Styles Group
Acoustics & Vibration Consultants

ASSESSMENT OF NOISE EFFECTS

SUNFIELD MASTERPLANNED COMMUNITY TAKANINI

PREPARED FOR

Winton Land Limited

DATE

1 May 2024

Acoustic advice prepared by Styles Group for Winton Land Limited.

REVISION HISTORY

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1	15/12/23		Final Draft	Jon Styles, MASNZ Title Styles Group	Gemma Sands Consultant Styles Group
2	08/04/24		Final		
3	01/05/24		Final		

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1.0 Introduction

Winton Land Limited has engaged Styles Group to assess the aircraft noise effects from Ardmore Airport (the **Airport**) across the land subject to the Sunfield fast-track approvals application in Takanini (the **Site**).

Parts of the Site are within the Airport's aircraft noise boundaries. Chapter D24 of the Auckland Unitary Plan - Operative in Part (**AUP**) provides a hierarchy of subdivision and land use restrictions based on aircraft noise exposure above 55 dB L_{dn}.

This advice identifies the aircraft noise levels across the Site and provides recommendations to ensure the proposed zoning arrangements and precinct provisions are consistent with the level of acoustic amenity prescribed by Chapter D24 of the AUP for the development of land exposed to aircraft noise from the Airport.

2.0 The proposal

Winton Land Limited propose to rezone 244 hectares of land in Takanini. The Site is currently zoned Mixed Rural Zone and Future Urban Zone according to the AUP. The proposal is to rezone the Site to facilitate a comprehensive master-planned community.

Figure 1 displays the aircraft noise boundaries across the proposed zoning arrangements. Figure 1 shows:

i. The small area of land inside the Air Noise Boundary at the 65 dB L_{dn} noise contour (the **ANB**) is proposed to be zoned Employment.

ii. The land between the ANB and the 60 dB L_{dn} noise contour is proposed to be zoned Employment, Town Centre, Health Care and Local Hub.

iii. The land between the 60 dB L_{dn} noise contour and Outer Noise Boundary at the 55 dB L_{dn} noise contour (the **ONB**) is proposed to be zoned Employment, Town Centre, Residential and Aged Care.

iv. The land outside the ONB is proposed to be zoned Residential, Aged Care and Employment. The AUP does not manage the aircraft noise levels for land use activities located outside the ONB.

We understand that the Sunfield masterplan has been designed to align with the existing constraints associated with the operative Airport aircraft noise boundaries. The proposal does not seek to authorise any changes to the aircraft noise boundaries.

