics of the houses were incorporated as dummy variables, in preference to continuous variables.

Significantly, aircraft noise was not incorporated into a single index, but was broken into several components including:

- Frequency of loud incidents (no. above a standard level);
- Loudness of these incidents (the mean of these loud events); and
- Variability of this noise (as measured by the std. deviation).

**Results:**

- The method adopted with multiple noise variables was found to be more explanatory than using a single noise index.
- Previous studies of housing prices and airport noise rely on fixed specifications. Levesque found that a flexible function was preferable to linear, log-linear and exponential models. As a result there is no average discount that can be applied for the impact of aircraft noise.
- Houses exposed to a high number of loud noise events sell at a statistically significant discount.
- Houses exposed to a high level of loud noise sell at a statistically significant discount.
- The greater the variability in 'loud noise' events the higher the price premium. Continuous noise events were found to produce a greater discount in residential value.

- Report / Title:** Aircraft Noise and Residential Property Values: Results of a Survey Study
- Author:** M. Frankel
- Date:** 1991
- Airport:** Chicago (O'Hare) International Airport
- Study Areas:** 35 Suburbs in the vicinity of the airport
- Method:** Realtor and appraiser survey that assessed purchaser and vendor behaviour and tried to judge the effect of various noise levels upon residential values.
- Results:**
- As expected, in the short run aircraft noise weakens the supply side of the market as more owner-occupiers are keen to sell and weakens the demand side as prospective buyers avoid noisy properties or seek price compensations.
  - Purchasers often lack adequate information about the noise environment, producing misjudged-judged, high bids.
  - Perceived effect of aircraft noise on residential values.

Noise Level	Median of Assessed Reduction in Values	
	Realtors (Estate Agents)	Appraisers (Valuers)
Low	1.6%	1.2%
Moderate	5.5%	3.0%
Substantial	13.0%	10.0%
Severe	21.6%	16.5%
Sample size (n)	199	69

- Multi-family properties were perceived by both realtors and appraisers to have a consistently lower discount (25 -33 percent lower) than single family properties.
- The argument presented for this fact was that multi-family properties contain a significantly higher proportion of rental occupants. The relative mobility of these occupants, as opposed to home owners, may make them less attentive and/or less concerned about environmental factors, such as aircraft noise.
- The results for low noise levels approximate the mean of the wide range of regression studies (worldwide).
- The results for high noise levels lie towards the upper limit of the range found in regression studies.
- The real estate agents consistently assessed the reduction in value caused by aircraft noise, at a higher rate than the valuers.

- Report / Title:** 'The Effect of Aircraft Noise on Residential Property Values'
- Author:** JLW Research and Consultancy
- Date:** 1993
- Airport:** Sydney (Kingsford Smith) Airport
- Study Areas:**
- Method:** Survey of local real estate agents. Estimations of the value difference between noise-affected and noise-unaffected properties.

- Results:
- The agents' assessment of the impact upon property values of aircraft noise is summarised below:

<b>ANEF Zone in Comparison to &lt; 20 ANEF</b>	<b>Estimated Reduction in Property Values \$30-\$40,000</b>	<b>Areas Compared (Approximately)</b>
35+	\$30-\$40,000	Sydenham, Erskineville
30-35	\$25-\$30,000	Marrickville, Dulwich Hill/ Lewisham
25-30	\$10-\$15,000	Western side of Leichhardt, north-east of Leichhardt
20-25	No consistent estimate	Drummoyne, Russell Lea

**Report / Title:** 'Influence of Adelaide Airport and associated jet aircraft noise on surrounding residential property values'

**Author:** A. Lucas

**Date:** 1981

**Airport:** Adelaide International Airport

**Study Areas:** Brooklyn Park, West Richmond, Richmond, Cowandilla

**Method:** Comprised of a number of questions and identifiers that were included in a survey of regression variables.

- Results:
- People over the age of 50 are particularly sensitive to high noise levels and avoid these areas. They perceive a significant reduction in residential property value from airport-related noise.
  - A significant number of the people surveyed in the high noise areas became accustomed to aircraft noise or did not notice it at all.
  - Homes in high-noise areas take longer to sell than comparable dwellings in unaffected areas, implying a clear noise-related impact upon market activity.
  - People who re-located into high noise areas were generally well informed about the noise pollution. 90 percent of those in the 40 ANEF area and 83 percent in the 30-40 ANEF area believed that aircraft noise reduced prices considerably, suggesting that purchasers were conscious of the price concessions that were available and made a deliberate choice to reside in the affected area.

## **Appendix B**

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House Price Data



## Appendix B

### Sources for House Price Data

*Table A.1* compares movements in median and mean prices for the Sydney region between 1991 and 1995/6 from various sources. There are large variations in median and average price movements, as well as price levels in each year. These variations are a result of differing methods of estimation and sources of data.

Each of the major sources are discussed below.

#### ***Real Estate Institute:***

The Real Estate Institute of Australia Ltd collect residential sales information nationally from members. The Sydney Metropolitan area is defined as the suburbs included in the Sydney Gregory's Street Directory index. Price movement are moving annual medians for houses and units. They are based on a monthly survey of member real estate agents across Sydney.

#### ***Residex:***

Utilise unit record sales data from the Land Titles Office. This index for Sydney excludes the Blue Mountains and the Central Coast.

#### ***Office Of State Revenue:***

The Office of State Revenue collects residential sales data information during the processing of stamp duty payments. Residential properties include houses, units, townhouses, villas and vacant land. The index includes those transactions where no consideration passes for the transfer of property eg. dealings between family members. Duty is charged on an assessed value of the property which is included as a notional consideration in the sales data. Also, multiple dwelling units on single titles (such as a block of flats which had not been strata titled) are included as one sale and will distort the average values upward. Various government and charitable organisations are exempt from duty.

The area defined as the Sydney Metropolitan Area is defined as "that area bounded by Warringah and Hornsby local government areas in the north; Baulkham Hills, Windsor and Penrith local government areas in the west and Liverpool, Camden, Campbelltown and Sutherland local government areas in the south. The Sydney (City) local government area is also included in this region."

#### ***Real Estate Year Book/Allen Consulting:***

The Real Estate Yearbook utilises data compiled by the Land Titles Office as issued by the NSW Valuer Generals Department. The 1996 publication included data up to and including 31 January 1996.

### **Method Adopted for Estimating Metropolitan, Regional and Small Area Median Price Movements**

NSW Valuer General transaction data was used as supplied by Residex. Sales were excluded from the analysis if:

- buyers and sellers had the same surnames. This was to exclude where possible intra-family or part sales; or
- entries were duplicated.

In each geographic area sales in excess of five times the median were excluded so as to remove data keying errors. The most common type of error is the addition of an extra zero. A \$200,000 sales incorrectly is included as a \$2,000,000 sale.

TABLE A.1 HOUSING PRICE TRENDS - SYDNEY REGION

	1991	1992	1993	1994	1995	1996	Annual Ch.	Comment
<b>Houses</b>							92 to 95	
Real Estate Institute ('000)	\$182.2 (Dec)	\$178.9 (Dec)	\$186.5 (Dec)	\$198.8 (Dec)	\$198.7 (Dec)	\$200.2 (June)		Moving annual median
Real Estate Institute (%)		-1.8%	4.2%	6.6%	0%	1.6%	3.6%	
Office Of State Revenue ('000)	\$222.1 (Dec)	\$236.5 (Dec)	\$239.4 (Dec)	\$265.9 (Dec)	\$267.8 (Dec)	\$271.8 (June)		Average sales value for year. Average sales value for six months to June 1996
Office Of State Revenue (%)		6.51%	1.19%	11.13%	0.69%	1.50%	4.2%	
Residex Medians ('000)	\$172.5 (Dec)	\$185.0 (Dec)	\$185.0 (Dec)	\$203.0 (Dec)	\$210.0 (Dec)	\$220.0 (Oct)		
Residex Medians (%)		7.2%	0%	9.7%	3.4%	4.8%	4.3%	
Residex Index	100 (Dec)	102.1 (Dec)	108.6 (Dec)	118.6 (Dec)	117.8 (Dec)	124.7 (Oct)		
Residex Index (%)		2.13	6.35	9.15	-0.63	5.92	4.9%	
Real Estate Year Book ('000)	\$189 (Dec)	\$195 (Dec)	\$195 (Dec)	\$213 (Dec)	\$210 (Dec)	NA		
Real Estate Year Book (%)		3.1%	0.0%	9.2%	-1.4%	NA	2.5%	

	1991	1992	1993	1994	1995	1996	Annual Ch.	Comment
<b>Units</b>								
Real Estate Institute ('000)	\$136.6 (Dec)	\$138.0 (Dec)	\$143.0 (Dec)	\$154.0 (Dec)	\$154.3 (Dec)	\$161.6 (June)		Moving annual median
Real Estate Institute (%)		1.0%	3.6%	7.0%	0.2%	4.4%	3.8%	
Office Of State Revenue ('000)	\$177.1 (Dec)	\$182.4 (Dec)	\$193.7 (Dec)	\$223.3 (Dec)	\$218.4 (Dec)	\$228.5 (June)		Average sales value for year. Average sales value for six months to June 1996
Office Of State Revenue (%)		3.01%	6.19%	15.32%	-2.24%	4.66%	6.2%	
Residex Medians ('000)	\$144.0 (Dec)	\$151.0 (Dec)	\$152.8 (Dec)	\$165.0 (Dec)	\$170.0 (Dec)	\$175.0 (Oct)		
Residex Medians (%)		4.9%	1.2%	8.0%	3.0%	2.9%	4.0%	
Residex Index	100 (Dec)	100.8 (Dec)	103.6 (Dec)	113.6 (Dec)	111.2 (Dec)	116.1 (Oct)		
Residex Index (%)		.77%	2.76%	9.69%	-2.09%	4.36%	4.8%	
Real Estate Year Book ('000)	\$150.5	\$154.5	\$156.0	\$167.0	\$169.5	NA		
Real Estate Year Book (%)		2.7%	1.0%	7.1%	1.5%	NA	3.1%	

## **Appendix C**

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Survey of Real Estate Agents

# Survey of the Major Determinants of Residential Value



## AREAS

Date: \_\_\_\_\_

A: \_\_\_\_\_

B: \_\_\_\_\_

Interviewee: \_\_\_\_\_

We are undertaking a survey of factors affecting housing prices in Sydney on behalf of the Commonwealth Government. Our study covers areas across Metropolitan Sydney, but for the purpose of this interview we would like to focus on two particular areas, these being **Area A** and **Area B**.

*Indicate marked subject areas on the map.*

**Q1.** How long have you been selling properties in this area? \_\_\_\_\_ years.

**Q2.** Have you personally marketed properties in these two areas: YES/NO

*If the agent has more than two years experience in the area, and has marketed properties in both areas, proceed with the interview. If the agent has less than two years experience in the area, or has not marketed properties in both localities, ask to speak to someone who does meet these requirements.*

*If none of the agents fulfil these requirements, thank the respondent for their time and terminate interview.*

*Present photograph of typical property example. Point out the assumed lot size, frontage, dwelling characteristics and position.*

I believe that this building is typical of housing in both these areas. Assume that this exact property is located in area A and another identical property is located in area B. Assuming further that both are located in quiet streets, with no other differences, such as views. We require you to compare the value of these two hypothetical properties.

**Q3.** What do you believe this typical property would presently sell for in each locality.

Area A \_\_\_\_\_ \$ \_\_\_\_\_

Area B \_\_\_\_\_ \$ \_\_\_\_\_

So for this property, the difference in value between the two areas is approximately \$ \_\_\_\_\_ .

