City Of Canada Bay Council

Sydney Airport Draft Master Plan 2039

Acoustic review

November 2018

Executive summary

Draft Sydney Airport Master Plan 2039

The master plan references the Internal Civil Aviation Organisation's (ICAO) '*Balanced Approach'* and consists of the following four key pillars to reduce environmental aircraft noise impacts:

- Reduction at the source
- Land Use Planning & Managements
- Noise Abatement Operational Procedures
- Operating Restrictions

Comparison of ANEF 2033 and ANEF 2039

- In some areas to the north (including the Canada Bay LGA), northeast and southeast of the airport, the noise contours move further away from the airport
- The number of aircraft flying to or from Sydney Airport is forecast to increase from 348,500 in 2017 to 408,260 in 2039
- The proportion of international flights, which typically use larger aircraft and require the use of the main runway, is forecast to grow from 21 percent in 2017 to 28 percent in 2039
- The updated ANEF 2039 reflects a more balanced use of Sydney Airport's two parallel north-south runways

Implications for Canada Bay LGA

Reduction at the source

- There is a marginal increase for some noisy aircrafts over the Canada Bay LGA. However, there is a significant decrease in overall noisy aircrafts and an increase in the prevalence of newer, quieter aircrafts over the Canada Bay LGA as the year 2039 is approached.

Land use planning and management

- There is a significant increase of land falling within the 20 ANEF 2039 contour when compared to the ANEF 2033.

Noise abatements operational procedures

- There is an increase in average daily movements for aircraft landing north-south and departing south to north over the Canada Bay LGA
- The 2039 Master Plan indicates that even though the frequency of flights over the Canada Bay LGA is forecasted to increase, the forecasted noise events over 70 dBA from Sydney Airport aircraft movements will reduce

Operating Restrictions

No significant changes to the operating restrictions are proposed as part of the Sydney Airport Master Plan 2039

Canada Bay planning controls – LEP and DCP

Recommended wording for a clause within the Canada Bay LEP and a control within the Canada Bay DCP have been recommended to protect the future acoustic amenity of the noise-sensitive receptors within the Canada Bay LGA

Comments for Submission to Sydney Airport Corporation

An overview of GHD's acoustic review has been provided along with comments for consideration to be included within Council's submission to the Sydney Airport Corporation.

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1. Introduction

1.1 Purpose of report

GHD has been engaged to undertake a review of the draft Sydney Airport Draft Master Plan 2039 in relation to the Australian Noise Exposure Forecast (ANEF) and comment on its implications for the City of Canada Bay Council (Council) Local Government Area (LGA).

1.2 Scope of works

The following tasks were undertaken as part of this review:

- Review relevant documentation from the Sydney Airport Draft Master Plan 2039 pertaining to aircraft noise and changes from the previous master plan, being 2033
- Determine proposed changes in the draft master plan 2039 compared to the existing master plan 2039 and identify any key acoustic impacts for the City of Canada Bay LGA. The following charts will be compared:
  - 2033 and 2039 ANEF Charts – to provide information relating to land use requirements and any additional restrictions or requirements for acoustical assessment
  - 2033 and 2039 N70 Charts – this will provide an overview of the impact of the changes, with the N70 chart detailing any increases or decrease of numbers of aircraft overpasses above 70 dBA
- Quantify and outline the relevant acoustic impacts to the City of Canada Bay LGA
- Provide comments for inclusion into Council's submission to the Sydney Airport Corporation with any supporting information
- Provide comments, where necessary, regarding Council legislation and policy, recommending changes that addresses any impacts as a result of the draft master plan 2039 ANEF. If required, this could be in the form of draft wording for a Condition of Consent or any update to the City of City Development Control Plan (DCP) or Local Environmental Plan (LEP) controls

1.3 Limitations

This report: has been prepared by GHD for City Of Canada Bay Council and *may only be used and relied on by City Of Canada Bay Council for the purpose agreed between GHD and the City Of Canada Bay Council as set out in section 1.2 of this report.*

GHD otherwise disclaims responsibility to any person other than City Of Canada Bay Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

2. Sydney Airport Draft Master Plan 2039

2.1 Sydney Airport Master Plan 2039

A review of the Sydney Airport Master Plan 2039 was undertaken to develop an understanding of the framework that Sydney Airport has adopted to manage aircraft noise. The master plan references the Internal Civil Aviation Organisation's (ICAO) '*Balanced Approach'* and consists of the following four key pillars to reduce environmental aircraft noise impacts:

- Reduction at the source
- Land Use Planning & Managements
- Noise Abatement Operational Procedures
- Operating Restrictions

The strategy adopted by Sydney Airport as part of the 2039 master plan has been summarised below.

2.1.1 Reduction at the source

- Noise standards for noisy aircraft are progressively becoming more stringent
- New generation aircrafts (Boeing B787, B737Max, Airbus A350, A320neo) are quieter and are replacing ageing, noisier aircrafts (Boeing 747, 767 and Airbus A340)
- Since 2010, legacy four engine aircraft (B747/A340) numbers have reduced by 68% from 38 movements per day to below 15 movements per day
- The noise emitted from individual aircrafts have reduced over time, however the frequency of flights has increased

2.1.2 Land use planning and managements

- Mitigating instruments, such as mandated noise insulation by local planning authorities for new homes that fall inside the ANEF contours
- Financial instruments may include insulation funds to support property owners to mitigate noise impacts or incentives for aircraft operators to renew their fleets with quieter aircraft. There are currently no such financial instruments operating at Sydney Airport in relation to aircraft noise mitigation

2.1.3 Noise abatement operational procedures

- Noise emission reduction through operational measures such as lower thrust or drag settings
- Increase in noise source distance between aircraft and the ground-based sensitive receptors by landing and taking off at different angles
- Reduction in exposed population by flying over less populated areas (i.e. water or non-residential land uses)
- Provide respite from aircraft noise by runway alternation and/or operating restrictions