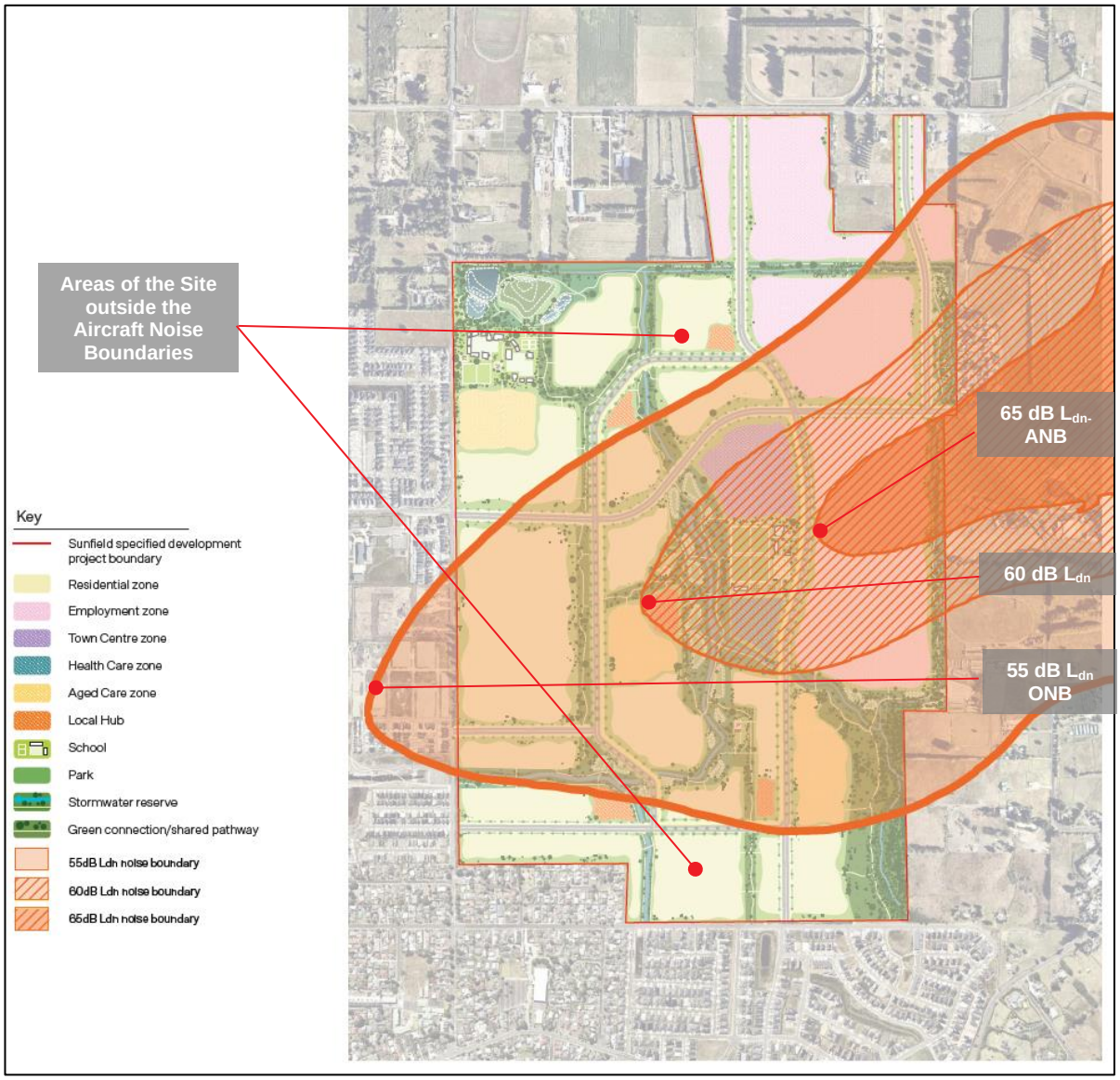

Figure 1 Proposed zoning layout and aircraft noise boundaries

3.0 Management of aircraft noise under the Chapter D24 of AUP

The noise control boundaries and provisions for managing exposure to aircraft noise associated with Ardmore Airport's designation were reviewed and adopted as part of the AUP plan review process. We consider that the relevant AUP provisions are appropriate.

The Airport's noise contours define the locations at which the maximum sound exposure, expressed in L_{dn} dBA, must not be exceeded. The Airport must operate in compliance with the noise limits specified at the ANB and the ONB.

Chapter D24 of the AUP includes land use controls to manage the subdivision and development of land exposed to aircraft noise levels greater than 55 dB $L_{dn.}$ The land use

controls are generally consistent with the recommended land use planning measures in New Zealand Acoustical Standard 6805:1992 *Airport Noise Management and Land Use Planning* (**NZS6805**).

The controls in Chapter D24 give effect to the objectives in D24.2(1) and (2) of the AUP which require:

> (1) Airports and airfields are protected from reverse sensitivity effects.
>
> (2) The adverse effects of aircraft noise on residential and other **activities sensitive to aircraft noise** are avoided, remedied or mitigated.

Activities Sensitive to Aircraft Noise (**ASAN**) are defined in Chapter J1 of the AUP as:

> **ASAN** means: Any dwellings, boarding houses, marae, papakāinga, integrated residential development, retirement villages, supported residential care, care centres, education facilities, tertiary education facilities, hospitals, and healthcare facilities with an overnight stay facility.

The above definition of ASAN is broader than just dwellings, and controls a range of accommodation, care, education and healthcare facilities.

This advice includes high-level recommendations to ensure that the type of land use activities that are enabled by the proposed zoning / precinct arrangements align with the expectations in Chapter D24 for the management of ASAN inside the noise control boundaries.