# Survey of the Major Determinants of Residential Value

**Q4.** Referring to the two areas:

*Present 'Excellent - V.Poor' Scale.*

Locality Characteristics <i>(rotate starting point for each interview)</i>	Could you please rank the attractiveness of each neighbourhood on the below scale: A: _____ B: _____	
Open space/parks		
Community facilities & shopping centres		
Schools & colleges		
Access to public transport		
Streetscape & visual amenity		
Overall quality & size of housing stock		
Traffic noise & congestion		
Aircraft noise & overflying		
Bush fires		
Neighbourhood security & safety		
Other (please specify)		
Ranking 1 to 5 for each characteristic:	5. Excellent/Not an Issue 4. Good/Of Little Concern 3. Average/Satisfactory, but an issue 2. Poor/Of Some Concern 1. Very Poor/A Big Problem	

# Survey of the Major Determinants of Residential Value

**Q5.** Earlier you noted a \$ \_\_\_\_\_ difference in value between the example properties in the two areas:

*Present list of locality characteristics (rotate sheet for each interview)*

Locality Characteristics	Which of the following characteristics contribute to this difference in value? (please tick)	Could you rank in order of importance (1 - n) those factors which explain the difference in value?	Please place a monetary value on the relevant factors?
Open space/parks	<input type="checkbox"/>		\$
Community facilities & shopping centres	<input type="checkbox"/>		\$
Schools & colleges	<input type="checkbox"/>		\$
Access to public transport	<input type="checkbox"/>		\$
Streetscape & visual amenity	<input type="checkbox"/>		\$
Overall quality & size of housing stock	<input type="checkbox"/>		\$
Traffic noise & congestion	<input type="checkbox"/>		\$
Aircraft noise & overflying	<input type="checkbox"/>		\$
Bush fires	<input type="checkbox"/>		\$
Neighbourhood security & safety	<input type="checkbox"/>		\$
Prestige (please be careful to distinguish from the above factors)	<input type="checkbox"/>		\$
Other (please specify)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		\$
<b>Total</b>	Not Applicable	Not Applicable	\$

*If Aircraft Noise and Overflying is registered as a factor contributing to the difference in value between the two areas proceed to the Specialised Section on Aircraft Noise.*

*If Aircraft Noise and Overflying is not registered as a contributing factor, proceed to the explanation and thank you.*



# Survey of the Major Determinants of Residential Value

## Specialised Section: Aircraft Noise Impacts

**Q1.** Considering the question of aircraft noise, from your experience how often was, and is the issue raised by buyers when considering properties in your area.

	FREQUENCY			
	Never	Rarely	Occasionally	Frequently
When the 3rd Runway was just Opened (1994/95)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Now	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Q2.** Do you feel that buyers in this area are well informed about the issue of aircraft noise. (Please comment)

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**Q3.** How frequently have, and presently do buyers use the aircraft noise issue as their main reason of making a lower than list price offer or not proceeding with a purchase.

Area	Period	Never	Rarely	Occasionally	Frequently
A: _____	1994/95	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B: _____	1994/95	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A: _____	Now	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B: _____	Now	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Q4.** If aircraft noise does affect values in your area, does the level of affect vary between property types and price ranges ?

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*Proceed to explanation and thank you.*

# Survey of the Major Determinants of Residential Value



## Explanation and Thank You

This survey comprises a small part of the work for the Environmental Impact Statement (EIS) on the Second Sydney Airport presently being undertaken by Rust PPK on behalf of the Commonwealth Department of Transport and Regional Development.

JLW Advisory are sub-consultants to Rust PPK for the residential property section of the EIS. Naturally, if we are to evaluate the possible impact upon residential property values in areas potentially affected by the second airport, it is necessary for us to attempt to assess and analyse the impact of Sydney (Kingsford Smith) Airport upon house prices. This survey comprises one part of this assessment process.

On behalf of the Department of Transport and Regional Development, thank you for your time.

# Survey of the Major Determinants of Residential Value

Survey areas are identified below and are paired.

Interview Area	Comparable Areas	
	Area A	Area B
1	Hunters Hill	Woolwich
2	Boronia Park	Gladesville
3	East Ryde	Ryde
4	West Lane Cove	Lane Cove
5	West Lindfield, Killara	East Lindfield
6	West Pymble	Pymble, St Ives

# Example Property

Interview Area 1



- Assume:
- Four bedrooms
  - Two bathrooms
  - 1 000 sqm block
  - 15 metre frontage
  - Single garage

# Example Property

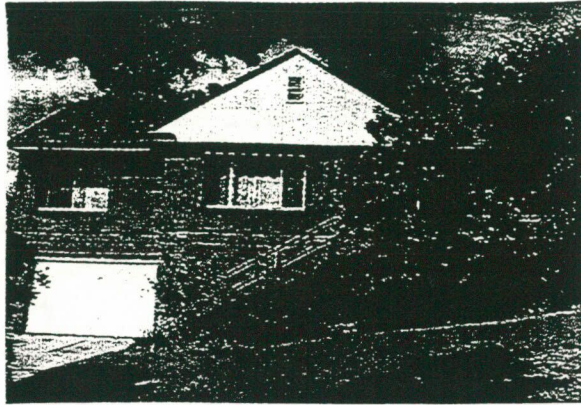
## Interview Area 2



- Assume:
- Three bedrooms
  - One bathroom
  - 600 sqm block
  - 12 metre frontage
  - Developed 1960s

# Example Property

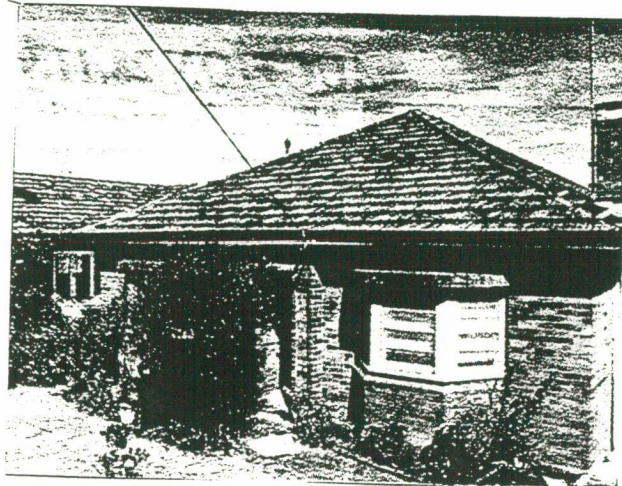
Interview Area 3



- Assume:
- Three bedrooms
  - One bathroom
  - Quarter acre block
  - 15 metre frontage
  - Single garage

# Example Property

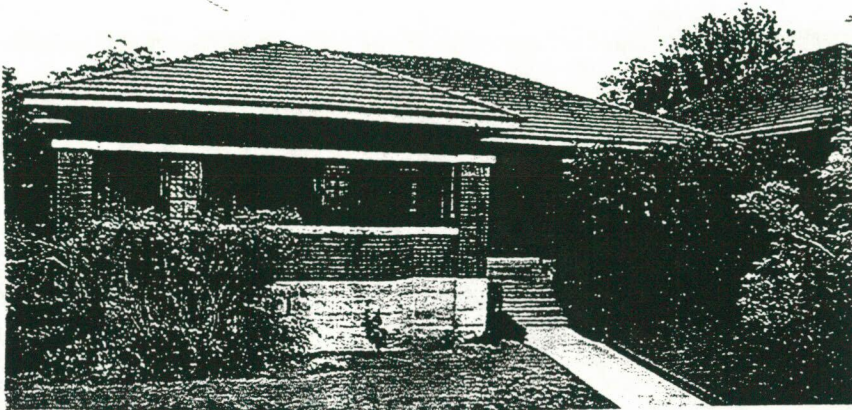
Interview Area 4



- Assume:
- Two bedrooms
  - One bathroom
  - 600 sqm block
  - 12-15 metre frontage

# Example Property

Interview Area 5



- Assume:
- Three bedrooms
  - One bathroom
  - 1 000 sqm block of land
  - 15 metre frontage
  - California Bungalow



# Example Property

Interview Area 6



- Assume:
- Three bedrooms
  - One bathroom
  - 1 000 sqm block of land
  - 20-25 metre frontage
  - Single garage

## **Appendix D**

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Outputs of Property Devaluation  
Assessment

### Badgerys Creek Options

Airport Option:	BC - Option A
Traffic Forecast:	
Operating Mode:	1

Area	CAA	17	17	18	20	22	22	25	26	26	26	27	27	27	28	28	28	28	29	29	
	Noise Level (ANEC)	15-20	20-25	15-20	15-20	15-20	20-25	15-20	15-20	20-25	25-30	15-20	20-25	25-30	15-20	20-25	25-30	30-35	15-20	20-25	
1996	Noise Level (ANEC)	15	20	15	15	15	20	15	15	20	25	15	20	25	15	20	25	30	15	20	
	Houses																				
	Multi-unit dwellings																				
2016	Houses	8	4	22	2	359	10	6	36	105	6	68	48	13	93	80	55	3	762	24	
	Multi-unit dwellings	0	0	0	0	22	1	0	1	3	0	0	0	0	0	0	0	0	40	1	
	1995/96 Property Prices	Houses	\$200,600	\$200,600	\$200,904	\$138,900	\$303,022	\$303,022	\$413,786	\$271,750	\$271,750	\$271,750	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$421,038	\$421,038
	Multi-unit dwellings	\$158,000	\$158,000	\$159,000	\$110,000	\$239,000	\$239,000	\$327,000	\$215,000	\$215,000	\$215,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$333,000	\$333,000	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Aggregate Real Values 2016 (1996\$)	Houses	\$1,556,656	\$738,208	\$4,287,291	\$269,466	\$105,521,351	\$2,787,802	\$2,408,235	\$9,489,510	\$26,251,050	\$1,385,925	\$20,388,962	\$13,081,578	\$3,415,677	\$27,884,903	\$22,750,570	\$14,450,939	\$741,866	\$319,374,165	\$9,296,519
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$5,100,260	\$219,880	\$0	\$208,550	\$593,400	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$12,920,400	\$306,360
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Sum of Real Values (1996\$)	2016	\$1,556,656	\$738,208	\$4,287,291	\$269,466	\$110,621,611	\$3,007,682	\$2,408,235	\$9,698,060	\$26,844,450	\$1,385,925	\$20,388,962	\$13,081,578	\$3,415,677	\$27,884,903	\$22,750,570	\$14,450,939	\$741,866	\$332,294,565	\$9,602,879	
Difference in Real Values	2016	(\$48,144)	(\$64,192)	(\$132,597)	(\$6,334)	(\$3,421,287)	(\$261,536)	(\$74,481)	(\$299,940)	(\$2,334,300)	(\$244,575)	(\$630,586)	(\$1,137,528)	(\$602,766)	(\$862,420)	(\$1,978,310)	(\$2,550,166)	(\$185,467)	(\$10,277,151)	(\$835,033)	

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 (\$66,612,906)

Airport Option:	BC - Option A
Traffic Forecast:	
Operating Mode:	2

Area	CAA	17	17	22	22	25	26	26	26	27	27	27	28	28	28	28	29	38	38	
	Noise Level (ANEC)	15-20	20-25	15-20	20-25	15-20	20-25	15-20	20-25	25-30	15-20	20-25	25-30	15-20	20-25	25-30	30-35	15-20	15-20	20-25
1996	Noise Level (ANEC)	15	20	15	20	15	20	15	20	25	15	20	25	15	20	25	30	15	15	20
	Houses																			
	Multi-unit dwellings																			
2016	Houses	10	2	253	89	13	2	19	75	50	41	30	20	72	37	13	4	24	47	24
	Multi-unit dwellings	0	0	16	6	0	0	0	2	1	0	0	0	0	0	0	0	1	0	0
	1995/96 Property Prices	Houses	\$200,600	\$200,600	\$303,022	\$303,022	\$413,786	\$413,786	\$271,750	\$271,750	\$271,750	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$421,038	\$306,435
	Multi-unit dwellings	\$158,000	\$158,000	\$239,000	\$239,000	\$327,000	\$327,000	\$215,000	\$215,000	\$215,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$333,000	\$242,000	\$242,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Real Values 2016 (1996\$)	Houses	\$1,945,820	\$369,104	\$74,364,629	\$24,811,441	\$5,217,841	\$761,366	\$5,008,353	\$18,750,750	\$11,549,375	\$12,293,344	\$8,531,464	\$5,254,887	\$21,588,312	\$10,522,138	\$3,415,677	\$989,155	\$9,801,765	\$13,970,372
	Multi-unit dwellings	\$0	\$0	\$3,709,280	\$1,319,280	\$0	\$0	\$0	\$395,600	\$182,750	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$323,010	\$0
Sum of Real Values	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Sum of Real Values	2016	\$1,945,820	\$369,104	\$78,073,909	\$26,130,721	\$5,217,841	\$761,366	\$5,008,353	\$19,146,350	\$11,732,125	\$12,293,344	\$8,531,464	\$5,254,887	\$21,588,312	\$10,522,138	\$3,415,677	\$989,155	\$10,124,775	\$13,970,372	\$6,766,085
Difference in Real Values	2016	(\$60,180)	(\$32,096)	(\$2,414,657)	(\$2,272,237)	(\$161,377)	(\$66,206)	(\$154,898)	(\$1,664,900)	(\$2,070,375)	(\$380,207)	(\$741,866)	(\$927,333)	(\$867,880)	(\$914,969)	(\$602,766)	(\$247,289)	(\$313,137)	(\$432,073)	(\$588,355)