2.1.4 Operating restrictions

- Sydney Airport Curfew Act 1995 – 11 pm to 6 am curfew (restricts operations to specific types of aircraft or operations and specific runway assignment rules)

- Sydney Airport Demand Management Act 1997 – Cap with maximum of 80 movements per hour
- Protection of regional access to Sydney Airport
- Long Term Operating Plan (LTOP), including Runway Modes of Operation and respite from aircraft noise

2.2 Australian Noise Exposure Forecast (ANEF)

The Sydney Airport ANEF is a land use planning tool to assist in managing noise sensitive land uses around the Sydney Airport. It provides guidance for the NSW Government and local councils to make informed planning and developing decisions. The updated Sydney Airport ANEF 2039 considers the following:

- Aircraft movement forecasts to 2039 including fleet mix and origin/destination
- Airfield layout, Runway Modes of Operation (RMO), associated arrival and departure flight paths and Air Traffic Control (ATC) allocations to runways and flights paths for each RMO/route
- Terrain elevation of Sydney
- Meteorology as affecting runway direction, aircraft performance and atmospheric noise dispersion
- Opportunities to use noise sharing modes based on runway demands/capacity and meteorology
- Aircraft noise levels as presented in Australian Standard AS2021:2015 Acoustics – Aircraft Noise Intrusion – Building Siting and Construction
- The commissioning of the Western Sydney Airport by 2026. The 2039 ANEF is a composite contour based on the following design years:
  - 2026 design day
  - 2039 design day

2.3 Comparison of 2033 and 2039 Masterplans

A review of the 2033 and draft 2039 master plans for Sydney Airport was undertaken to compare and provide comment on the differences relating to potential noise impacts. Both the 2033 and 2039 master plans predict the annual growth of passengers and international/domestic flights from Sydney Airport. The review indicates that the forecasted growth and number of passengers in the 2039 master plan are lower than those forecasted within the 2033 master plan. The decrease in forecasted annual growth is likely due to the inclusion of the assumption of a two-airport system serving Sydney from 2027 onwards when Western Sydney Airport commences operations. A summary of the differences in the forecasts between 2033 and 2039 and provided below in Table 2-1.

Table 2-1 Comparison between Master Plan 2033 and 2039

Sydney Airport forecast	Master Plan 2033	Master Plan 2039
Number of passenger per year	74.3 mil for 2033	60.7 mil for 2033
Aircraft movements per year	388,466 for 2033	371,654 for 2033
Annual growth – passengers	3.4% (2012 to 2033)	3.1% (2017 to 2039)
Annual growth – international flights	2.3% (2012 to 2033)	2.0% (2017 to 2039)
Annual growth – domestic flights	1.0% (2012 to 2033)	0.5% (2017 to 2039)
Annual growth – total freight	2.4% (2012 to 2033)	2.1% (2017 to 2039)

3. Implications for Canada Bay LGA

3.1 Summary of 2039 predictions

- In some areas to the north (including the Canada Bay LGA), northeast and southeast of the airport, the noise contours move further away from the airport (i.e. the ANEF zones have expanded in these areas)
- In some areas to the east, south and west of the airport, the noise contours move closer to the airport
- Number of aircraft flying to or from Sydney Airport is forecast to increase from 348,500 in 2017 to 408,260 in 2039
- Proportion of international flights, which typically use larger aircraft and require the use of the main runway, is forecast to grow from 21 percent in 2017 to 28 percent in 2039
- The updated ANEF 2039 reflects the more balanced use of Sydney Airport's two parallel north-south runways

A detailed summary of the changes between the 2033 master plan and the 2039 master plan, in relation to aircraft noise mitigation, is provided below.

3.2 Reduction of noise source

A review was undertaken of the daily movements by runway detailed within the 2033 and 2039 ANEF. As summarised in Section 2.1.1, replacing ageing noisy aircraft such as the B747-400, B777-300, A330-343 with newer and quieter aircraft such as the B787, B737Max, A350 and the A320 neo is part of the 'Balanced Approach' strategy.

The runways that affect the Canada Bay LGA are as follows:

- 16R -34L landing north to south (straight line)
- 16R – 34L departing south to north (straight line and curved flight path)

A summary of the review is as follows:

- The number of 747-400 (noisier than new generation aircrafts) aircraft overpasses landing over the Canada Bay LGA is to increase from 0.37 a day to 1.16 a day
- The number of 747-400 aircrafts overpasses departing over the Canada Bay LGA is to marginally increase from 0.58 a day to 0.6 a day
- There is a significant decrease in A330-343 (noisier than new generation aircrafts) arrival and departure overpasses over the Canada Bay LGA
- A340 (noisier than new generation aircrafts) aircraft movements over the Canada Bay LGA will reduce to 0 movements per day
- There is a decrease in A380 (noisier than new generation aircrafts) arrivals and departures over the Canada Bay LGA
- There is a decrease in A777 (noisier than new generation aircrafts) arrivals and departures over the Canada Bay LGA
- The prevalence of quieter aircraft such as the 737Max, B787 and the A320Neo and A321Neo have increased

In summary, there is a marginal increase for some types of noisy aircrafts over the Canada Bay LGA. However, there is a significant decrease in overall noisy aircrafts and an increase in the prevalence of newer, quieter aircrafts over the Canada Bay LGA.

3.3 Land use planning

The ANEF system was developed as a land use planning tool aimed at determining the acceptability of noise sensitive buildings surrounding an airport. Residential buildings that fall outside the 20 ANEF contour are considered 'acceptable', whereas residential buildings that fall within the 20 - 25 ANEF contour are considered 'conditionally acceptable' (see Table 4-1 to see the acceptability of different land use types for each contour area).

The draft 2039 Master Plan predicts an expansion of the 20 ANEF contour across the Canada Bay LGA when compared to the ANEF 2033 contours as shown in Figure 1 and Figure 2. The 25 ANEF contour does not fall within the Canada Bay LGA.