3.1 Chapter D24 Policies

The policies in D24 that manage aircraft noise from Ardmore Airport include:

> D24.3. Policies
>
> (1) Avoid the establishment of new activities sensitive to aircraft noise (except tertiary education facilities) within the 65dB L_{dn} noise contour in the Aircraft Noise Overlay.
>
> (2) Avoid the establishment of new tertiary education facilities and additions or alterations to existing activities sensitive to aircraft noise (other than existing dwellings) within the 65dB L_{dn} noise contour in the Aircraft Noise Overlay unless all habitable rooms and all learning, amenity and recreation spaces on site are located inside buildings and achieve an internal noise environment of 40dB L_{dn}.
>
> (3) Avoid establishing residential and other activities sensitive to aircraft noise at:
>
> (a) airports/airfields except for Auckland International Airport: within the area between the 55dB L_{dn} and 65dB L_{dn} noise contours, unless the effects can be adequately remedied or mitigated through restrictions on the numbers of people to be accommodated through zoning and density mechanisms and the acoustic treatment (including mechanical ventilation) of buildings containing activities sensitive to aircraft noise excluding land designated for defence purposes;

(5) Manage residential intensification and activities sensitive to aircraft noise within areas identified for accommodating urban growth in a way that avoids reverse sensitivity effects as far as practicable, including reverse sensitivity effects between those land uses and such effects on Auckland International Airport, Ardmore Airport, Whenuapai Airbase and North Shore Airport, and that avoids, remedies or mitigates adverse aircraft noise effects on people and communities.

Policy D24.3(1) is given effect to by a prohibited activity status for all new ASAN inside the ANB.

All other policies refer to the need to avoid the establishment of residential and other ASAN within the area between the ONB and ANB, unless the effects can be "adequately remedied or mitigated" through:

- Restrictions on the numbers of people to be accommodated through zoning and density mechanisms
- Acoustic treatment (including mechanical ventilation) of all buildings containing ASAN
- Management of residential intensification (and ASAN) within areas identified for accommodating urban growth in a way that avoids reverse sensitivity effects as far as practicable and avoids, remedies or mitigates adverse aircraft noise effects on people and communities.

The Site is currently zoned Rural and Future Urban which provides for a low intensity of development. Enabling the development and intensification of land between the ONB and 60dB L_{dn} contour will ultimately mean the introduction of new ASAN at greater densities than authorised by the current operative zoning arrangements. The anticipated density requirements for ASAN within the area between the ONB and ANB of the Airport are not accurately defined in Chapter D24. We understand that residential development has been authorised at a density of 32.5 dwellings per hectare on the adjacent land inside the ONB on the western side of Cosgrave Road.

It is our experience that the management of residential intensification in environments exposed to noise from transport infrastructure involves a wide range of planning considerations beyond acoustics. The ultimate determination of the appropriate zoning and density arrangements is a non-acoustical matter that is left to others. The management of residential intensification in a way that avoids reverse sensitivity effects is also a non-acoustical matter that is to be addressed by others.

This advice considers the proposal in terms of:

- Alignment with the hierarchy of land use controls in Chapter D24 that control the development of ASAN within the relevant contours

- General requirements in Chapter D24 requiring acoustic treatment of ASAN within the relevant contours

4.0 Proposed zoning arrangements inside the ANB

Figure 2 shows the proposed Employment Zone across a relatively small area of land inside the ANB.

Policy D24.3(1) of the AUP seeks to "*avoid the establishment of new activities sensitive to aircraft noise (except tertiary education facilities) within the 65 dB L_{dn} noise contour in the Aircraft Noise Overlay"*. The activity table in Chapter D24 applies a prohibited activity status to new ASN inside the ANB. A26 and A27 also require legal mechanisms to be included in subdivision applications to preclude future ASAN.