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 \$(49,163,108)

# Badgerys Creek Options

Airport Option:	BC - Option A
Traffic Forecast:	
Operating Mode:	1

Area	CAA	35	36	38	38	38	38	39	39	39	39	39	40	40	41	41	41	42	42	
	Noise Level (ANEC)	15-20	15-20	15-20	20-25	25-30	30-35	15-20	20-25	25-30	30-35	>35	15-20	20-25	15-20	20-25	25-30	15-20	20-25	
	Noise Level (ANEC)	15	15	15	20	25	30	15	20	25	30	40	15	20	15	20	25	15	20	
1996	Houses																			
	Multi-unit dwellings																			
2018	Houses	727	130	41	26	19	30	152	44	20	10	6	581	526	69	291	8	5	23	
	Multi-unit dwellings	126	1	0	0	0	0	21	6	3	1	1	8	8	0	0	0	0	0	2
1995/96 Property Prices	Houses	\$634,683	\$288,020	\$306,435	\$306,435	\$306,435	\$306,435	\$200,600	\$200,600	\$200,600	\$200,600	\$200,600	\$122,400	\$122,400	\$182,031	\$182,031	\$182,031	\$279,600	\$279,600	
	Multi-unit dwellings	\$501,000	\$228,000	\$242,000	\$242,000	\$242,000	\$242,000	\$158,000	\$158,000	\$158,000	\$158,000	\$158,000	\$97,000	\$97,000	\$144,000	\$144,000	\$144,000	\$221,000	\$221,000	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Aggregate Real Values 2016 (1996\$)	Houses	\$447,558,001	\$36,319,322	\$12,186,920	\$7,329,925	\$4,948,925	\$7,354,440	\$29,576,464	\$8,120,288	\$3,410,200	\$1,604,800	\$1,203,600	\$68,980,968	\$59,231,808	\$12,183,335	\$48,733,339	\$1,237,811	\$1,356,060	\$5,916,338	
	Multi-unit dwellings	\$61,232,220	\$221,160	\$0	\$0	\$0	\$0	\$3,218,460	\$872,160	\$402,900	\$126,400	\$158,000	\$752,720	\$713,920	\$0	\$0	\$0	\$0	\$406,640	
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Sum of Real Values (1996\$)	2018	\$508,790,221	\$36,540,482	\$12,186,920	\$7,329,925	\$4,948,925	\$7,354,440	\$32,794,924	\$8,992,448	\$3,813,100	\$1,731,200	\$1,361,600	\$69,733,688	\$59,945,728	\$12,183,335	\$48,733,339	\$1,237,811	\$1,356,060	\$6,322,976	
Difference in Real Values	2018	(\$15,735,780)	(\$1,130,118)	(\$376,915)	(\$637,385)	(\$873,340)	(\$1,838,610)	(\$1,014,278)	(\$781,952)	(\$872,900)	(\$432,800)	\$0	(\$2,156,712)	(\$5,212,672)	(\$376,804)	(\$4,237,682)	(\$218,437)	(\$41,940)	(\$549,824)	

Airport Option:	BC - Option A
Traffic Forecast:	
Operating Mode:	2

Area	CAA	38	38	38	39	39	39	39	39	40	40	40	41	41	41	42	42	42	42
	Noise Level (ANEC)	25-30	30-35	>35	15-20	20-25	25-30	30-35	>35	15-20	20-25	25-30	15-20	20-25	25-30	15-20	20-25	25-30	30-35
	Noise Level (ANEC)	25	30	40	15	20	25	30	40	15	20	25	15	20	25	15	20	25	30
1996	Houses																		
	Multi-unit dwellings																		
2018	Houses	10	25	3	150	54	17	17	7	13	992	121	62	300	20	12	30	19	3
	Multi-unit dwellings	0	0	0	21	7	2	2	1	0	14	2	0	0	0	1	3	2	0
1995/96 Property Prices	Houses	\$306,435	\$306,435	\$306,435	\$200,600	\$200,600	\$200,600	\$200,600	\$200,600	\$122,400	\$122,400	\$122,400	\$182,031	\$182,031	\$182,031	\$279,600	\$279,600	\$279,600	\$279,600
	Multi-unit dwellings	\$242,000	\$242,000	\$242,000	\$158,000	\$158,000	\$158,000	\$158,000	\$158,000	\$97,000	\$97,000	\$97,000	\$144,000	\$144,000	\$144,000	\$221,000	\$221,000	\$221,000	\$221,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$2,604,698	\$6,128,700	\$919,305	\$29,187,300	\$9,965,808	\$2,898,670	\$2,728,160	\$1,404,200	\$1,543,464	\$111,707,136	\$12,588,840	\$10,947,344	\$50,240,556	\$3,094,527	\$3,254,544	\$7,716,960	\$4,515,540	\$671,040
	Multi-unit dwellings	\$0	\$0	\$0	\$3,218,460	\$1,017,520	\$268,600	\$252,800	\$158,000	\$0	\$1,249,360	\$164,900	\$0	\$0	\$0	\$214,370	\$609,960	\$375,700	\$0
Sum of Real Values	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sum of Real Values	2016	\$2,604,698	\$6,128,700	\$919,305	\$32,405,760	\$10,983,328	\$3,167,270	\$2,980,960	\$1,562,200	\$1,543,464	\$112,956,496	\$12,753,740	\$10,947,344	\$50,240,556	\$3,094,527	\$3,468,914	\$8,326,920	\$4,891,240	\$671,040
Difference in Real Values	2016	(\$459,653)	(\$1,532,175)	\$0	(\$1,002,240)	(\$955,072)	(\$558,930)	(\$745,240)	\$0	(\$47,736)	(\$9,822,304)	(\$2,250,660)	(\$338,578)	(\$4,368,744)	(\$546,093)	(\$107,286)	(\$724,080)	(\$863,160)	(\$167,760)

### Badgerys Creek Options

Airport Option:	BC - Option A
Traffic Forecast:	
Operating Mode:	1

Area	CAA	42	42	43	64	64	Total No. Affected
	Noise Level (ANEC)	25-30	30-35	15-20	15-20	20-25	
1996	Noise Level (ANEC)	25	30	15	15	20	
	Houses						0
	Multi-unit dwellings						0
2016	Houses	31	6	219	51	6	4743
	Multi-unit dwellings	3	1	0	0	0	249
1995/96 Property Prices	Houses	\$279,600	\$279,600	\$339,536	\$182,031	\$182,031	
	Multi-unit dwellings	\$221,000	\$221,000	\$268,000	\$144,000	\$144,000	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	
Aggregate Real Values 2016 (1996\$)	Houses	\$7,367,460	\$1,342,080	\$72,127,632	\$9,005,074	\$1,004,811	
	Multi-unit dwellings	\$563,550	\$176,800	\$0	\$0	\$0	
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	
	2016	\$7,931,010	\$1,518,880	\$72,127,632	\$9,005,074	\$1,004,811	
Difference in Real Values	2016	(\$1,399,590)	(\$379,720)	(\$2,230,752)	(\$278,507)	(\$87,375)	

Airport Option:	BC - Option A
Traffic Forecast:	
Operating Mode:	2

Area	CAA	43	43	64
	Noise Level (ANEC)	15-20	20-25	15-20
1996	Noise Level (ANEC)	15	20	15
	Houses			
	Multi-unit dwellings			
2016	Houses	684	109	6
	Multi-unit dwellings	0	0	0
1995/96 Property Prices	Houses	\$339,536	\$339,536	\$182,031
	Multi-unit dwellings	\$268,000	\$268,000	\$144,000
Real Values 1996	Houses	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$225,275,345	\$34,048,670	\$1,059,420
	Multi-unit dwellings	\$0	\$0	\$0
Sum of Real Values	1996	\$0	\$0	\$0
	2016	\$225,275,345	\$34,048,670	\$1,059,420
Difference in Real Values	2016	(\$0,967,279)	(\$2,960,754)	(\$32,766)

Airport Option:	BC - Option B
Traffic Forecast:	
Operating Mode:	1

Area	CAA	17	18	20	22	22	25	26	26	26	27	27	27	28	28	28	29	36	38	38
	Noise Level (ANEC)	15-20	15-20	15-20	15-20	20-25	15-20	15-20	20-25	25-30	15-20	20-25	25-30	15-20	20-25	25-30	15-20	15-20	15-20	20-25
	Noise Level (ANEC)	15	15	15	15	20	15	15	20	25	15	20	25	15	20	25	15	15	15	20
1996	Houses																			
	Multi-unit dwellings																			
2016	Houses	5	20	2	349	16	58	113	34	2	79	60	14	131	149	63	938	394	40	51
	Multi-unit dwellings	0	0	0	22	1	0	3	1	0	0	0	0	0	0	0	48	2	0	0
1995/96 Property Prices	Houses	\$200,600	\$200,904	\$138,900	\$303,022	\$303,022	\$413,786	\$271,750	\$271,750	\$271,750	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$421,038	\$288,020	\$306,435	\$306,435
	Multi-unit dwellings	\$158,000	\$159,000	\$110,000	\$239,000	\$239,000	\$327,000	\$215,000	\$215,000	\$215,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$333,000	\$228,000	\$242,000	\$242,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$972,910	\$3,897,538	\$269,466	\$102,582,038	\$4,460,484	\$23,279,600	\$29,786,518	\$8,500,340	\$461,975	\$23,687,176	\$17,062,927	\$3,678,421	\$39,278,735	\$42,372,936	\$16,552,894	\$383,085,635	\$110,075,484	\$11,889,678	\$14,377,930
	Multi-unit dwellings	\$0	\$0	\$0	\$5,100,260	\$219,880	\$0	\$625,650	\$197,800	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$15,504,480	\$442,320	\$0	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$972,910	\$3,897,538	\$269,466	\$107,682,298	\$4,680,364	\$23,279,600	\$30,412,168	\$8,698,140	\$461,975	\$23,687,176	\$17,062,927	\$3,678,421	\$39,278,735	\$42,372,936	\$16,552,894	\$398,590,115	\$110,517,804	\$11,889,678	\$14,377,930
Difference in Real Values	2016	(\$30,090)	(\$120,542)	(\$8,334)	(\$3,330,380)	(\$406,888)	(\$719,988)	(\$940,583)	(\$756,360)	(\$81,525)	(\$732,593)	(\$1,483,733)	(\$649,133)	(\$1,214,806)	(\$3,684,603)	(\$2,921,099)	(\$12,327,529)	(\$3,418,076)	(\$367,722)	(\$1,250,255)

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 \$(52,016,201)