Table 3-1 presents the approximate number of lots within the 20 ANEF contours for 2033 and 2039 for each land use category within the Canada Bay LGA. The number of lots within the contour were calculated by creating a centroid for each cadastral lot within the Canada Bay LGA and assigning it to the land use category as per the Canada Bay LEP 2012.

Table 3-1 Land uses within ANEF 20 contours – 2033 and 2039

Land use category	Number of lots within the ANEF 20 contour – 2033 Master Plan	Number of lots within the ANEF 20 contour – 2039 Master Plan	Difference between 2033 and 2039
Infrastructure	23	23	0 (0%)
Low Density Residential	875	1184	+309 (+35%)
Medium Density Residential	683	803	+120 (+18%)
Mixed Use	128	160	+32 (+25%)
Neighbourhood Centre	45	50	+5 (+0.11%)
Public Recreation	40	52	+12 (+30%)

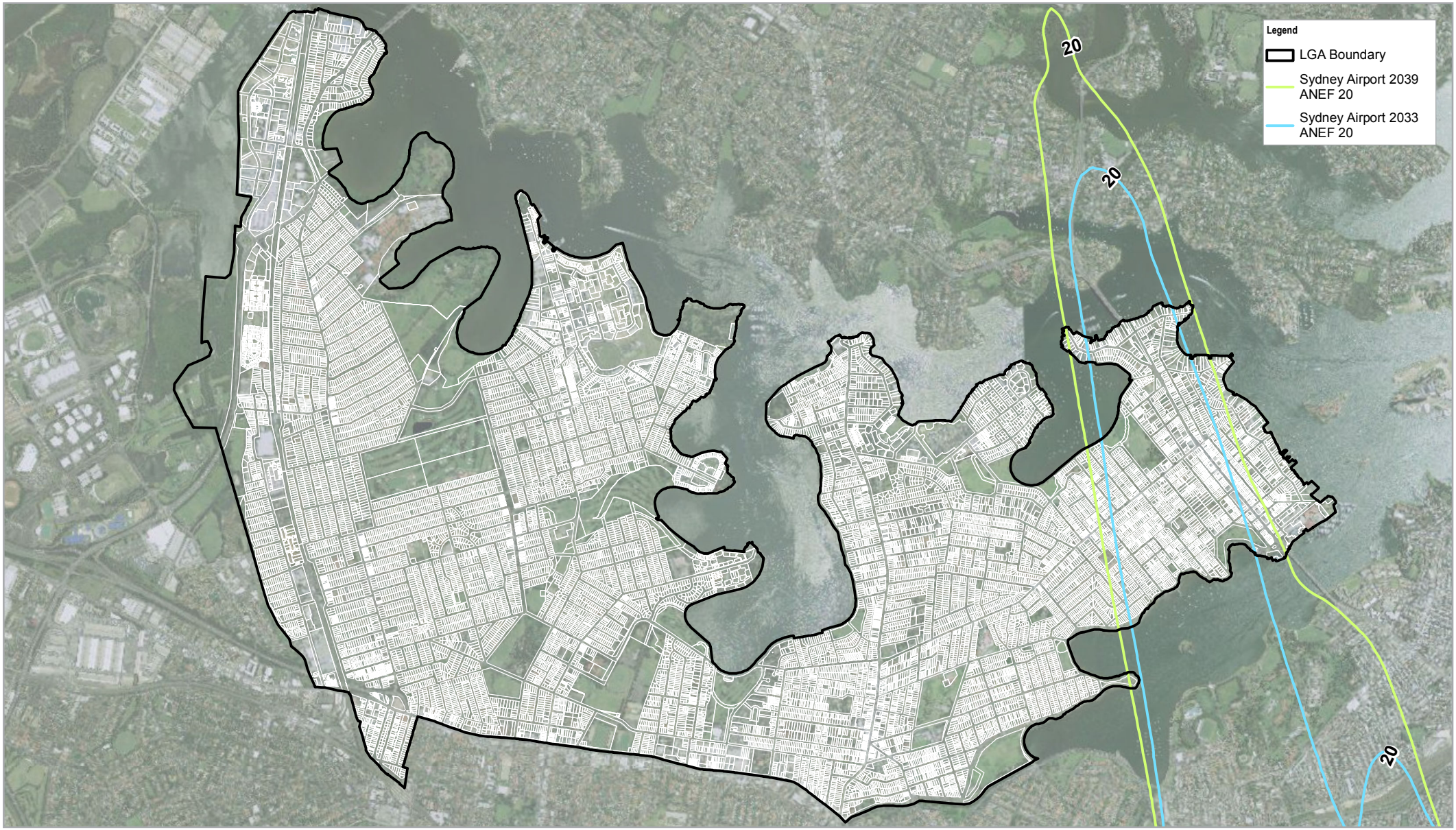
The table above shows a significant increase across most land uses within the 2039 ANEF 20 contour when compared to the 2033 ANEF. The increase in the number of lots within the 2039 ANEF 20 contour can be attributed to the following:

- An increase in number of flights flying to and from Sydney Airport – see Table 3-3
- An increase in proportion of international flights to and from Sydney Airport (larger aircraft)
- An increase in number of aircraft landing on 16R or 16L in a north to south direction – see Table 3-2. (Note there is a forecasted decrease in departures in a south to north direction)

A review of the total flights aircraft movements per day forecasted within ANEF 2033 and ANEF 2039 for the north south runways are presented in Table 3-2. Note should be made that only 16R Arrivals and 34L Departures fly over the Canada Bay LGA. 16L Arrivals and 34R Departures are presented for reference.