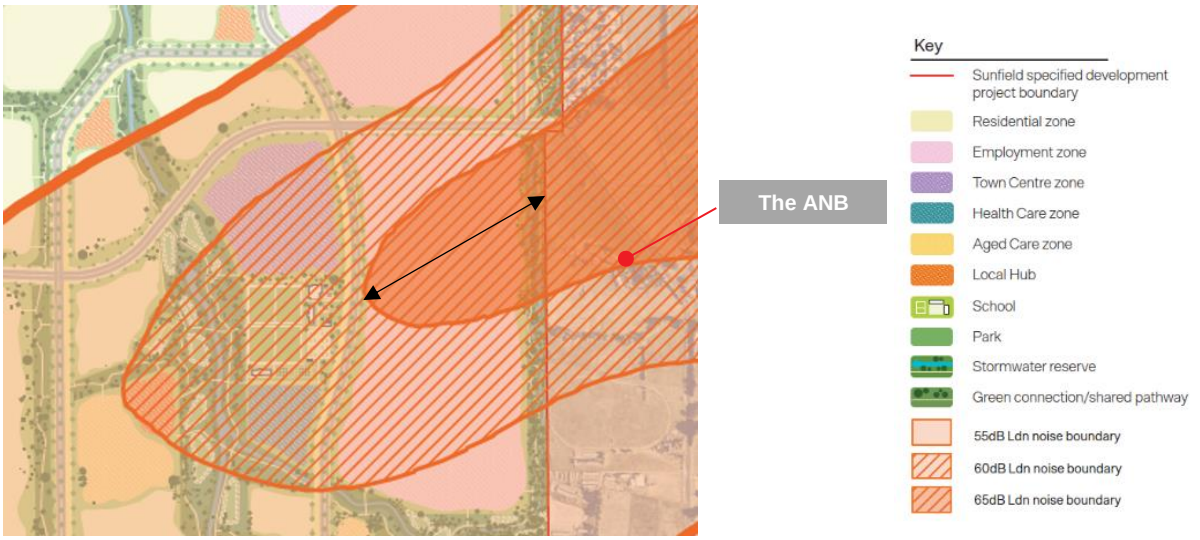

Figure 2 Proposed zoning arrangements inside the ANB

4.1 Recommendations

The controls in Chapter D24 will prohibit the establishment of new ASAN inside the ANB.

We understand that the Employment Zone will be designed to provide for industrial type activities such as warehousing. We recommend that the proposal aligns with Chapter D24 by enabling land uses activities that are inherently noisy themselves, and / or not sensitive to aircraft noise.

5.0 Proposed zoning between the 65 dB L_{dn} and 60 dB L_{dn} noise contour

Figure 3 displays the proposed zoning arrangements between the ANB and the 60 dB L_{dn} noise contour.

We understand that the proposal is to limit the potential for new ASAN between the ONB and 60 dB L_{dn} noise contours. The proposed zoning arrangements between the ONB and 60 dB

L_{dn} noise contours will provide for retail and services in the Town Centre Zone, healthcare activities inside the Health Care Zone and retail and service activities inside the Local Hub. The Open Space Zone inside this area is intended to provide for active / organised recreation.

