CONSULTANT ADVICE

Project:	West Coast Airports	**Document No.:**	Ca 001		
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From:	Steve Peakall	**No. Pages:**	4	**Attachments:**	Yes
CC:					
Subject:	Franz Josef heliport – proposed noise boundaries				

Introduction

Marshall Day Acoustics (MDA) has been engaged to prepare future noise contours for 5 aviation facilities in the West Coast district.

The five facilities are:

- Hokitika Airport;
- Westport Airport;
- Greymouth Airport;
- Karamea Airfield, and;
- Franz Josef helipad.

The intent of the noise contours was to apply a consistent noise management and land use planning regime in the District Plan for the West Coast Regional Council's (WCRC) aviation facilities. However, four of these are small regional airfield facilities with runways supporting both fixed wing and helicopter activity. Because Franz Josef Heliport is used by helicopters only and would be subject to a different noise standard, we adopt a different approach.

We therefore discuss the four airfields in a separate consultant advice note (Ca 002)

This memo relates to Franz Josef only.

Background

Franz Josef glacier is a major tourist destination on the West Coast and as such the township of Franz Josef has developed to support that tourism. Part of the tourist industry is focussed around helicopter trips to and from the glacier and other parts of the region. The town has a well developed array of helipads used by the resident tourist operators, as well as occasional use for search and rescue and DOC operations. We understand that the helipads are collectively managed as the Franz Josef Heliport, and this is the busiest heliport in New Zealand.

Noise Performance Standards

New Zealand Standard NZS 6807:1994 *Noise Management and Land Use Planning for Helicopter Landing Areas*provides a standard approach to managing the effects of helicopter noise emissions on sensitive receivers.

NZS 6807:1994 recommends that the L_{dn} metric is used when assessing the noise effects of helicopters. L_{dn} uses the cumulative noise energy that is produced by all movements during a typical 24-hour period with a 10 decibels penalty applied to any night movements. This metric is used extensively in New Zealand and overseas for helicopter and airport noise assessments. It has been found to correlate well with community response to helicopter noise.

NZS 6807 is intended for helicopter landing areas used for ten or more flight movements in any month or where flight movements are likely to result in a maximum sound level exceeding 70 dB L_{AFmax} at night or 90 dB L_{AFmax} during the day in any residential zone or notional boundary of any rural dwelling. It is not intended to apply to infrequently used helicopter landing areas or emergency operations.

The Standard sets out limits of acceptability for helicopter noise for a range of receivers. Table shows these limits.

Table 1: NZS 6807 Limits of Acceptability

Affected Land Use	L_{dn} day-night average sound level (dB)	L_{AFmax} night-time maximum sound level (dB)
Industrial	75	n/a
Commercial	65	n/a
Residential	50	70
Rural (at notional boundary)	50	70
Residential (internal)	40	55

The hours for night-time L_{max} shall be defined by the local authority. In the absence of any specific definition by the local authority for helicopter landing areas, the hours of 10.00pm to 7.00am the following day shall be defined as night-time for the purposes of the Standard.

The Standard defines an acceptable limit of 50 dB L_{dn} during the daytime for residential and rural receivers. The Standard suggests a maximum seven-day average L_{dn} which means that the noise level can be higher on some days (up to 53 dB L_{dn}) provided the average over seven days does not exceed 50 dB L_{dn}.

We consider that the use of NZS 6807 to develop noise boundaries for Franz Josef is appropriate. The noise boundaries should be implemented in the District Plan, and be used as the basis of setting land use planning controls, and for heliport noise compliance requirements.

Noise Boundary Development

We have predicted helicopter noise levels using SoundPLAN and verified against L_{AE} sound levels MDA has measured over a number of years. SoundPLAN uses the calculation method defined in *DIN45684 Acoustics – Determination of aircraft noise exposure at airfields – Calculation Method* for helicopter noise.

Our predictions are based on helicopter movement data provided by Franz Josef heliport. Based on discussions with TTPP staff, the predicted contours have been based on no expansion to the heliport movements from pre covid number.

The predicted noise contours are shown in Figure 1.