Table 3-2 Total daily average aircraft movements using 16R/34L and 16L/34R

Runway	Arrival/ Departure	Direction	2033	2026	2039	Difference (2033 and 2039)
16R	Arrivals	North to south	144.60	154.02	157.85	+13.25
34L	Departures	South to north	133.95	111.18	117.89	-16.06
16L	Arrivals	North to south	114.75	129.00	126.92	+12.17
34R	Departures	South to north	133.26	135.80	127.73	-5.53



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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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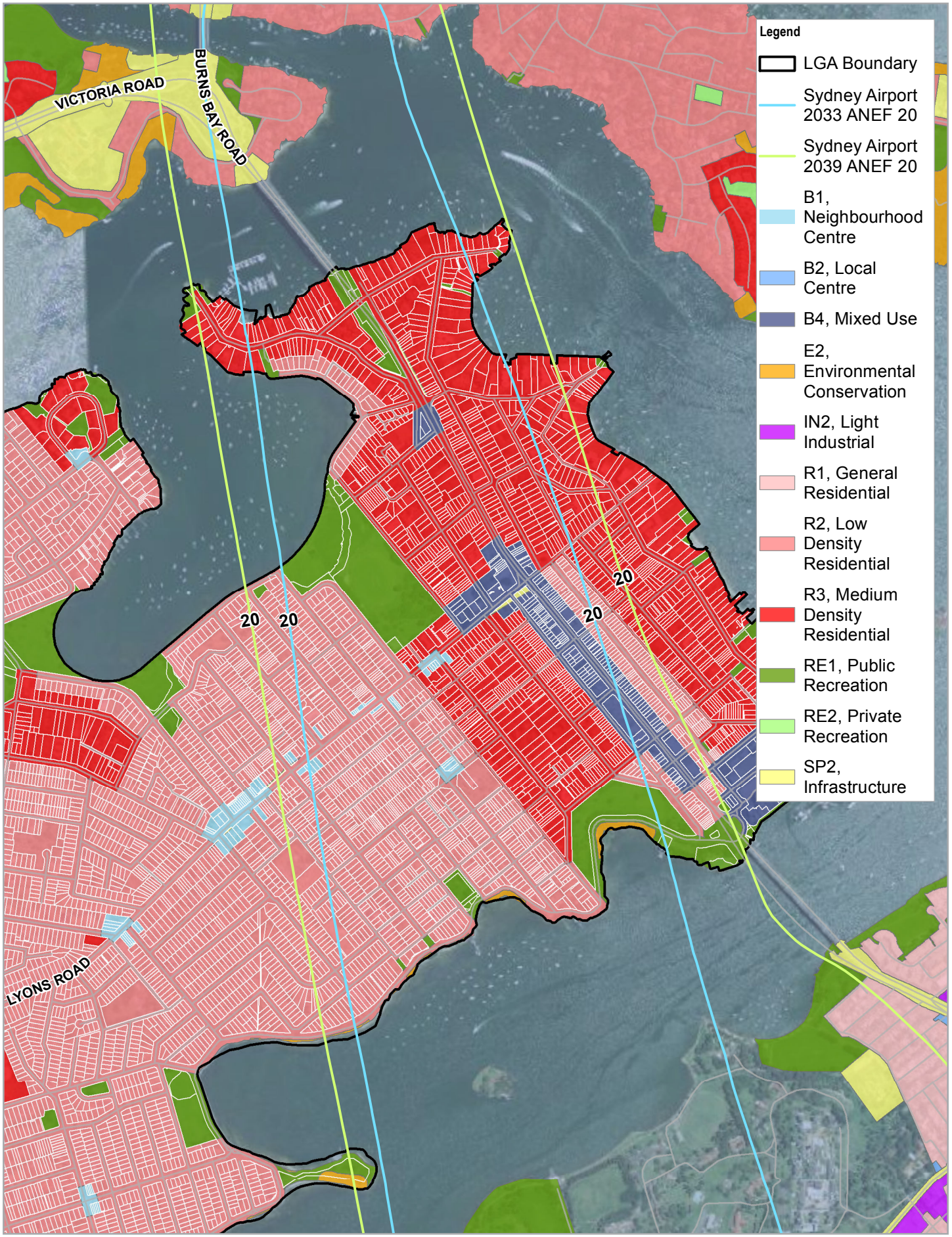
ANEF 20 Contours within Canada Bay LGA – 2033 and 2039

Project No. **21-27763**
Revision No. **-**
Date **30/10/2018**

FIGURE 1

Data Source: NSW Department of Lands: DTDB and DCDB - 2012. Created by: afoddy



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Kilometers

Map Projection: Transverse Mercator
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ANEF 20 Contours within Canada Bay LGA – 2033 and 2039 (Focused with planning zones)

Project No. **21-27763**
Revision No. **-**
Date **30/10/2018**

FIGURE 2

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Data Source: NSW Department of Lands: DTDB and DCDB - 2012. Created by: afoddy

3.4 Noise abatement operational procedures

The noise abatement operational procedures summarised within Section 2.1.3 should result in the following:

- Reduction in flight paths over populated areas and an increase in flight paths over less-populated areas (towards the water or non-residential land uses)
- Increase in respite period for certain areas for a more balanced use of the north-south runways
- Lower aircraft noise levels experienced within the surrounding areas of Sydney Airport (quantifiable by a reduction in N70 – aircraft overpass events louder than 70 dBA)

3.4.1 Flight paths over Canada Bay LGA

There are three jet aircraft flight paths (refer to Map 25 and Map 26 of the draft 2039 masterplan) that affect the Canada Bay LGA, being:

- Flight Path A – Flight Path B and C combined
- Flight Path B – Flights departing from 16R/34L in a south to north direction and/or curving west
- Flight Path C – Flight landing on 16R/34L or 16L/34R in a north to south direction

A review of the 2033 and 2039 Master Plan was undertaken to quantify the changes affecting the Canada Bay LGA. The changes are summarised in Table 3-3.