Airport Option:	BC - Option B
Traffic Forecast:	
Operating Mode:	2

Area	CAA	17	17	22	22	25	25	26	26	26	27	27	27	28	28	28	28	29	38	38	
	Noise Level (ANEC)	15-20	20-25	15-20	20-25	15-20	20-25	15-20	20-25	25-30	15-20	20-25	25-30	15-20	20-25	25-30	30-35	15-20	15-20	20-25	
	Noise Level (ANEC)	15	20	15	20	15	20	15	20	25	15	20	25	15	20	25	30	15	15	20	
1996	Houses																				
	Multi-unit dwellings																				
2016	Houses	4	0	463	77	34	46	89	37	10	32	65	48	99	47	32	21	24	58	13	
	Multi-unit dwellings	0	0	29	5	0	0	2	1	0	0	0	0	0	0	0	0	1	0	0	
1995/96 Property Prices	Houses	\$200,600	\$200,600	\$303,022	\$303,022	\$413,786	\$413,786	\$271,750	\$271,750	\$271,750	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$309,111	\$421,038	\$306,435	\$306,435
	Multi-unit dwellings	\$158,000	\$158,000	\$239,000	\$239,000	\$327,000	\$327,000	\$215,000	\$215,000	\$215,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$333,000	\$242,000	\$242,000	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Real Values 2016 (1996\$)	Houses	\$778,328	\$0	\$138,090,210	\$21,466,078	\$13,646,662	\$17,511,424	\$23,460,178	\$9,250,370	\$2,309,875	\$9,594,805	\$18,484,838	\$12,611,729	\$29,683,929	\$13,365,960	\$8,407,819	\$5,193,065	\$9,801,765	\$17,240,033	\$3,664,963	
	Multi-unit dwellings	\$0	\$0	\$6,723,070	\$1,099,400	\$0	\$0	\$417,100	\$197,800	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$323,010	\$0	\$0	
Real Values	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	2016	\$778,328	\$0	\$142,813,280	\$22,565,478	\$13,646,662	\$17,511,424	\$23,877,278	\$9,448,170	\$2,309,875	\$9,594,805	\$18,484,838	\$12,611,729	\$29,683,929	\$13,365,960	\$8,407,819	\$5,193,065	\$10,124,775	\$17,240,033	\$3,664,963	
Difference in Real Values	2016	(\$24,072)	\$0	(\$4,416,906)	(\$1,962,216)	(\$422,062)	(\$1,522,732)	(\$738,473)	(\$821,580)	(\$407,625)	(\$296,747)	(\$1,607,377)	(\$2,225,599)	(\$918,060)	(\$1,162,257)	(\$1,483,733)	(\$1,298,266)	(\$313,137)	(\$533,197)	(\$318,692)	

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 \$(56,402,865)

Airport Option:	BC - Option B
Traffic Forecast:	
Operating Mode:	1

Area	CAA	38	38	39	39	39	39	40	40	41	41	41	42	42	42	42	43	64	64
	Noise Level (ANEC)	25-30	30-35	15-20	20-25	25-30	30-35	15-20	20-25	15-20	20-25	25-30	15-20	20-25	25-30	30-35	15-20	15-20	20-25
	Noise Level (ANEC)	25	30	15	20	25	30	15	20	15	20	25	15	20	25	30	15	15	20
1996	Houses																		
	Multi-unit dwellings																		
2018	Houses	13	14	58	21	9	5	464	144	41	328	13	28	22	14	6	410	64	3
	Multi-unit dwellings	0	0	8	3	1	1	7	2	0	0	0	3	2	1	1	0	0	0
1995/96 Property Prices	Houses	\$306,435	\$306,435	\$200,600	\$200,600	\$200,600	\$200,600	\$122,400	\$122,400	\$182,031	\$182,031	\$182,031	\$279,600	\$279,600	\$279,600	\$279,600	\$339,536	\$182,031	\$182,031
	Multi-unit dwellings	\$242,000	\$242,000	\$158,000	\$158,000	\$158,000	\$158,000	\$97,000	\$97,000	\$144,000	\$144,000	\$144,000	\$221,000	\$221,000	\$221,000	\$221,000	\$268,000	\$144,000	\$144,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$3,386,107	\$3,432,072	\$11,285,756	\$3,875,592	\$1,534,590	\$802,400	\$55,089,792	\$16,215,552	\$7,239,373	\$54,594,738	\$2,011,443	\$7,593,936	\$5,659,104	\$3,327,240	\$1,342,080	\$135,033,467	\$11,300,484	\$502,406
	Multi-unit dwellings	\$0	\$0	\$1,228,080	\$436,080	\$134,300	\$126,400	\$658,630	\$178,480	\$0	\$0	\$0	\$643,110	\$406,840	\$187,850	\$176,800	\$0	\$0	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2018	\$3,386,107	\$3,432,072	\$12,511,836	\$4,311,672	\$1,668,890	\$928,800	\$55,748,422	\$16,394,032	\$7,239,373	\$54,594,738	\$2,011,443	\$8,237,046	\$6,065,744	\$3,515,090	\$1,518,880	\$135,033,467	\$11,300,484	\$502,406
Difference in Real Values	2018	(\$597,548)	(\$858,018)	(\$388,964)	(\$374,928)	(\$294,510)	(\$232,200)	(\$1,724,178)	(\$1,425,568)	(\$223,898)	(\$4,747,368)	(\$354,960)	(\$254,754)	(\$527,456)	(\$620,310)	(\$379,720)	(\$4,176,293)	(\$349,500)	(\$43,687)

Airport Option:	BC - Option B
Traffic Forecast:	
Operating Mode:	2

Area	CAA	38	38	39	39	39	39	40	40	41	41	41	42	42	42	42	43	43	64
	Noise Level (ANEC)	25-30	30-35	15-20	20-25	25-30	30-35	15-20	20-25	15-20	20-25	25-30	15-20	20-25	25-30	30-35	15-20	20-25	15-20
	Noise Level (ANEC)	25	30	15	20	25	30	15	20	15	20	25	15	20	25	30	15	20	15
1996	Houses																		
	Multi-unit dwellings																		
2018	Houses	6	15	62	23	16	7	423	552	30	305	45	23	15	20	5	1368	164	12
	Multi-unit dwellings	0	0	9	3	2	1	6	8	0	0	0	2	1	2	0	0	0	0
1995/96 Property Prices	Houses	\$306,435	\$306,435	\$200,600	\$200,600	\$200,600	\$200,600	\$122,400	\$122,400	\$182,031	\$182,031	\$182,031	\$279,600	\$279,600	\$279,600	\$279,600	\$339,536	\$339,536	\$182,031
	Multi-unit dwellings	\$242,000	\$242,000	\$158,000	\$158,000	\$158,000	\$158,000	\$97,000	\$97,000	\$144,000	\$144,000	\$144,000	\$221,000	\$221,000	\$221,000	\$221,000	\$268,000	\$268,000	\$144,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$1,562,819	\$3,677,220	\$12,064,084	\$4,244,696	\$2,728,160	\$1,123,360	\$50,221,944	\$62,159,616	\$5,297,102	\$51,077,899	\$6,962,686	\$6,237,876	\$3,858,480	\$4,753,200	\$1,118,400	\$450,550,691	\$51,229,192	\$2,118,841
	Multi-unit dwellings	\$0	\$0	\$1,379,340	\$436,080	\$268,600	\$126,400	\$564,540	\$713,920	\$0	\$0	\$0	\$428,740	\$203,320	\$375,700	\$0	\$0	\$0	\$0
Real Values	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$1,562,819	\$3,677,220	\$13,443,424	\$4,680,776	\$2,996,760	\$1,249,760	\$50,786,484	\$62,873,536	\$5,297,102	\$51,077,899	\$6,962,686	\$6,666,616	\$4,061,800	\$5,128,900	\$1,118,400	\$450,550,691	\$51,229,192	\$2,118,841
Difference in Real Values	2016	(\$275,792)	(\$919,305)	(\$415,776)	(\$407,024)	(\$528,840)	(\$312,440)	(\$1,570,716)	(\$5,467,284)	(\$163,828)	(\$4,441,556)	(\$1,228,709)	(\$206,184)	(\$353,200)	(\$905,100)	(\$279,600)	(\$13,934,557)	(\$4,454,712)	(\$65,531)

Second Sydney Airport EIS

Airport Option:	BC - Option B
Traffic Forecast:	
Operating Mode:	1

Area	CAA	
	Noise Level (ANEC)	
1996	Houses	0
	Multi-unit dwellings	0
2016	Houses	4173
	Multi-unit dwellings	106
1995/96 Property Prices	Houses	
	Multi-unit dwellings	
Real Values 1996	Houses	
	Multi-unit dwellings	
Real Values 2016 (1996\$)	Houses	
	Multi-unit dwellings	
Sum of Real Values (1996\$)	1996	
	2016	
Difference in Real Values	2016	

Airport Option:	BC - Option B
Traffic Forecast:	
Operating Mode:	2

Area	CAA	
	Noise Level (ANEC)	
1996	Houses	0
	Multi-unit dwellings	0
2016	Houses	4290
	Multi-unit dwellings	72
1995/96 Property Prices	Houses	
	Multi-unit dwellings	
Real Values 1996	Houses	
	Multi-unit dwellings	
Real Values 2016 (1996\$)	Houses	
	Multi-unit dwellings	
Real Values	1996	
	2016	
Difference in Real Values	2016	



Airport Option:	BC - Option B
Traffic Forecast:	
Operating Mode:	3

Area	CAA	15	17	17	22	22	25	25	26	26	26	27	27	27	28	28	28	28	29	36	
	Noise Level (ANEC)	15-20	15-20	20-25	15-20	20-25	15-20	20-25	15-20	20-25	25-30	15-20	20-25	25-30	15-20	20-25	25-30	30-35	15-20	15-20	
	Noise Level (ANEC)	15	15	20	15	20	15	20	15	20	25	15	20	25	15	20	25	30	15	15	
1996	Houses																				
	Multi-unit dwellings																				
2016	Houses	20	18	5	398	20	44	22	107	32	5	60	70	21	141	109	51	4	609	70	
	Multi-unit dwellings	0	0	0	25	1	0	0	3	1	0	0	0	0	0	0	0	0	0	31	0
1995/96 Property Prices	Houses	\$ 384,194	\$ 200,600	\$ 200,600	\$ 303,022	\$ 303,022	\$ 413,786	\$ 413,786	\$ 271,750	\$ 271,750	\$ 271,750	\$ 309,111	\$ 309,111	\$ 309,111	\$ 309,111	\$ 309,111	\$ 309,111	\$ 309,111	\$ 421,038	\$ 288,020	
	Multi-unit dwellings	\$148,500	\$158,000	\$158,000	\$239,000	\$239,000	\$327,000	\$327,000	\$215,000	\$215,000	\$215,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$244,000	\$333,000	\$228,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$7,453,364	\$3,502,476	\$922,760	\$116,984,673	\$5,575,605	\$17,660,386	\$8,375,029	\$28,204,933	\$8,000,320	\$1,154,938	\$17,990,260	\$19,906,748	\$5,517,631	\$42,277,111	\$30,997,651	\$13,399,962	\$989,155	\$248,719,778	\$19,556,558	
	Multi-unit dwellings	\$0	\$0	\$0	\$5,795,750	\$219,880	\$0	\$0	\$625,650	\$197,800	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10,013,310	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$7,453,364	\$3,502,476	\$922,760	\$122,780,423	\$5,795,485	\$17,660,386	\$8,375,029	\$28,830,583	\$8,198,120	\$1,154,938	\$17,990,260	\$19,906,748	\$5,517,631	\$42,277,111	\$30,997,651	\$13,399,962	\$989,155	\$258,733,088	\$19,556,558	
Difference in Real Values	2016	(\$230,516)	(\$108,324)	(\$80,240)	(\$3,797,333)	(\$503,955)	(\$546,198)	(\$728,263)	(\$891,668)	(\$712,880)	(\$203,813)	(\$556,400)	(\$1,731,022)	(\$973,700)	(\$1,307,540)	(\$2,695,448)	(\$2,364,699)	(\$247,289)	(\$8,002,054)	(\$604,842)	

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 (\$60,462,723)