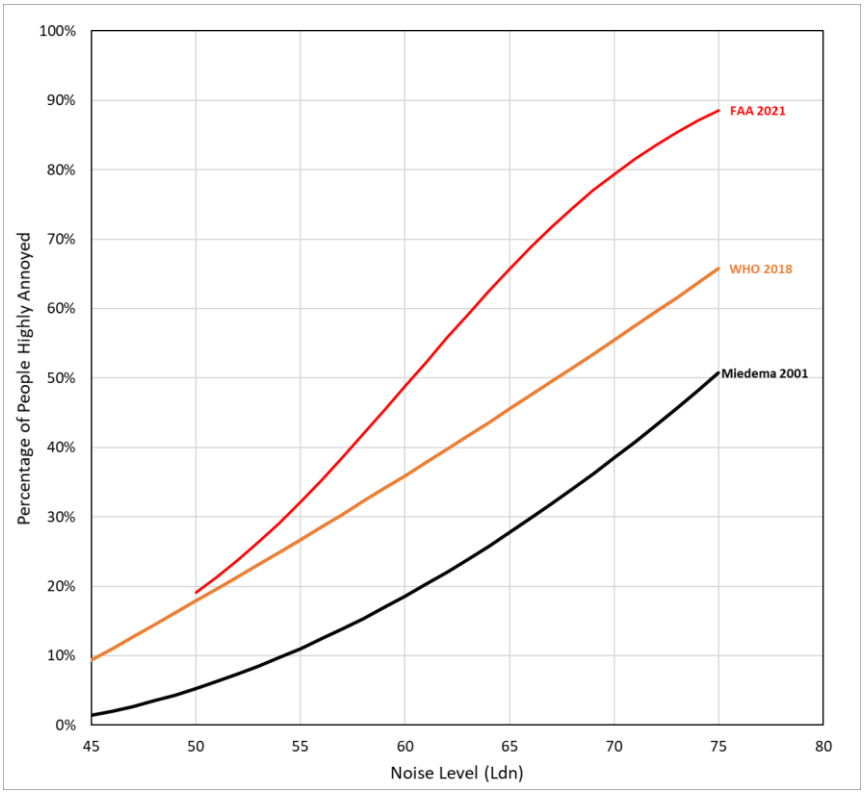
Helicopter noise effects

The typical way adverse noise effects are experienced is by a change in noise level received, annoyance effects from a given helicopter noise exposure and sleep disturbance effects.

Individual responses to a certain level of helicopter noise vary greatly. A large number of studies have been carried out overseas in relation to the overall relationship of a given community's annoyance with reference to varying noise levels they receive (known as a dose response relationship), albeit focussed on fixed wing aiports. However much of this was taken into account when NZS 6807 was developed.

A dose response relationship specific to aircraft noise was developed by Miedema and Oudshoorn and has been used extensively for airports here and overseas since that time in assessment of noise effects studies. This relationship has until recently generally been regarded as the latest research in this area. The latest and most relevant research is now considered to be the World Health Organisation (WHO) study in 2018 and to a lesser extent the Federal Aviation Administration (FAA) study in the US in 2021.

Both the FAA and WHO studies show a higher level of annoyance than the Miedema 2001 dose-response curve. The dose response curves from the FAA and WHO studies are shown below along with the Miedema study for comparison.



Whilst these are specifically based on data from fixed wing airports, they are a useful guide for helicopters too (which are however considered more annoying). The WHO 2018 dose response relationship indicates that for aircraft noise environments of 50 dB L_{dn}, 18% of the population are likely to be highly annoyed. This shows why NZS 6807 recommends prohibition of noise sensitive activity inside the helinoise boundary. For aircraft noise environments of 60 dB L_{dn}, 36% of the population are likely to be highly annoyed by the noise, which is of increasing significance.

Recommendations

Because of these high noise levels and resultant adverse effects that can eventuate, we recommend that the 50 dB L_{dn} and 60 dB L_{dn} noise contours be implemented in the District Plan. We discuss the recommended land use planning controls below:

In our opinion, helicopter noise environments greater than 60 dB L_{dn} are not suitable for residential or other noise sensitive activity because of the unacceptably high noise levels.

We therefore recommend noise sensitive activity should be prohibited inside the 60 dB L_{dn} boundary

Further, as highlighted above, helicopter noise environments greater than 50 dB L_{dn} are also not generally suitable for residential or other noise sensitive activity because of the high noise levels. Sound insulation measures can improve internal noise environments but do not fully mitigate the effects for residential activity, particularly in outdoor living areas or where residents wish to open windows and doors.

NZS 6807 recommends in relation to a defined helinoise boundary (normally set at 50 dB L_{dn}) that:

"*New residential uses, schools, and hospitals shall be prohibited unless a district plan permits such uses, subject to a requirement (such as the production of an acoustic design certificate) to incorporate appropriate acoustic insulation to ensure a satisfactory internal noise environment (refer table 1). Alterations or additions to existing residential uses should be fitted with appropriate acoustic insulation and*

encouragement should be given to ensure a satisfactory internal environment throughout the rest of the building."

An interpretation of this clause is that as a desirable starting point, new noise sensitive activities are incompatible with such levels of helicopter noise and should be prohibited. It is our opinion that land use controls to prohibit new noise sensitive activities should be imposed within the helinoise boundary (50 dB L_{dn} noise boundary).