Table 3-3 Average jet movements over Canada Bay LGA – 2033 and 2039

Flight path/movement prediction	2033 forecast	2039 forecast	Difference
Flight Path A			
Average daily movements	302	320	+6%
Percentage of movements for Flight Path A	33%	33%	0%
Daily range of movements	0-489	0 – 482	-1.4%
Zero movement days	0%	0%	0%
Total respite periods	3%	6%	+3%
Flight Path B			
Average daily movements	103	91	-11.7%
Percentage of movements for Flight Path B	11%	9%	-2%
Daily range of movements	0 – 235	0 – 217	-7.7%
Zero movements days	26%	22%	-4%
Total respite periods	51%	55%	+4%
Flight Path C			
Average daily movements	199	229	+15%
Percentage of movements for Flight Path C	22%	24%	+2%
Daily range of movements	0 – 489	0 – 482	-1.4%
Zero movements days	23%	14%	-9%
Total respite periods	49%	46%	-3%

The forecasts summarised in Table 3-2 indicate:

- An increase in average daily movement for Flight Path A, no change in the percentage of movements and an increase in total respite periods

- A significant decrease in average daily movements for Flight Path B, a slight decrease in percentage of movements and an increase in total respite periods
- A significant increase in average daily movements for Flight Path C, a slight increase in percentage of movements and a decrease in total respite periods

The proposed changes detailed within Table 3-2 (especially the increase in average daily movements for Flight Path C) may be a contributing factor to the expansion of the ANEF 20 contour in the ANEF 2039 when compared to ANEF 2033.

3.4.2 Comparison of N70 contours for 2033 and 2039

To quantify the forecasted noise levels experienced within the Canada Bay LGA, Table 3-3 presents the difference for the forecast N70 for each land use within Canada Bay. The N70 is the number of aircraft overpass event louder than 70 dBA. The 2039 Masterplan states that "*The N70 level is chosen because it is equivalent to the single event of 60 dBA specified within AS2021:2015 as the indoor design sound level for normal domestic areas in dwelling. An external single noise event will be attenuated by approximately 10 dB(A) by the fabric of a house within open windows. This is the sound pressure level of a noise event that is likely to interfere with conversation or with listening to radio or television*". This statement assumes that that a 'normal domestic area' refers to a bathroom, toilet and laundry. For reference, Table 3-3 of AS2021:2015 presents the following indoor design sound levels for rooms within residential buildings:

- 50 dBA for sleeping areas, dedicated lounges
- 55 dBA for other habitable spaces
- 60 dBA for bathrooms, toilets and laundries

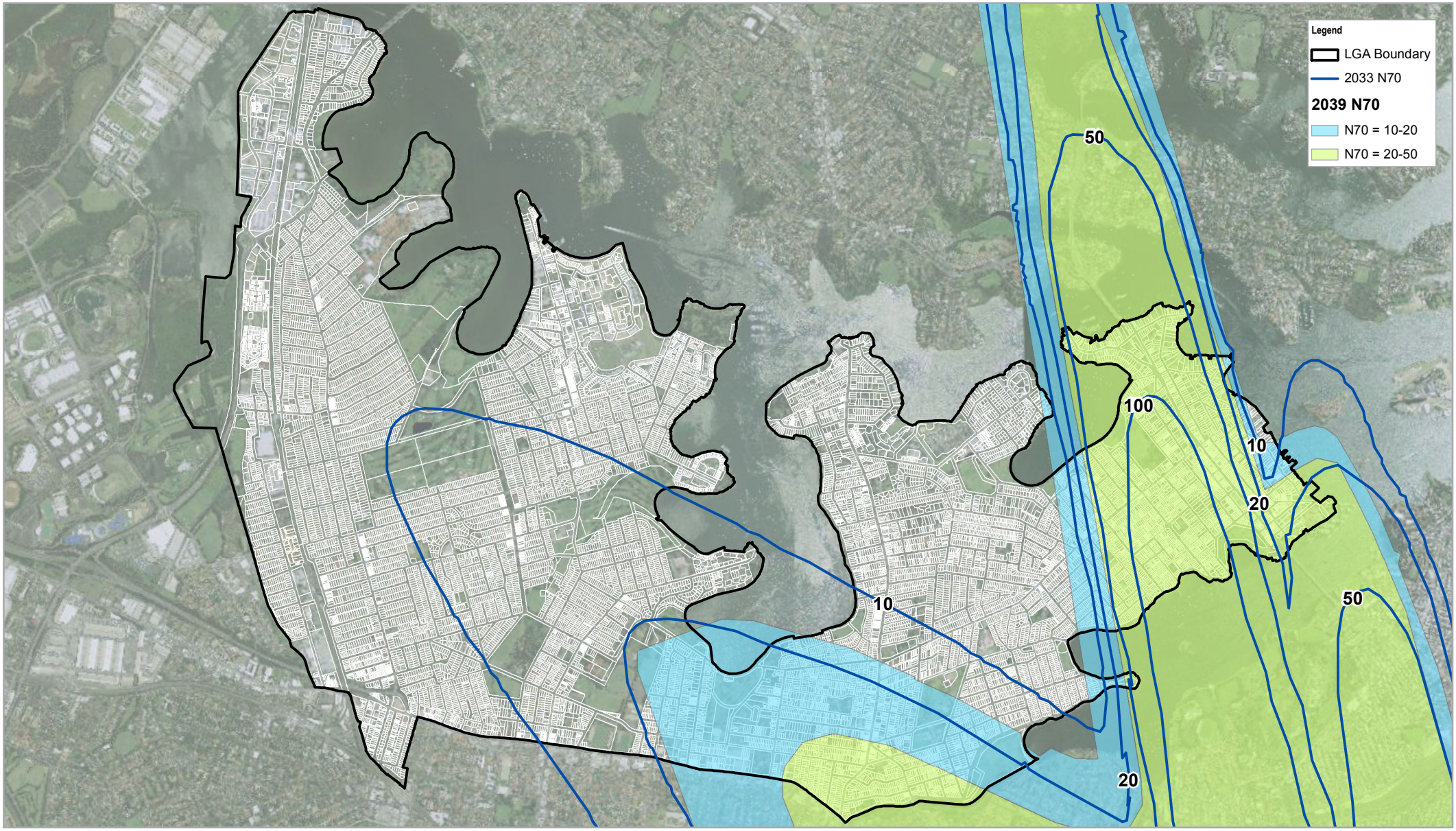
Table 3-4 No. of lots identified within N70 contours – 2033 and 2039