Airport Option:	BC - Option C
Traffic Forecast:	
Operating Mode:	1

Area	CAA	11	13	16	16	16	17	17	17	17	17	18	18	19	20	28	37	38	38	38	
	Noise Level (ANEC)	15-20	15-20	15-20	20-25	15-20	15-20	20-25	25-30	30-35	>35	15-20	20-25	15-20	15-20	15-20	15-20	15-20	20-25	25-30	
	Noise Level (ANEC)	15	15	15	20	15	15	20	25	30	40	15	20	15	15	15	15	15	20	25	
1996	Houses																				
	Multi-unit dwellings																				
2016	Houses	530	429	262	8	65	15	28	6	5	8	224	29	425	578	2	94	72	31	24	
	Multi-unit dwellings	72	85	2	0	0	0	0	0	0	0	4	1	95	58	0	2	0	0	0	0
1995/96 Property Prices	Houses	\$114,400	\$133,300	\$384,194	\$384,194	\$200,600	\$200,600	\$200,600	\$200,600	\$200,600	\$200,600	\$200,904	\$200,904	\$123,300	\$138,900	\$309,111	\$303,738	\$306,435	\$306,435	\$306,435	
	Multi-unit dwellings	\$78,100	\$95,800	\$148,500	\$148,500	\$158,000	\$158,000	\$158,000	\$158,000	\$158,000	\$158,000	\$159,000	\$159,000	\$120,700	\$110,000	\$244,000	\$240,000	\$242,000	\$242,000	\$242,000	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$58,813,040	\$55,470,129	\$97,639,063	\$2,827,668	\$12,647,830	\$2,918,730	\$4,798,352	\$1,023,060	\$802,400	\$1,604,800	\$43,652,421	\$5,360,119	\$50,830,425	\$77,875,674	\$599,675	\$27,694,831	\$21,401,420	\$8,739,528	\$8,251,274	
	Multi-unit dwellings	\$5,454,504	\$7,898,710	\$288,090	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$618,920	\$148,280	\$11,122,505	\$6,188,600	\$0	\$465,600	\$0	\$0	\$0	
Sum of Real Values	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	2016	\$64,267,544	\$63,368,839	\$97,927,153	\$2,827,668	\$12,647,830	\$2,918,730	\$4,798,352	\$1,023,060	\$802,400	\$1,604,800	\$44,269,341	\$5,506,399	\$61,952,930	\$84,064,274	\$599,675	\$28,160,431	\$21,401,420	\$8,739,528	\$6,251,274	
Difference in Real Values	2016	(\$1,987,656)	(\$1,959,861)	(\$3,028,675)	(\$245,884)	(\$391,170)	(\$90,270)	(\$417,248)	(\$180,540)	(\$200,600)	\$0	(\$1,369,155)	(\$478,817)	(\$1,916,070)	(\$2,599,926)	(\$18,547)	(\$870,941)	(\$681,900)	(\$759,959)	(\$1,103,166)	

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 (\$25,398,629)

Airport Option: BC - Option B  
 Traffic Forecast:  
 Operating Mode: 3

Area	CAA	38	38	38	38	39	39	39	39	40	40	41	41	41	42	42	42	42	43	
	Noise Level (ANEC)	15-20	20-25	25-30	30-35	15-20	20-25	25-30	30-35	15-20	20-25	15-20	20-25	25-30	15-20	20-25	25-30	30-35	15-20	
	Noise Level (ANEC)	15	20	25	30	15	20	25	30	15	20	15	20	25	15	20	25	30	15	
1996	Houses																			
	Multi-unit dwellings																			
2016	Houses	89	44	14	14	164	49	18	6	336	330	42	323	15	28	22	16	5	1288	
	Multi-unit dwellings	0	0	0	0	23	7	2	1	5	5	0	0	0	3	2	2	0	0	
1995/96 Property Prices	Houses	\$ 306,435	\$ 306,435	\$ 306,435	\$ 306,435	\$ 200,600	\$ 200,600	\$ 200,600	\$ 200,600	\$ 122,400	\$ 122,400	\$ 182,031	\$ 182,031	\$ 182,031	\$ 279,600	\$ 279,600	\$ 279,600	\$ 279,600	\$ 339,536	
	Multi-unit dwellings	\$242,000	\$242,000	\$242,000	\$242,000	\$158,000	\$158,000	\$158,000	\$158,000	\$97,000	\$97,000	\$144,000	\$144,000	\$144,000	\$221,000	\$221,000	\$221,000	\$221,000	\$268,000	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Real Values 2016 (1996\$)	Houses	\$26,454,534	\$12,404,489	\$3,646,577	\$3,432,072	\$31,911,448	\$9,043,048	\$3,069,180	\$962,880	\$39,892,608	\$37,160,640	\$7,415,943	\$54,092,332	\$2,320,895	\$7,593,936	\$5,659,104	\$3,802,560	\$1,118,400	\$423,543,997	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$3,524,980	\$1,017,520	\$268,600	\$126,400	\$470,450	\$446,200	\$0	\$0	\$0	\$643,110	\$406,640	\$375,700	\$0	\$0	
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	2016	\$26,454,534	\$12,404,489	\$3,646,577	\$3,432,072	\$35,436,428	\$10,060,568	\$3,337,780	\$1,089,280	\$40,363,058	\$37,606,840	\$7,415,943	\$54,092,332	\$2,320,895	\$8,237,046	\$6,065,744	\$4,178,260	\$1,118,400	\$423,543,997	
Difference in Real Values	2016	(\$818,181)	(\$1,078,651)	(\$643,514)	(\$858,018)	(\$1,095,972)	(\$874,832)	(\$589,020)	(\$272,320)	(\$1,248,342)	(\$3,270,160)	(\$229,359)	(\$4,703,681)	(\$409,570)	(\$254,754)	(\$527,456)	(\$737,340)	(\$279,600)	(\$13,099,299)	

Airport Option: BC - Option C  
 Traffic Forecast:  
 Operating Mode: 1

Area	CAA	38	38	39	39	39	42	42	43	43	43	43	43	44	44	62	62	67	
	Noise Level (ANEC)	30-35	>35	15-20	20-25	25-30	15-20	20-25	15-20	20-25	25-30	30-35	>35	15-20	20-25	15-20	20-25	15-20	
	Noise Level (ANEC)	30	40	15	20	25	15	20	15	20	25	30	40	15	20	15	20	15	
1996	Houses																		0
	Multi-unit dwellings																		0
2016	Houses	14	38	20	46	26	12	5	66	28	15	7	6	27	5	73	2	49	3272
	Multi-unit dwellings	0	0	3	6	4	1	0	0	0	0	0	0	1	0	5	0	5	344
1995/96 Property Prices	Houses	\$306,435	\$306,435	\$200,600	\$200,600	\$200,600	\$279,600	\$279,600	\$339,536	\$339,536	\$339,536	\$339,536	\$339,536	\$289,879	\$289,879	\$339,536	\$339,536	\$223,984	
	Multi-unit dwellings	\$242,000	\$242,000	\$158,000	\$158,000	\$158,000	\$221,000	\$221,000	\$268,000	\$268,000	\$268,000	\$268,000	\$268,000	\$229,000	\$229,000	\$268,000	\$268,000	\$121,300	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Real Values 2016 (1996\$)	Houses	\$3,432,072	\$11,644,530	\$3,891,640	\$8,489,392	\$4,433,260	\$3,254,544	\$1,286,160	\$21,737,095	\$8,746,447	\$4,329,084	\$1,901,402	\$2,037,216	\$7,591,931	\$1,333,443	\$24,042,544	\$624,746	\$10,645,960	
	Multi-unit dwellings	\$0	\$0	\$459,780	\$872,160	\$537,200	\$214,370	\$0	\$0	\$0	\$0	\$0	\$0	\$222,130	\$0	\$1,299,800	\$0	\$588,305	
Sum of Real Values	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	2016	\$3,432,072	\$11,644,530	\$4,351,420	\$9,361,552	\$4,970,460	\$3,468,914	\$1,286,160	\$21,737,095	\$8,746,447	\$4,329,084	\$1,901,402	\$2,037,216	\$7,814,061	\$1,333,443	\$25,342,344	\$624,746	\$11,234,265	
Difference in Real Values	2016	(\$858,018)	\$0	(\$134,580)	(\$814,048)	(\$877,140)	(\$107,286)	(\$111,840)	(\$672,281)	(\$760,561)	(\$763,956)	(\$475,350)	\$0	(\$241,672)	(\$115,952)	(\$783,784)	(\$54,326)	(\$347,451)	

Airport Option:	BC - Option B
Traffic Forecast:	
Operating Mode:	3

Area	CAA		
	43	64	
	Noise Level (ANEC)	20-25	15-20
	Noise Level (ANEC)	20	15
1996	Houses		
	Multi-unit dwellings		
2016	Houses	109	36
	Multi-unit dwellings	0	0
1995/96 Property Prices	Houses	\$ 339,536	\$ 182,031
	Multi-unit dwellings	\$268,000	\$144,000
Real Values 1996	Houses	\$0	\$0
	Multi-unit dwellings	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$34,048,670	\$8,356,523
	Multi-unit dwellings	\$0	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0
	2016	\$34,048,670	\$8,356,523
Difference in Real Values	2016	(\$2,960,754)	(\$196,593)

Airport Option:	BC - Option C
Traffic Forecast:	
Operating Mode:	1

Area	CAA		
	43	64	
	Noise Level (ANEC)	20-25	15-20
	Noise Level (ANEC)	20	15
1996	Houses		
	Multi-unit dwellings		
2016	Houses		
	Multi-unit dwellings		
1995/96 Property Prices	Houses		
	Multi-unit dwellings		
Real Values 1996	Houses		
	Multi-unit dwellings		
Real Values 2016 (1996\$)	Houses		
	Multi-unit dwellings		
Sum of Real Values	1996		
	2016		
Difference in Real Values	2016		

Airport Option: BC - Option C  
 Traffic Forecast:  
 Operating Mode: 2

Area	CAA	11	12	15	16	17	17	17	17	17	18	18	19	37	38	38	38	38	38	39	
	Noise Level (ANEC)	15-20	15-20	15-20	15-20	15-20	20-25	25-30	30-35	>35	15-20	20-25	15-20	15-20	15-20	20-25	25-30	30-35	>35	15-20	
	Noise Level (ANEC)	15	15	15	15	15	20	25	30	40	15	20	15	15	15	20	25	30	40	15	
1996	Houses																				
	Multi-unit dwellings																				
2016	Houses	242	377	26	9	16	6	6	4	7	164	40	939	17	68	26	34	56	11	16	
	Multi-unit dwellings	33	45	0	0	0	0	0	0	0	3	1	209	0	0	0	0	0	0	0	2
1995/96 Property Prices	Houses	\$114,400	\$123,300	\$384,194	\$200,600	\$200,600	\$200,600	\$200,600	\$200,600	\$200,600	\$200,904	\$200,904	\$123,300	\$303,738	\$306,435	\$306,435	\$306,435	\$306,435	\$306,435	\$200,600	
	Multi-unit dwellings	\$78,100	\$120,700	\$148,500	\$158,000	\$158,000	\$158,000	\$158,000	\$158,000	\$158,000	\$159,000	\$159,000	\$120,700	\$240,000	\$242,000	\$242,000	\$242,000	\$242,000	\$242,000	\$158,000	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Real Values 2016 (1996\$)	Houses	\$26,854,256	\$45,089,577	\$9,689,373	\$1,751,238	\$3,113,312	\$1,107,312	\$1,023,060	\$641,920	\$1,404,200	\$31,959,808	\$7,393,267	\$112,305,339	\$5,008,640	\$20,212,453	\$7,329,925	\$8,855,972	\$13,728,288	\$3,370,785	\$3,113,312	
	Multi-unit dwellings	\$2,499,981	\$5,268,555	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$462,690	\$146,280	\$24,469,511	\$0	\$0	\$0	\$0	\$0	\$0	\$306,520	
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	2016	\$29,354,237	\$50,358,132	\$9,689,373	\$1,751,238	\$3,113,312	\$1,107,312	\$1,023,060	\$641,920	\$1,404,200	\$32,422,498	\$7,539,547	\$136,774,850	\$5,008,640	\$20,212,453	\$7,329,925	\$8,855,972	\$13,728,288	\$3,370,785	\$3,419,832	
Difference in Real Values	2016	(\$907,863)	(\$1,557,468)	(\$299,671)	(\$54,162)	(\$96,288)	(\$96,288)	(\$180,540)	(\$160,480)	\$0	(\$1,002,758)	(\$655,613)	(\$4,230,150)	(\$154,906)	(\$625,127)	(\$637,385)	(\$1,562,819)	(\$3,432,072)	\$0	(\$105,788)	