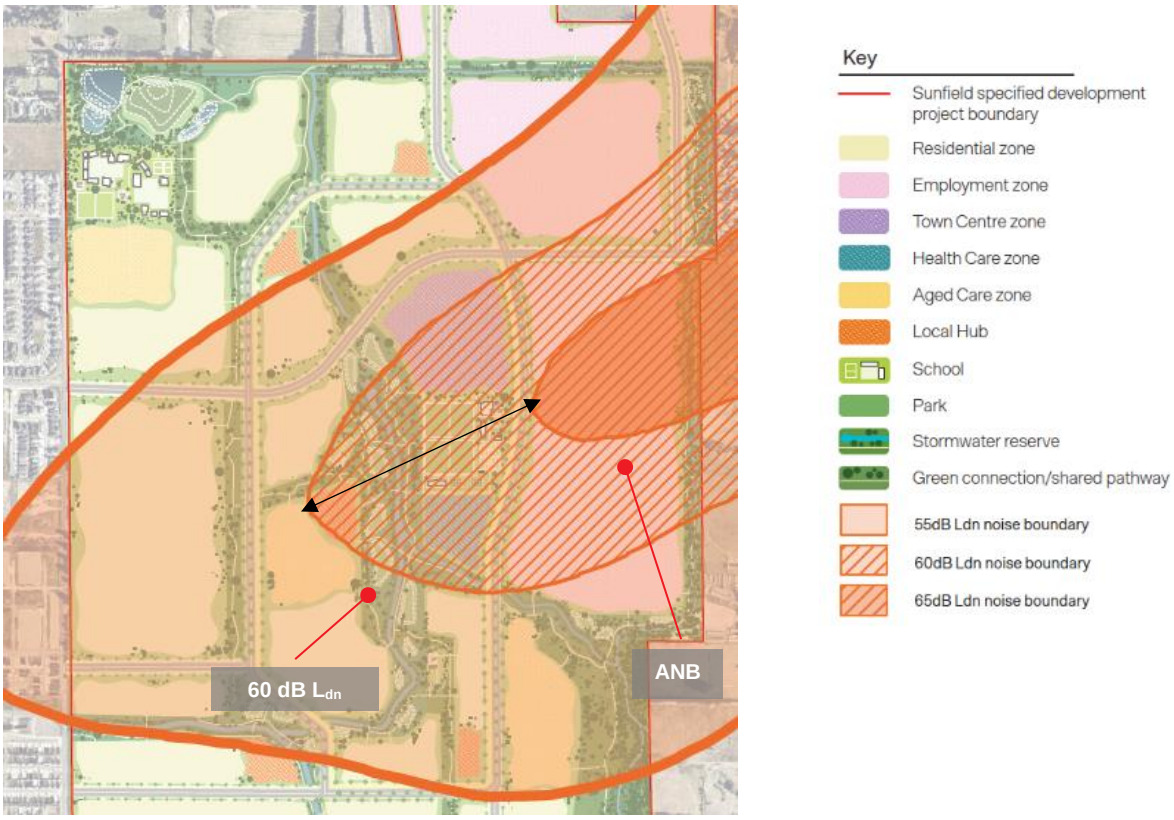

Figure 3 Proposed zoning arrangements between the ANB and 60 dB L_{dn} contour

Table D24.4.2 (A14 and A15) of Chapter D24 applies a discretionary activity status to new ASAN, where they are designed and constructed in accordance with the relevant acoustic treatment standards in D24.6.2(1) and D24.6.2(5). ASAN are a non-complying activity where they do not comply with the acoustic treatment requirements.

5.1 Recommendations

We understand that the proposed zoning arrangements will generally preclude ASAN between the 65 dB L_{dn} and 60 dB L_{dn} noise contours. Any new ASAN will require a discretionary activity resource consent in accordance with Chapter D24.

We note that the proposed Health Care Zone may introduce the potential for ASAN if the activity table provides for hospitals or healthcare facilities that include an overnight stay facility. These activities would require a discretionary resource consent pursuant to Chapter D24. The resource consent process would enable the compatibility of the care facility and proposed acoustic mitigation measures to be considered on a case-by-case basis. It is our experience that specialised facilities such as hospitals and healthcare facilities with overnight stay facilities can be easily designed and constructed to be compatible with high noise environments.

We understand that the purpose of the Open Space Zone is intended to provide for active forms of recreation that are generally not noise sensitive. We consider that this arrangement is acceptable as the proposal is to set aside areas of open space for passive uses outside the ONB. Residents will therefore have access to areas of open space that provide a higher level of aural amenity.

We generally recommend that the proposal aligns with the anticipated outcomes of Chapter D24 provided that the zoning arrangements limit the potential for ASAN. If any ASAN are anticipated, the specific types of ASAN should be limited to activities that can be managed to be compatible with aircraft noise through the use of acoustic treatment. The activities should not rely on a good level of outdoor amenity.

6.0 Proposed zoning arrangements between the 60dB L_{dn} noise contour and the ONB

Figure 4 displays the proposed zoning arrangements between the 60 dB L_{dn} noise contour and the ONB. The area is proposed to be zoned Employment, Town Centre, Aged Care and Residential.

We understand that the proposal is to provide for acoustically treated residential development within this area. The proposed density and typologies of residential development across the land between the ONB and the 60dB L_{dn} noise contour has not yet been confirmed.

Table D24.4.2 (A14 and A15) of Chapter D24 applies a restricted discretionary activity status to ASAN where they are designed and constructed in accordance with standards D24.6.2(1) and D24.6.2(5) (or are otherwise non-complying).