Land use category	No. of lots identified within 2033 forecast N70 contours				No. of lots identified within 2039 forecast N70 contours			
	10[1]	20[1]	50[1]	100[1]	10[1]	20[1]	50[1]	100[1]
Enterprise Corridor	107	73	-	-	**73**	**57**		
Environmental Conservation	2	1	-	-	**1**	**0**		
General Industrial	160	159	-	-	**157**	**0**		
Infrastructure	23	23	23	4	23	23	23	**0**
Low Density Residential	5609	2647	1073	544	**3241**	**1791**	**896**	**387**
Medium Density Residential	2011	1177	750	339	**1389**	**965**	**723**	**201**
Mixed Use	501	350	147	16	**409**	**246**	**137**	**7**
Neighbourhood Centre	142	87	50	42	**102**	**74**	**45**	**30**
Private Recreation	10	1	-	-	**2**	2		
Public Recreation	249	127	46	15	**146**	**75**	**41**	**13**

Notes:
1) Number of aircraft noise events over 70 dBA

The predictions summarised in Table 3-3 indicates a significant decrease in aircraft noise events over 70 dBA within Canada Bay LGA across all land use categories. The numbers in **bold** indicate a decrease in aircraft noise events over 70 dBA when compared to 2033. The 2039 Master Plan indicates that even though the frequency of flights over the Canada Bay LGA is forecasted to increase, the noise levels experienced are lower.

A comparison between the N70 contours for 2033 and 2039 across the Canada Bay LGA are shown in Figure 3.



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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Revision No. **-**
Date **30/10/2018**

Comparison of N70 contours across Canada Bay LGA – 2033 and 2039

FIGURE 3

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3.5 Operating restrictions

No significant changes are proposed in regards to:

- The Sydney Airport Curfew Act 1995
- Sydney Airport Demand Management Act 1997
- Protection of regional access to Sydney Airport
- Runway Modes of Operation and respite from aircraft noise

4. Canada Bay planning controls

4.1 Canada Bay Local Environmental Plan 2013.

A review of the Canada Bay Local Environmental Plan (LEP) 2013 was undertaken. No specific clauses relating to aircraft noise intrusion were found.

4.2 Canada Bay Development Control Plan 2015

A review of the Canada Bay Development Control Plan (DCP) 2015 was undertaken. No specific planning controls specific to aircraft noise intrusion were found.

4.3 Councils within ANEF Zones

A review of the Local Environmental Plans (LEPs) of the Local Government Areas (LGAs) that fall within the ANEF zones was undertaken. It was found that all Council LEP's contained a clause pertaining to development in areas subject to aircraft noise, except for Hunter's Hill Council (least affected Council with respect to aircraft noise within the ANEF zones). The wording of the clause within each LEP are generally consistent with the recommended LEP Clause presented in Section 4.4. The section of each clause pertaining to aircraft noise intrusion within the LEP are as follows:

- **Bayside Council**
  - Rockdale LEP 2011 Part 6.3
  - Botany Bay LEP 2013 Part 6.9
- **Inner West Council**
  - Leichhardt LEP 2013 Part 6.8
  - Marrickville LEP 2011 Part 6.5
- **City of Sydney Council**
  - Sydney LEP 2012 Part 7.17

4.4 Recommended LEP Clause

To ensure that future development within the Canada Bay LGA is in accordance with the Australian Standard AS2021:2015, it is recommended that the following clause pertaining to development in areas subject to aircraft noise be incorporated into the Canada Bay LEP:

Development in areas subject to aircraft noise

1. *The objectives of this clause are as follows:*
   a. *to prevent certain noise sensitive developments from being located near the Sydney (Kingsford Smith) Airport and its flight paths,*
   b. *to assist in minimising the impact of aircraft noise from that airport and its flight paths by requiring appropriate noise attenuation measures in noise sensitive buildings,*
   c. *to ensure that land use and development in the vicinity of that airport do not hinder or have any other adverse impacts on the ongoing, safe and efficient operation of that airport.*
2. *The objectives of this clause are as follows:*
   a. *that is on land that is near the Kingsford Smith Airport and in an ANEF contour of 20 or greater, and*

b. *that the consent authority considers is likely to be adversely affected by aircraft noise, and*

c. *that involves any one or more of the following:*

i) *the erection of a new building,*

ii) *a substantial alteration or addition to an existing building,*

iii) *an alteration or addition to a building that is required by a development consent to be compliant with AS 2021—2015,*

iv) *the change of use of any part of a building to a centre-based child care facility, educational establishment, entertainment facility, health services facility, place of public worship, public administration building or residential accommodation,*

v) *the change of use of any part of a building on land that is in an ANEF contour of 25 or greater to business premises, a hostel, office premises, retail premises or tourist and visitor accommodation,*

vi) *the change of use of any part of a building on land that is in an ANEF contour of 30 or greater to light industry.*

3. *Before determining a development application for development to which this clause applies, the consent authority:*

a. *must consider whether the development will result in the creation of a new dwelling or an increase in the number of dwellings or people affected by aircraft noise,*

b. *must consider the location of the development in relation to the criteria set out in Table 2.1 (Building Site Acceptability Based on ANEF Zones) in AS 2021—2015, and*

c. *must consider whether the development will meet the indoor design sound levels shown in Table 3.3 (Indoor Design Sound Levels for Determination of Aircraft Noise Reduction) in AS 2021—2015*

4. *In this clause:*

***ANEF contour** means a noise exposure contour shown as an ANEF contour on the Noise Exposure Forecast Contour Map for the Kingsford Smith Airport prepared by the Department of the Commonwealth responsible for airports.*