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 (\$31,383,491)

Airport Option: BC - Option C  
 Traffic Forecast:  
 Operating Mode: 3

Area	CAA	11	15	16	17	17	17	17	17	18	18	19	20	28	28	29	36	37	37	38	
	Noise Level (ANEC)	15-20	15-20	15-20	15-20	20-25	25-30	30-35	>35	15-20	20-25	15-20	15-20	15-20	20-25	15-20	15-20	15-20	20-25	15-20	
	Noise Level (ANEC)	15	15	15	15	20	25	30	40	15	20	15	15	15	20	15	15	15	20	15	
1996	Houses																				
	Multi-unit dwellings																				
2016	Houses	271	188	36	23	17	5	5	7	228	17	588	58	110	16	24	43	219	101	77	
	Multi-unit dwellings	37	1	0	0	0	0	0	0	4	0	131	6	0	0	1	0	4	2	0	
1995/96 Property Prices	Houses	\$114,400	\$384,194	\$200,600	\$200,600	\$200,600	\$200,600	\$200,600	\$200,600	\$200,904	\$200,904	\$123,300	\$138,900	\$309,111	\$309,111	\$421,038	\$288,020	\$303,738	\$303,738	\$306,435	
	Multi-unit dwellings	\$78,100	\$148,500	\$158,000	\$158,000	\$158,000	\$158,000	\$158,000	\$158,000	\$159,000	\$159,000	\$120,700	\$110,000	\$244,000	\$244,000	\$333,000	\$228,000	\$240,000	\$240,000	\$242,000	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Real Values 2016 (1996\$)	Houses	\$30,072,328	\$70,061,618	\$7,004,952	\$4,475,388	\$3,137,384	\$852,550	\$802,400	\$1,404,200	\$44,431,929	\$3,142,139	\$70,325,388	\$7,814,514	\$32,982,144	\$4,550,114	\$9,801,765	\$12,013,314	\$64,523,063	\$28,223,335	\$22,887,630	
	Multi-unit dwellings	\$2,803,009	\$144,045	\$0	\$0	\$0	\$0	\$0	\$0	\$616,920	\$0	\$15,337,349	\$640,200	\$0	\$0	\$323,010	\$0	\$931,200	\$441,600	\$0	
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	2016	\$32,875,337	\$70,205,663	\$7,004,952	\$4,475,388	\$3,137,384	\$852,550	\$802,400	\$1,404,200	\$45,048,849	\$3,142,139	\$85,662,737	\$8,454,714	\$32,982,144	\$4,550,114	\$10,124,775	\$12,013,314	\$65,454,263	\$28,664,935	\$22,887,630	
Difference in Real Values	2016	(\$1,016,763)	(\$2,171,309)	(\$216,648)	(\$138,414)	(\$272,816)	(\$150,450)	(\$200,600)	\$0	(\$1,393,263)	(\$273,229)	(\$2,649,363)	(\$261,486)	(\$1,020,066)	(\$395,662)	(\$313,137)	(\$371,546)	(\$2,024,359)	(\$2,492,603)	(\$707,865)	

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 (\$28,314,618)

Airport Option:	BC - Option C
Traffic Forecast:	
Operating Mode:	2

Area	CAA	39	39	39	42	42	42	43	43	43	43	44	44	44	45	62	63	64	66
	Noise Level (ANEC)	20-25	25-30	30-35	15-20	20-25	25-30	15-20	20-25	25-30	30-35	15-20	20-25	25-30	15-20	15-20	15-20	15-20	15-20
	Noise Level (ANEC)	20	25	30	15	20	25	15	20	25	30	15	20	25	15	15	15	15	15
1996	Houses																		
	Multi-unit dwellings																		
2016	Houses	17	39	18	33	16	2	20	67	23	14	249	20	4	463	7	55	7	11
	Multi-unit dwellings	2	5	2	3	2	0	0	0	0	0	9	1	0	59	0	0	0	0
1995/96 Property Prices	Houses	\$200,600	\$200,600	\$200,600	\$279,600	\$279,600	\$279,600	\$339,536	\$339,536	\$339,536	\$339,536	\$289,879	\$289,879	\$289,879	\$319,897	\$339,536	\$213,500	\$182,031	\$281,354
	Multi-unit dwellings	\$158,000	\$158,000	\$158,000	\$221,000	\$221,000	\$221,000	\$268,000	\$268,000	\$268,000	\$268,000	\$229,000	\$229,000	\$229,000	\$253,000	\$268,000	\$169,000	\$144,000	\$222,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$3,137,384	\$6,649,890	\$2,888,640	\$8,949,998	\$4,115,712	\$475,320	\$6,588,998	\$20,928,999	\$6,637,929	\$3,802,803	\$70,014,475	\$5,333,774	\$985,589	\$143,668,942	\$2,305,449	\$11,390,225	\$1,235,990	\$3,002,047
	Multi-unit dwellings	\$290,720	\$671,500	\$252,800	\$643,110	\$406,640	\$0	\$0	\$0	\$0	\$0	\$1,999,170	\$210,680	\$0	\$14,479,190	\$0	\$0	\$0	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$3,428,104	\$7,321,390	\$3,141,440	\$9,593,106	\$4,522,352	\$475,320	\$6,588,998	\$20,928,999	\$6,637,929	\$3,802,803	\$72,013,645	\$5,544,454	\$985,589	\$158,148,132	\$2,305,449	\$11,390,225	\$1,235,990	\$3,002,047
Difference in Real Values	2016	(\$298,096)	(\$1,292,010)	(\$785,360)	(\$296,694)	(\$393,248)	(\$83,880)	(\$203,722)	(\$1,819,913)	(\$1,171,399)	(\$950,701)	(\$2,227,226)	(\$482,126)	(\$173,927)	(\$4,891,179)	(\$71,303)	(\$352,275)	(\$38,227)	(\$92,847)

Airport Option:	BC - Option C
Traffic Forecast:	
Operating Mode:	3

Area	CAA	38	38	38	38	39	39	39	39	42	42	43	43	43	43	44	44	62	63
	Noise Level (ANEC)	20-25	25-30	30-35	>35	15-20	20-25	25-30	30-35	15-20	20-25	15-20	20-25	25-30	30-35	15-20	20-25	15-20	15-20
	Noise Level (ANEC)	20	25	30	40	15	20	25	30	15	20	15	20	25	30	15	20	15	15
1996	Houses																		
	Multi-unit dwellings																		
2016	Houses	34	34	32	23	31	37	46	2	21	9	48	48	17	11	72	8	57	7
	Multi-unit dwellings	0	0	0	0	4	5	6	0	2	1	0	0	0	0	2	0	4	0
1995/96 Property Prices	Houses	\$306,435	\$306,435	\$306,435	\$306,435	\$200,600	\$200,600	\$200,600	\$200,600	\$279,600	\$279,600	\$339,536	\$339,536	\$339,536	\$339,536	\$289,879	\$289,879	\$339,536	\$213,500
	Multi-unit dwellings	\$242,000	\$242,000	\$242,000	\$242,000	\$158,000	\$158,000	\$158,000	\$158,000	\$221,000	\$221,000	\$268,000	\$268,000	\$268,000	\$268,000	\$229,000	\$229,000	\$268,000	\$169,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$9,585,287	\$8,855,972	\$7,844,736	\$7,048,005	\$6,032,042	\$6,828,424	\$7,843,460	\$320,960	\$5,695,452	\$2,315,088	\$15,808,796	\$14,993,910	\$4,906,295	\$2,987,917	\$20,245,149	\$2,133,509	\$18,772,945	\$1,449,665
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$613,040	\$726,800	\$805,800	\$0	\$428,740	\$203,320	\$0	\$0	\$0	\$0	\$444,280	\$0	\$1,039,840	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$9,585,287	\$8,855,972	\$7,844,736	\$7,048,005	\$6,645,082	\$7,555,224	\$8,649,260	\$320,960	\$6,124,192	\$2,518,408	\$15,808,796	\$14,993,910	\$4,906,295	\$2,987,917	\$20,689,409	\$2,133,509	\$19,812,785	\$1,449,665
Difference in Real Values	2016	(\$833,503)	(\$1,562,819)	(\$1,961,184)	\$0	(\$205,518)	(\$658,976)	(\$1,526,340)	(\$80,240)	(\$189,408)	(\$218,992)	(\$488,932)	(\$1,303,818)	(\$865,817)	(\$746,979)	(\$639,879)	(\$185,523)	(\$612,767)	(\$44,835)

Second Sydney Airport EIS

Airport Option:	BC - Option C
Traffic Forecast:	
Operating Mode:	2

Area	CAA	
	Noise Level (ANEC)	
	Noise Level (ANEC)	
1996	Houses	0
	Multi-unit dwellings	0
2016	Houses	3129
	Multi-unit dwellings	376
1995/96 Property Prices	Houses	
	Multi-unit dwellings	
Real Values 1996	Houses	
	Multi-unit dwellings	
Real Values 2016 (1996\$)	Houses	
	Multi-unit dwellings	
Sum of Real Values (1996\$)	1996	
	2016	
Difference in Real Values	2016	

Airport Option:	BC - Option C
Traffic Forecast:	
Operating Mode:	3

Area	CAA		67
	Noise Level (ANEC)		
	Noise Level (ANEC)	15-20	
	Noise Level (ANEC)	15	
1996	Houses		
	Multi-unit dwellings		
2016	Houses	17	
	Multi-unit dwellings	2	
1995/96 Property Prices	Houses	\$223,984	
	Multi-unit dwellings	\$121,300	
Real Values 1996	Houses	\$0	
	Multi-unit dwellings	\$0	
Real Values 2016 (1996\$)	Houses	\$3,693,496	
	Multi-unit dwellings	\$235,322	
Sum of Real Values (1996\$)	1996	\$0	
	2016	\$3,928,818	
Difference in Real Values	2016	(\$121,510)	

2587  
212

### Holsworthy Options

Airport Option:	H - Option A
Traffic Forecast:	
Operating Mode:	1

Area	CAA	33	34	46	48	48	49	55	56	57	57	58	58	59	59	60	81	
	Noise Level (ANEC)	15-20	15-20	15-20	15-20	20-25	15-20	15-20	15-20	15-20	20-25	15-20	20-25	25-30	15-20	20-25	15-20	
	Noise Level (ANEC)	15	15	15	15	20	15	15	15	15	20	15	20	25	15	20	15	
1996	Houses																	
	Multi-unit dwellings																	
2016	Houses	1187	892	534	7319	16	228	289	512	307	2037	1943	1230	137	61	56	78	2
	Multi-unit dwellings	533	172	159	761	2	13	0	0	96	634	532	337	37	9	8	23	0
1995/96 Property Prices	Houses	\$142,000	\$125,900	\$375,482	\$146,900	\$146,900	\$172,000	\$139,800	\$160,000	\$138,900	\$138,900	\$126,900	\$126,900	\$126,900	\$350,000	\$350,000	\$137,100	\$271,208
	Multi-unit dwellings	\$112,000	\$145,300	\$297,000	\$98,800	\$98,800	\$136,000	\$110,000	\$126,000	\$87,000	\$87,000	\$96,100	\$96,100	\$96,100	\$277,000	\$277,000	\$103,100	\$214,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$163,497,380	\$108,933,716	\$194,492,166	\$1,042,906,267	\$2,162,368	\$38,039,520	\$39,190,134	\$79,462,400	\$41,363,031	\$260,304,156	\$239,169,699	\$143,600,040	\$14,777,505	\$20,709,500	\$18,032,000	\$10,372,986	\$526,144
	Multi-unit dwellings	\$57,905,120	\$24,241,852	\$45,806,310	\$72,931,196	\$181,792	\$1,714,960	\$0	\$0	\$8,101,440	\$50,745,360	\$49,591,444	\$29,794,844	\$3,022,345	\$2,418,210	\$2,038,720	\$2,300,161	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$221,402,500	\$133,175,568	\$240,298,476	\$1,115,837,463	\$2,344,160	\$39,754,480	\$39,190,134	\$79,462,400	\$49,464,471	\$311,049,516	\$288,761,143	\$173,394,884	\$17,799,850	\$23,127,710	\$20,070,720	\$12,673,147	\$526,144
Difference in Real Values	2016	(\$6,847,500)	(\$4,118,832)	(\$7,431,912)	(\$34,510,437)	(\$203,840)	(\$1,229,520)	(\$1,212,066)	(\$2,457,600)	(\$1,529,829)	(\$27,047,784)	(\$8,930,757)	(\$15,077,816)	(\$3,141,150)	(\$715,290)	(\$1,745,280)	(\$391,953)	(\$16,272)