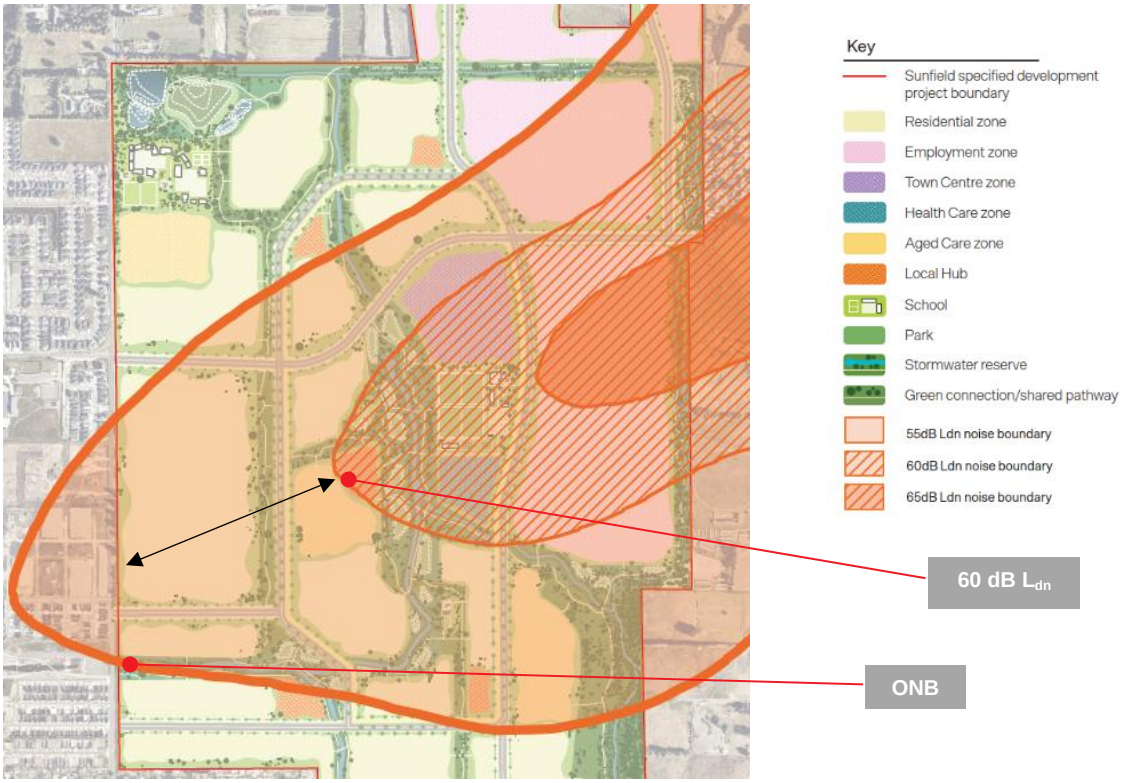

Figure 4 Proposed zoning arrangements between the ONB and 60 dB L_{dn} contour

6.1 Recommendations

Chapter D24 requires all new ASAN between the ONB and 60 dB L_{dn} noise contours obtain land use consent as a restricted discretionary activity where they are designed and constructed in accordance with standards D24.6.2(1), D24.6.2(4) and D24.6.2(5).

We recommend that the controls within the ONB and the 60 dB L_{dn} contour achieves the following outcomes:

- The overall number / density of potential ASAN are managed in accordance with D24.3(3). We leave the determination of the appropriate density levels to others.
- We recommend that the development controls should encourage development that does not create an expectation of high acoustic amenity in outdoor areas. This might be achieved by limiting outdoor spaces in favour of the communal open space areas outside the ONB or by encouraging use of enclosed conservatory-style gardens or similar.
- We recommended that the Precinct Description identifies that the Site is exposed to aircraft noise from the Airport and that exposure to aircraft noise should be anticipated. We understand that a no-complaints covenant is proposed to be registered on the titles. Our experience is that this is likely to function as an “alert” to future residents that

aircraft noise should be anticipated. This can have the effect of 'filtering out' residents that identify as sensitive to aircraft noise.

- All ASAN will need to be acoustically treated to the standards set out in D24. We have provided comment on the specifications for ventilation and/or air-conditioning systems in Section 8.0.

7.0 Proposed zoning arrangements outside the ONB

The area of the site beyond the ONB is proposed to be zoned Employment, Aged Care, Residential and includes a School and areas of Open Space.

The AUP does not include any noise-related land use controls to manage the subdivision and development of land exposed to aircraft noise levels less than 55 dB L_{dn} (i.e. beyond the ONB).

We consider that there is no need to manage exposure to aircraft noise in this area.

8.0 Mechanical ventilation and cooling for ASAN

D24.6.2(1) requires that new ASAN are provided with ventilation and/or air-conditioning measures to enable occupants to remain adequately ventilated and thermally comfortable when windows are shut to reduce aircraft noise. Mechanical ventilation and cooling systems are a fundamental part of the overall acoustic treatment package and ensure that an adequate internal noise environment is achievable, particularly in warm weather.