***AS 2021—2015** means AS 2021—2015, Acoustics—Aircraft noise intrusion—Building siting and construction.*

4.5 Recommended DCP Clause

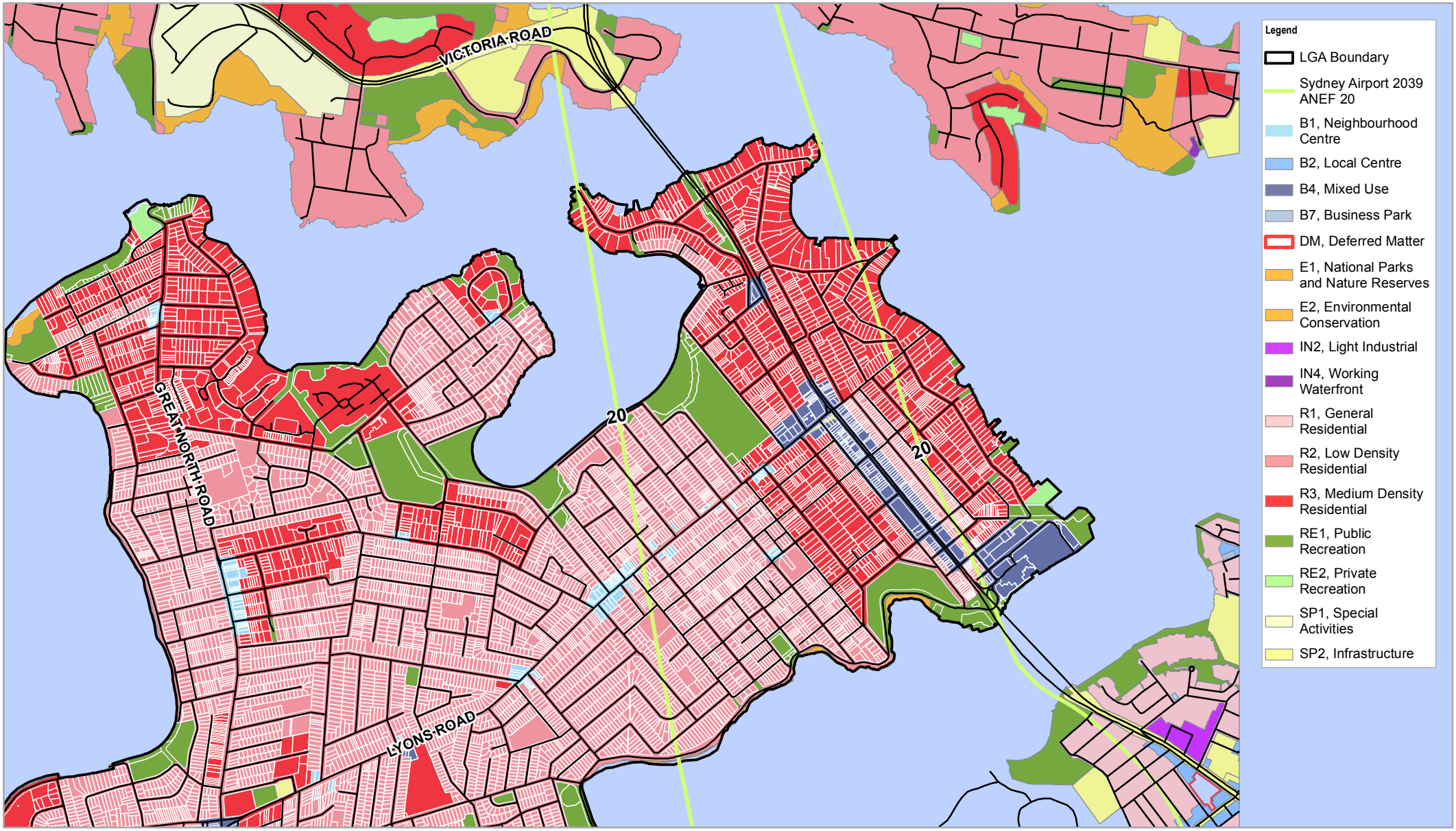
To adequately protect the future acoustic amenity of noise-sensitive receptors within the Canada Bay LGA, it is recommended that the following clause pertaining to development in areas subject to aircraft noise be incorporated into the Canada Bay DCP:

Control

Aircraft noise

- *New development on land within an ANEF affected area (including ANEF Contour 20), must be designed and constructed in accordance with Australian Standard AS2021:2015 and other guidelines issued by relevant agencies and authorities; and*
- *The introduction of acoustic measures to reduce aircraft noise should not detract from the streetscape value of individual buildings*

The 2039 ANEF contours over the Canada Bay LGA are shown in Figure (Figure number TBC).



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Kilometers

Map Projection: Transverse Mercator
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Grid: GDA 1994 MGA Zone 56

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20 ANEF Contour (2039) – Canada Bay LGA

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FIGURE 4

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4.6 Building site acceptability based on ANEF Zones

For land uses identified within the Canada Bay LGA, Table 4-1 shows the acceptability of developments (based on building types) for each ANEF Zone. Note should be made that Residential, educational, health, aged care and public buildings within (or slightly outside) the 20 – 25 ANEF Zone in Canada Bay LGA should require acoustical assessment in accordance with Clause 2.3.2 (flow chart presented in Section 4.6.1 below) of AS2021:2015.

Table 4-1 Building site acceptability based on ANEF Zones (AS2021:2015)

Building type	ANEF Zone of site		
	Acceptable	Conditionally acceptable	Unacceptable
House, home unity, flat, caravan park	Less than 20 ANEF[1]	20 to 25 ANEF	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	20 to 25 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF[1]	20 to 25 ANEF	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF[1]	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF[1]	20 to 30 ANEF	Greater than 30 ANEF
Commercial buildings	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	Acceptable in all ANEF Zones		

Notes:
The actual location of the 20 ANEF contours is difficult to define accurately, mainly because of variation in aircraft flight paths. Because of this, the procedure of Clause 2.3.2 may be followed for buildings sites outside but near to the 20 ANEF contour

4.6.1 Determination of appropriate building materials

For buildings that fall within the ANEF Zone in the Canada Bay LGA, the following flow chart has been provided as a methodology to determine the appropriate building materials required for the construction of the development.