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 (\$121,008,554)

Airport Option:	H- Option A
Traffic Forecast:	
Operating Mode:	2

Area	CAA	30	33	34	48	48	49	55	56	57	57	57	58	58	59	76	80	
	Noise Level (ANEC)	15-20	15-20	15-20	15-20	20-25	15-20	15-20	15-20	15-20	20-25	25-30	15-20	20-25	25-30	15-20	15-20	
	Noise Level (ANEC)	15	15	15	15	20	15	15	15	15	20	25	15	20	25	15	15	
1996	Houses																	
	Multi-unit dwellings																	
2016	Houses	26	2210	2970	6545	466	227	68	326	850	1007	31	708	493	70	19	37	288
	Multi-unit dwellings	3	993	572	681	48	13	0	0	265	313	10	194	135	19	3	5	40
1995/96 Property Prices	Houses	\$146,400	\$142,000	\$125,900	\$146,900	\$146,900	\$172,000	\$139,800	\$160,000	\$138,900	\$138,900	\$138,900	\$126,900	\$126,900	\$126,900	\$350,000	\$123,500	\$170,000
	Multi-unit dwellings	\$116,000	\$112,000	\$145,300	\$98,800	\$98,800	\$136,000	\$110,000	\$126,000	\$87,000	\$87,000	\$87,000	\$96,100	\$96,100	\$96,100	\$277,000	\$98,000	\$134,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$3,692,208	\$304,405,400	\$362,705,310	\$932,616,685	\$62,978,968	\$37,872,680	\$9,221,208	\$50,595,200	\$114,523,050	\$128,682,516	\$3,660,015	\$87,149,844	\$57,556,764	\$7,550,550	\$6,450,500	\$4,432,415	\$47,491,200
	Multi-unit dwellings	\$337,560	\$107,879,520	\$80,618,252	\$65,264,316	\$4,363,008	\$1,714,960	\$0	\$0	\$22,363,350	\$25,052,520	\$739,500	\$18,084,098	\$11,935,620	\$1,552,015	\$806,070	\$475,300	\$5,199,200
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$4,029,768	\$412,284,920	\$443,323,562	\$997,881,001	\$67,341,976	\$39,587,640	\$9,221,208	\$50,595,200	\$136,886,400	\$153,735,036	\$4,399,515	\$105,233,942	\$69,492,384	\$9,102,565	\$7,256,570	\$4,907,715	\$52,690,400
Difference in Real Values	2016	(\$124,632)	(\$12,751,080)	(\$13,711,036)	(\$30,862,299)	(\$5,855,824)	(\$1,224,360)	(\$285,192)	(\$1,564,800)	(\$4,233,600)	(\$13,368,264)	(\$776,385)	(\$3,254,658)	(\$6,042,816)	(\$1,606,335)	(\$224,430)	(\$151,785)	(\$1,629,600)

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 (\$115,578,894)

### Holsworthy Options

Airport Option:	H - Option A
Traffic Forecast:	
Operating Mode:	1

Area	CAA	89	90	90	103	103
	Noise Level (ANEC)	20-25	15-20	20-25	15-20	20-25
	Noise Level (ANEC)	20	15	20	15	20
1996	Houses					
	Multi-unit dwellings					
2016	Houses	2C	588	11	70	21
	Multi-unit dwellings	C	22	0	4	1
1995/96 Property Prices	Houses	\$200,000	\$180,800	\$180,800	\$160,000	\$160,000
	Multi-unit dwellings	\$158,000	\$155,000	\$155,000	\$128,000	\$128,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$3,680,000	\$103,121,088	\$1,829,696	\$10,864,000	\$3,091,200
	Multi-unit dwellings	\$0	\$3,307,700	\$0	\$488,880	\$115,920
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0
Sum of Real Values (1996\$)	2016	\$3,680,000	\$106,428,788	\$1,829,696	\$11,352,880	\$3,207,120
Difference in Real Values	2016	(\$320,000)	(\$3,291,612)	(\$159,104)	(\$351,120)	(\$278,880)

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Airport Option:	H- Option A
Traffic Forecast:	
Operating Mode:	2

Area	CAA	81	89	89	90	93	103
	Noise Level (ANEC)	15-20	15-20	20-25	15-20	15-20	15-20
	Noise Level (ANEC)	15	15	20	15	15	15
1996	Houses						
	Multi-unit dwellings						
2016	Houses	51	4	17	1172	2745	79
	Multi-unit dwellings	0	0	0	43	129	4
1995/96 Property Prices	Houses	\$271,208	\$200,000	\$200,000	\$180,800	\$120,000	\$160,000
	Multi-unit dwellings	\$214,000	\$158,000	\$158,000	\$155,000	\$95,000	\$128,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$13,416,660	\$776,000	\$3,128,000	\$205,540,672	\$319,518,000	\$12,260,800
	Multi-unit dwellings	\$0	\$0	\$0	\$6,465,050	\$11,887,350	\$488,880
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0
Sum of Real Values (1996\$)	2016	\$13,416,660	\$776,000	\$3,128,000	\$212,005,722	\$331,405,350	\$12,749,680
Difference in Real Values	2016	(\$414,948)	(\$24,000)	(\$272,000)	(\$6,556,878)	(\$10,249,650)	(\$394,320)

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Airport Option:	H - Option A
Traffic Forecast:	
Operating Mode:	3

Area	CAA	33	34	48	48	49	65	66	67	67	68	68	68	69	69	74	80	81
Noise Level (ANEC)		15-20	15-20	15-20	20-25	15-20	15-20	15-20	15-20	20-25	15-20	20-25	25-30	15-20	20-25	15-20	15-20	15-20
Noise Level (ANEC)		15	15	15	20	15	15	15	15	20	15	20	25	15	20	15	15	15
1996	Houses																	
	Multi-unit dwellings																	
2016	Houses	873	1532	7133	16	164	137	362	895	1438	1485	900	76	115	3	35	31	39
	Multi-unit dwellings	392	295	742	2	9	0	0	279	448	401	246	21	17	0	9	4	0
1995/96 Property Prices	Houses	\$142,000	\$125,900	\$146,900	\$146,900	\$172,000	\$139,800	\$160,000	\$138,900	\$138,900	\$126,900	\$126,900	\$126,900	\$350,000	\$350,000	\$268,139	\$170,000	\$271,208
	Multi-unit dwellings	\$112,000	\$145,300	\$98,800	\$98,800	\$136,000	\$110,000	\$126,000	\$87,000	\$87,000	\$96,100	\$96,100	\$96,100	\$277,000	\$277,000	\$212,000	\$134,000	\$214,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$120,247,020	\$187,092,436	\$1,016,402,569	\$2,162,368	\$27,361,760	\$18,578,022	\$58,182,400	\$120,586,035	\$183,759,144	\$180,331,245	\$105,073,200	\$8,197,740	\$39,042,500	\$968,000	\$9,103,319	\$5,111,900	\$10,259,799
	Multi-unit dwellings	\$42,586,880	\$41,577,595	\$71,110,312	\$181,792	\$1,187,280	\$0	\$0	\$23,544,810	\$35,857,920	\$37,380,017	\$21,749,352	\$1,715,385	\$4,567,730	\$0	\$1,850,760	\$519,920	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$162,833,900	\$228,670,031	\$1,087,512,881	\$2,344,160	\$28,549,040	\$18,578,022	\$58,182,400	\$144,130,845	\$219,617,064	\$217,711,262	\$126,822,552	\$9,913,125	\$43,610,230	\$968,000	\$10,954,079	\$5,631,820	\$10,259,799
Difference in Real Values	2016	(\$5,036,100)	(\$7,072,269)	(\$33,634,419)	(\$203,840)	(\$882,960)	(\$574,578)	(\$1,737,600)	(\$4,457,655)	(\$19,097,136)	(\$6,733,338)	(\$11,028,048)	(\$1,749,375)	(\$1,348,770)	(\$84,000)	(\$338,786)	(\$174,180)	(\$317,313)

SUMMARY TABLE	
Total Difference in Real Values	2016 (\$107,900,939)

Airport Option:	H - Option B
Traffic Forecast:	
Operating Mode:	1

Area	CAA	103	103	103	103	67	72	74	75	75	75	76	78	79	80	80	81	81
Noise Level (ANEC)		15-20	20-25	25-30	30-35	15-20	15-20	15-20	15-20	20-25	25-30	15-20	15-20	15-20	15-20	20-25	15-20	20-25
Noise Level (ANEC)		15	20	25	30	15	15	15	15	20	25	15	15	15	15	20	15	20
1996	Houses																	
	Multi-unit dwellings																	
2016	Houses	33	4	13	4	22	262	4	6620	2786	254	123	1082	183	2641	1718	45	44
	Multi-unit dwellings	2	0	1	0	2	94	1	894	376	34	3	39	79	371	241	0	0
1995/96 Property Prices	Houses	\$160,000	\$160,000	\$160,000	\$160,000	\$223,984	\$130,600	\$268,139	\$123,500	\$123,500	\$123,500	\$120,000	\$117,000	\$115,000	\$170,000	\$170,000	\$271,208	\$271,208
	Multi-unit dwellings	\$126,000	\$126,000	\$126,000	\$126,000	\$121,300	\$94,400	\$212,000	\$98,000	\$98,000	\$98,000	\$96,700	\$96,700	\$91,000	\$134,000	\$134,000	\$214,000	\$214,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$5,121,600	\$588,800	\$1,768,000	\$512,000	\$4,779,819	\$33,190,684	\$1,040,379	\$793,042,900	\$316,545,320	\$26,863,650	\$14,317,200	\$122,796,180	\$20,413,650	\$435,500,900	\$268,695,200	\$11,838,229	\$10,978,500
	Multi-unit dwellings	\$244,440	\$0	\$107,100	\$0	\$235,322	\$8,607,392	\$205,640	\$84,983,640	\$33,900,160	\$2,832,200	\$281,397	\$3,658,161	\$6,973,330	\$48,222,580	\$29,710,480	\$0	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$5,366,040	\$588,800	\$1,875,100	\$512,000	\$5,015,141	\$41,798,076	\$1,246,019	\$878,026,540	\$350,445,480	\$29,495,850	\$14,598,597	\$126,454,341	\$27,386,980	\$483,723,480	\$298,405,680	\$11,838,229	\$10,978,500
Difference in Real Values	2016	(\$165,960)	(\$51,200)	(\$330,900)	(\$128,000)	(\$155,107)	(\$1,292,724)	(\$38,537)	(\$27,155,460)	(\$30,473,520)	(\$5,205,150)	(\$451,503)	(\$3,910,959)	(\$847,020)	(\$14,960,520)	(\$25,948,320)	(\$366,131)	(\$954,652)

SUMMARY TABLE	
Total Difference in Real Values	2016 (\$148,728,157)