If such a system is not provided, or is inadequate, occupants may be compelled to open windows and doors for ventilation and to remain cool in hot weather. This results in aircraft noise intrusion and invalidates the effort of applying acoustic treatment to the building envelope.

We have been involved in several recent plan review processes involving the scrutiny and development of ventilation standards for dwellings in high noise environments. While we are not experts in mechanical ventilation, we understand that the requirements of D24.6.2(b) do not reflect best practice.

D24.6.2(b) simply requires that "*the related ventilation and/or air conditioning system(s) satisfies the requirements of New Zealand Building Code Rule G4 with all external doors of the building and all windows of the habitable rooms closed".* We understand the solutions required by the New Zealand Building Code are not effective for cooling and do not address the potential for overheating where windows and doors are closed.

We recommend the adoption of the specifications in AUP standard E25.6.10(3)(b) to (f). These apply Auckland-wide and have been successfully applied to a significant number of projects. The main difference is the introduction of temperature control to ensure that the indoor environments remain cool whilst windows and doors are closed to reduce noise intrusion. The requirements of Clause G4 of the Building Code still apply. Our experience is that the controls we recommend are typically complied with by the implementation of domestic air conditioning

systems and an extraction fan that is capable of ensuring an adequate fresh air supply to reduce the concentration of contaminants.

9.0 Summary

We have reviewed the aircraft noise levels across the Site to determine compatibility with the anticipated noise outcomes in Chapter D24 of the AUP. Chapter D24 provides a hierarchy of subdivision and land use restrictions based on the level of aircraft noise exposure above 55 dB L_{dn}.

The noise control boundaries and provisions for managing exposure to aircraft noise associated with Ardmore Airport's designation were recently reviewed and adopted as part of the AUP plan review process. We consider that the relevant AUP provisions are appropriate. We recommend that the precinct provisions are implemented in a way that clearly delivers the outcomes sought by the relevant parts of D24.

We have identified that:

Inside the ANB

- The establishment of new ASAN within the ANB/ 65 L_{dn} noise contour is a prohibited activity. The precinct controls for the area of the Site inside the ANB will need to be ensure that the types of activities enabled by the Employment Zoning are inherently not sensitive to noise. The proposed Sunfield masterplan complies with this requirement.

The area between the ANB and the 60 dB L_{dn} noise contour

- The establishment of new acoustically treated ASAN within the area between the ANB/ 65 dB L_{dn} and 60 dB L_{dn} noise contours is a discretionary activity. Subdivision within this area is a restricted discretionary activity. We recommend precinct controls are used to limit the potential types of ASAN enabled by the zoning arrangements, to restrict the potential density of ASAN in accordance with D24.3(3) and to ensure the type of ASAN do not rely on outdoor amenity. All ASAN will need to be appropriately acoustically treated.

The area between the 60 dB L_{dn} noise contour and the ONB

- The establishment of new ASAN between the 60 dB L_{dn} noise contour and the ONB/ 55 dB L_{dn} noise contour is a restricted discretionary activity, and subdivision is also a restricted discretionary activity. We recommend precinct controls are used to restrict the density of ASAN in accordance with D24.3(3). All ASAN will need to be appropriately acoustically treated.

Mechanical ventilation and cooling controls

- We recommend that the precinct controls should include modifications to improve the certainty and effectiveness of the provisions in D24 that require mechanical ventilation and cooling. We recommend the adoption of the specifications in AUP standard E25.6.10(3)(b) to (f).

The area beyond the ONB

- The establishment of ASAN beyond the ONB is permitted. Density and built form will be controlled by planning controls not related to noise.

We have recommended that schools are located outside the ONB. The proposed Sunfield masterplan reflects this recommendation.

The appropriate density of ASAN between the ONB and ANB is not accurately defined in D24. The objective is simply to "*adequately remedy or mitigate*" potential effects through restrictions on the numbers of people to be accommodated through zoning and density mechanisms. Local authorities must balance a wide range of factors (including providing for population growth) when determining whether to release land for intensification, and the appropriate zoning and density arrangements across that land. We leave the determination of the appropriate density levels to the planning experts.