Flow chart (from Figure 1.1 of AS2021:2015)

If '*conditionally acceptable'* (within the 20 to 25 ANEF Zone within Canada Bay LGA) the following procedure should apply to assess aircraft noise intrusion:

1. Determine relevant aircraft types
2. Determine distance co-ordinates for building site relevant to aerodrome's runways
3. Determine maximum noise levels for relevant aircraft types
4. Determine indoor design sound level for aircraft flyovers for building/activity types
5. Determine aircraft noise reduction required
6. Determine appropriate building materials and constructions to achieve required aircraft noise reduction
7. Measure aircraft noise reduction achieved

5. Comments for Submission to Sydney Airport Corporation

5.1 Overview of findings

- The 20 ANEF contour for 2039 have expanded within the Canada Bay LGA when compared to the 20 contour for 2033
- An increase of landing aircrafts (north to south) are expected over the Canada Bay LGA for the 2039 forecasts when compared to the 2033 forecasts
- A decrease of departing aircrafts (south to north) are expected over the Canada Bay LGA for the 2039 forecasts when compared to the 2033 forecasts
- Significant increases in the overall frequency of flights and proportion of larger aircrafts (international flights) is forecast for 2039 when compared to 2017
- The number of lots within the Canada Bay LGA in the 20 ANEF Contour 2039 have increased when compared to the ANEF 2033 for most land uses.
- The number of aircraft pass-by events within Canada Bay LGA forecast in 2039 to have a noise level 70 dBA (N70) has decreased when compared to the 2033 forecasts.
- Canada Bay Council does not currently have a clause within its LEP or DCP pertaining specifically to aircraft noise intrusion for dwelling or buildings within the ANEF zones

5.2 Comments for Sydney Airport Corporation

- Figure 14.4 of the Masterplan 2033 and Map 23 of Masterplan 2039 show the flights paths at Sydney Airport for jet aircrafts across the Sydney area, however the style for both maps are not consistent. In regards to 34L departures, is the flight path area forecast to widen? Specifically for the Canada Bay LGA, are more aircrafts forecast to depart over the Canada Bay LGA for 2039 when compared to 2033?
- An increase in average daily movements and a decrease in zero movement days and total respite periods are forecast for landing aircrafts north to south. Additionally, a decrease in average daily movements and increase of zero movement days and respite periods are forecast for landing aircrafts south to north. Pillar 3 being, ‘Noise abatement operational procedures’ states that a reduction of flights paths over exposed is one of the procedures used to reduce potential noise impacts. Landing flights travelling north to south are over more populated areas (including Canada Bay LGA) when compared to landing flights travelling south to north. Can further detail be provided on why there is an increase in landing flights north to south instead of south to north?
- What are the main contributing factors to the expansion of the 20 ANEF Contour for 2039 over the Canada Bay LGA when compared to ANEF 2033?
- *Section 15.6.3 Pillar 3 – Noise Abatement Operational Procedures* of the 2039 Masterplan states that an increase in the distance between the source of aircraft noise and ground-based noise receptors can reduce potential aircraft noise impacts. Are there any proposed changes to the operational procedures that implement a greater distance between aircrafts and the ground, especially for landing and departing aircraft over the Canada Bay LGA?
- The 2039 Masterplan states that the N70 level is chosen because it is equivalent to the single event level of 60 dBA specified in AS2021:2015 as the indoor design sound level for normal domestic areas in dwellings (assuming an attenuation of 10 dBA through an open

window). However, AS2021:2015 specifies that 60 dBA is the indoor design sound level for bathrooms, toilets and laundries which are not habitable areas of a residential dwelling. Can more information be provided detailing the potential impacts to habitable areas (such as bedrooms, studies and living rooms) of residential dwellings? Perhaps with a N60 and N65 contour for an average day?

6. Conclusion

Draft Sydney Airport Master Plan 2039

The master plan references the Internal Civil Aviation Organisation's (ICAO) '*Balanced Approach'* and consists of the following four key pillars to reduce environmental aircraft noise impacts:

- Reduction at the source
- Land Use Planning & Managements
- Noise Abatement Operational Procedures
- Operating Restrictions

Comparison of ANEF 2033 and ANEF 2039

- In some areas to the north (including the Canada Bay LGA), northeast and southeast of the airport, the noise contours move further away from the airport
- Number of aircraft flying to or from Sydney Airport is forecast to increase from 348,500 in 2017 to 408,260 in 2039
- Proportion of international flights, which typically use larger aircraft and require the use of the main runway, is forecast to grow from 21 percent in 2017 to 28 percent in 2039
- The updated ANEF 2039 reflects the more balanced use of Sydney Airport's two parallel north-south runways

Implications for Canada Bay LGA

Reduction at the source

- there is a marginal increase for some noisy aircrafts over the Canada Bay LGA. However, there is a significant decrease in overall noisy aircrafts and an increase in the prevalence of newer, quieter aircrafts over the Canada Bay LGA.

Land use planning and management

- A significant increase of land falling within the 2039 ANEF 20 contour when compared to the 2033 ANEF.

Noise abatements operational procedures

- An increase in average daily movements for aircraft landing north-south and departing south to north over the Canada Bay LGA
- The 2039 Master Plan indicates that even though the frequency of flights over the Canada Bay LGA is forecasted to increase, the forecasted noise events over 70 dBA due to Sydney Airport aircraft movements will be lower

Operating Restrictions

No significant changes to the operating restrictions are proposed as part of the Sydney Airport Master Plan 2039.

Canada Bay planning controls – LEP and DCP

Recommended wording for a clause within the Canada Bay LEP and a control within the Canada Bay DCP were recommended to be protect the future acoustic amenity of the noise-sensitive receptors within the Canada Bay LGA.

Comments for Submission to Sydney Airport Corporation

An overview of GHD's acoustic review has been provided along with comments for consideration to be included within Council's submission to the Sydney Airport Corporation.

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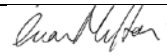
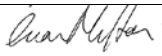
0	M.Velasco	E Milton		E Milton		2/11/18

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