Airport Option:	H - Option A
Traffic Forecast:	
Operating Mode:	3

Area	CAA	87	87	87	89	89	90	93	103	
	Noise Level (ANEC)	15-20	20-25	25-30	15-20	20-25	15-20	15-20	15-20	
	Noise Level (ANEC)	15	20	25	15	20	15	15	15	
1996	Houses									0
	Multi-unit dwellings									0
2016	Houses	5	60	29	20	20	721	1605	69	17793
	Multi-unit dwellings	3	8	4	0	0	27	75	4	2991
1995/96 Property Prices	Houses	\$216,400	\$216,400	\$216,400	\$200,000	\$200,000	\$180,800	\$120,000	\$160,000	
	Multi-unit dwellings	\$188,600	\$188,600	\$188,600	\$158,000	\$158,000	\$155,000	\$95,000	\$126,000	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Real Values 2016 (1996\$)	Houses	\$11,544,940	\$11,945,280	\$5,334,260	\$3,880,000	\$3,880,000	\$126,446,096	\$186,822,000	\$10,708,800	
	Multi-unit dwellings	\$1,463,530	\$1,388,096	\$641,240	\$0	\$0	\$4,059,450	\$6,911,250	\$488,880	
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	2016	\$13,008,470	\$13,333,376	\$5,975,500	\$3,880,000	\$3,880,000	\$130,505,546	\$193,733,250	\$11,197,680	
Difference in Real Values	2016	(\$402,324)	(\$1,159,424)	(\$1,054,500)	(\$120,000)	(\$320,000)	(\$4,036,254)	(\$5,991,750)	(\$346,320)	

Airport Option:	H - Option B
Traffic Forecast:	
Operating Mode:	1

Area	CAA	81	81	89	90	90	90	91	93	93	94
	Noise Level (ANEC)	25-30	30-35	15-20	15-20	20-25	25-30	15-20	15-20	20-25	15-20
	Noise Level (ANEC)	25	30	15	15	20	25	15	15	20	15
1996	Houses										
	Multi-unit dwellings										
2016	Houses	5	21	15	1167	488	113	6	1101	387	856
	Multi-unit dwellings	3	0	0	43	18	4	0	52	18	41
1995/96 Property Prices	Houses	\$271,200	\$271,208	\$200,000	\$180,800	\$180,800	\$180,800	\$120,000	\$120,000	\$120,000	\$303,000
	Multi-unit dwellings	\$214,000	\$214,000	\$158,000	\$155,000	\$155,000	\$155,000	\$95,000	\$95,000	\$95,000	\$239,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$11,526,340	\$4,556,294	\$2,910,000	\$204,663,792	\$81,171,968	\$17,365,840	\$698,400	\$128,156,400	\$42,724,800	\$251,586,960
	Multi-unit dwellings	\$0	\$0	\$0	\$6,465,050	\$2,566,800	\$527,000	\$0	\$4,791,800	\$1,573,200	\$9,505,030
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$11,526,340	\$4,556,294	\$2,910,000	\$211,128,842	\$83,738,768	\$17,892,840	\$698,400	\$132,948,200	\$44,298,000	\$261,091,990
Difference in Real Values	2016	(\$2,034,060)	(\$1,139,074)	(\$90,000)	(\$6,529,758)	(\$7,281,632)	(\$3,157,560)	(\$21,600)	(\$4,111,800)	(\$3,852,000)	(\$8,075,010)

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Airport Option: **H - Option B**  
 Traffic Forecast:  
 Operating Mode: **2**

Area	CAA	103	103	103	67	75	75	75	75	78	80	80	80	81	81	81	81	81
	Noise Level (ANEC)	15-20	20-25	25-30	15-20	15-20	20-25	25-30	30-35	15-20	15-20	20-25	25-30	15-20	20-25	25-30	30-35	40
	Noise Level (ANEC)	15	20	25	15	15	20	25	30	15	15	20	25	15	20	25	30	40
1996	Houses																	
	Multi-unit dwellings																	
2016	Houses	4	26	4	5	2212	322	138	226	847	1816	1597	1116	39	38	11	22	4
	Multi-unit dwellings	0	1	0	0	299	43	19	31	31	255	224	157	0	0	0	0	0
1995/96 Property Prices	Houses	\$160,000	\$160,000	\$160,000	\$223,984	\$123,500	\$123,500	\$123,500	\$123,500	\$117,000	\$170,000	\$170,000	\$170,000	\$271,208	\$271,208	\$271,208	\$271,208	\$271,208
	Multi-unit dwellings	\$126,000	\$126,000	\$126,000	\$121,300	\$98,000	\$98,000	\$98,000	\$98,000	\$96,700	\$134,000	\$134,000	\$134,000	\$214,000	\$214,000	\$214,000	\$214,000	\$214,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$620,800	\$3,827,200	\$544,000	\$1,086,322	\$264,986,540	\$36,585,640	\$14,486,550	\$22,328,800	\$96,126,030	\$299,458,400	\$249,770,800	\$161,262,000	\$10,259,799	\$9,481,432	\$2,535,795	\$4,773,261	\$1,084,832
	Multi-unit dwellings	\$0	\$115,920	\$0	\$0	\$26,422,940	\$3,876,880	\$1,582,700	\$2,430,400	\$2,907,769	\$33,144,900	\$27,614,720	\$17,882,300	\$0	\$0	\$0	\$0	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$620,800	\$3,943,120	\$544,000	\$1,086,322	\$293,409,480	\$40,462,520	\$16,069,250	\$24,759,200	\$99,033,799	\$332,603,300	\$277,385,520	\$179,144,300	\$10,259,799	\$9,481,432	\$2,535,795	\$4,773,261	\$1,084,832
Difference in Real Values	2016	(\$19,200)	(\$342,880)	(\$96,000)	(\$33,598)	(\$9,074,520)	(\$3,518,480)	(\$2,835,750)	(\$6,189,800)	(\$3,062,901)	(\$10,286,700)	(\$24,120,480)	(\$31,613,700)	(\$317,313)	(\$824,472)	(\$447,493)	(\$1,193,315)	\$0

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 (\$122,253,993)

Airport Option: **H - Option B**  
 Traffic Forecast:  
 Operating Mode: **3**

Area	CAA	103	103	103	67	72	74	75	75	75	78	79	80	80	80	81	81	
	Noise Level (ANEC)	15-20	20-25	25-30	15-20	15-20	15-20	15-20	20-25	25-30	30-35	15-20	15-20	15-20	20-25	25-30	15-20	20-25
	Noise Level (ANEC)	15	20	25	15	15	15	15	20	25	30	15	15	15	20	25	15	20
1996	Houses																	
	Multi-unit dwellings																	
2016	Houses	17	13	17	5	293	27	7158	1253	304	8	831	15	2156	1742	532	53	35
	Multi-unit dwellings	1	1	1	0	106	7	966	169	41	1	30	6	302	244	75	0	0
1995/96 Property Prices	Houses	\$160,000	\$160,000	\$160,000	\$223,984	\$130,600	\$268,139	\$123,500	\$123,500	\$123,500	\$123,500	\$117,000	\$115,000	\$170,000	\$170,000	\$170,000	\$271,208	\$271,208
	Multi-unit dwellings	\$126,000	\$126,000	\$126,000	\$121,300	\$94,400	\$212,000	\$98,000	\$98,000	\$98,000	\$98,000	\$96,700	\$91,000	\$134,000	\$134,000	\$134,000	\$214,000	\$214,000
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Real Values 2016 (1996\$)	Houses	\$2,638,400	\$1,913,600	\$2,312,000	\$1,086,322	\$37,117,826	\$7,022,560	\$857,492,610	\$142,365,860	\$31,912,400	\$790,400	\$94,310,190	\$1,673,250	\$355,524,400	\$272,448,800	\$76,874,000	\$13,942,803	\$8,732,898
	Multi-unit dwellings	\$122,220	\$115,920	\$107,100	\$0	\$9,706,208	\$1,439,480	\$91,827,960	\$15,237,040	\$3,415,300	\$78,400	\$2,613,970	\$529,620	\$39,253,960	\$30,080,320	\$8,542,500	\$0	\$0
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	2016	\$2,760,620	\$2,029,520	\$2,419,100	\$1,086,322	\$46,824,034	\$8,462,040	\$949,320,570	\$157,602,900	\$35,327,700	\$868,800	\$97,124,160	\$2,202,870	\$394,778,360	\$302,529,120	\$85,416,500	\$13,942,803	\$8,732,898
Difference in Real Values	2016	(\$85,380)	(\$176,480)	(\$426,900)	(\$33,598)	(\$1,448,166)	(\$261,713)	(\$29,360,430)	(\$13,704,600)	(\$8,234,300)	(\$217,200)	(\$3,003,840)	(\$68,130)	(\$12,209,640)	(\$26,306,880)	(\$15,073,500)	(\$431,221)	(\$759,382)

<b>SUMMARY TABLE</b>	
Total Difference in Real Values	2016 (\$138,332,159)

Airport Option: **H - Option B**  
 Traffic Forecast:  
 Operating Mode: **2**

Area	CAA	89		90		91		93		93	
		15-20	20-25	15-20	20-25	20-25	15-20	20-25	20-25	25-30	
	Noise Level (ANEC)	15	20	15	20	20	15	20	20	25	
1996	Houses										
	Multi-unit dwellings										
2016	Houses	20	6	995	765	6	877	400	202		
	Multi-unit dwellings	0	0	37	28	0	41	19	9		
1995/96 Property Prices	Houses	\$200,000	\$200,000	\$180,800	\$180,800	\$120,000	\$120,000	\$120,000	\$120,000		
	Multi-unit dwellings	\$158,000	\$158,000	\$155,000	\$155,000	\$95,000	\$95,000	\$95,000	\$95,000		
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		
Real Values 2016 (1996\$)	Houses	\$3,880,000	\$1,104,000	\$174,499,120	\$127,247,040	\$662,400	\$102,082,800	\$44,160,000	\$20,604,000		
	Multi-unit dwellings	\$0	\$0	\$5,562,950	\$3,992,800	\$0	\$3,778,150	\$1,660,600	\$726,750		
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0		
	2016	\$3,880,000	\$1,104,000	\$180,062,070	\$131,239,840	\$662,400	\$105,860,950	\$45,820,600	\$21,330,750		
Difference in Real Values	2016	(\$120,000)	(\$96,000)	(\$5,568,930)	(\$11,412,160)	(\$57,600)	(\$3,274,050)	(\$3,984,400)	(\$3,764,250)		

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Airport Option: **H - Option B**  
 Traffic Forecast:  
 Operating Mode: **3**

Area	CAA	81		89		90		90		91		93	
		25-30	30-35	15-20	20-25	15-20	20-25	25-30	20-25	15-20	20-25	25-30	
	Noise Level (ANEC)	25	30	15	20	15	20	25	20	15	20	25	
1996	Houses												
	Multi-unit dwellings												
2016	Houses	18	24	20	2	1238	591	9	6	999	368	112	
	Multi-unit dwellings	0	0	0	0	46	22	0	0	47	17	5	
1995/96 Property Prices	Houses	\$271,200	\$271,208	\$200,000	\$200,000	\$180,800	\$180,800	\$180,800	\$120,000	\$120,000	\$120,000	\$120,000	
	Multi-unit dwellings	\$214,000	\$214,000	\$158,000	\$158,000	\$155,000	\$155,000	\$155,000	\$95,000	\$95,000	\$95,000	\$95,000	
Real Values 1996	Houses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Real Values 2016 (1996\$)	Houses	\$8,760,000	\$5,207,194	\$3,880,000	\$368,000	\$217,115,488	\$98,304,576	\$1,383,120	\$662,400	\$116,283,600	\$40,627,200	\$11,424,000	
	Multi-unit dwellings	\$0	\$0	\$0	\$0	\$6,916,100	\$3,137,200	\$0	\$0	\$4,331,050	\$1,485,800	\$403,750	
Sum of Real Values (1996\$)	1996	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
	2016	\$8,760,000	\$5,207,194	\$3,880,000	\$368,000	\$224,031,588	\$101,441,776	\$1,383,120	\$662,400	\$120,614,650	\$42,113,000	\$11,827,750	
Difference in Real Values	2016	(\$1,545,800)	(\$1,301,798)	(\$120,000)	(\$32,000)	(\$6,928,812)	(\$8,821,024)	(\$244,080)	(\$57,600)	(\$3,730,350)	(\$3,662,000)	(\$2,087,250)	

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