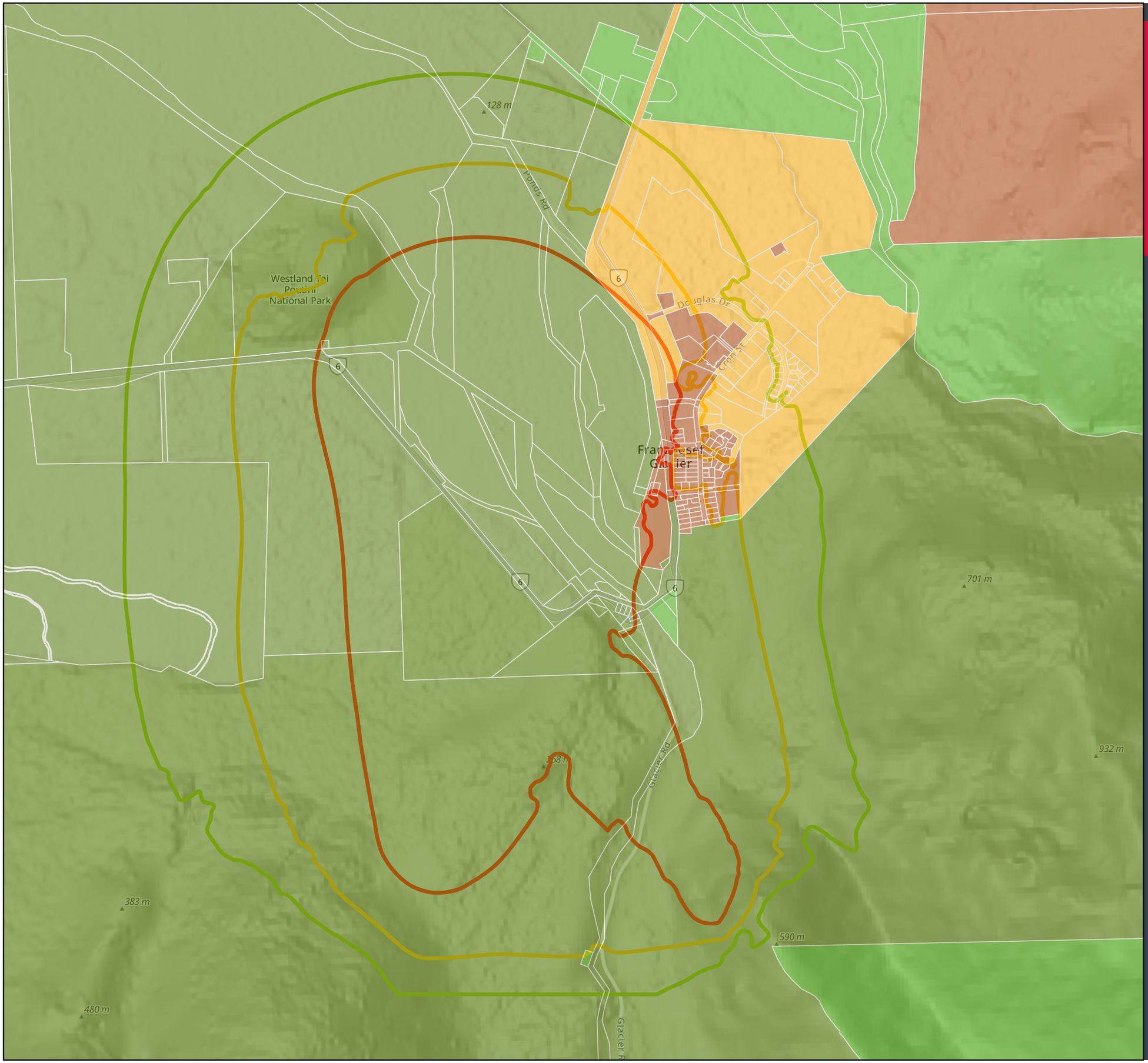
We therefore also recommend noise sensitive activity should be prohibited inside the 50 dB L_{dn} boundary

For those existing dwellings inside the proposed 50 dB L_{dn} noise boundary, alterations and additions to noise sensitive activity in all zones should be required to be fitted with appropriate acoustic insulation (to the alterations or additions only).

The approach we recommend is consistent with NZS 6807, and is also broadly in line with the philosophy adopted in NZS 6805 for fixed wing airports (but with recognition that helicopter noise is often perceived as more annoying and therefore with 5 dB more stringent noise controls)

We note that there should also be a mechanism imposed in the District Plan to ensure helicopter noise emissions do not exceed these noise levels at the noise boundaries.

FRANZ JOSEF HELIPORT
FUTURE NOISE CONTOURS



Predicted Noise Levels

- 50 dB Ldn
- 55 dB Ldn
- 60 dB Ldn

District Plan Zones

- General Residential Zone
- Rural-residential
- General Rural Zone
- Rural Lifestyle Zone
- Rural Zone
- Town Centre Zone
- Settlement Zone
- Commercial Zone
- General Industrial Zone
- Special Purpose Zone - High Use Visitor Zone
- Special Purpose Zone - Port Zone
- Waterbody
- Other

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West Coast Regional Council

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Drawing Details:
Scale: 1:9,423
Projection: WGS 1984 Web Mercator Auxiliary Sphere

Map Notes / Comments:
This map is for graphical purposes only. While every effort has been made to ensure that the data are accurate and reliable, Marshall Day Acoustics cannot assume liability for errors or omissions in the data graphically represented.
The noise contours produced by SoundPLAN are for graphical purposes only. The noise contours are generated by interpolations of calculated grid points (spacing typically 5-25m), with varying interpolation accuracy. Therefore, the calculated noise level at a given point may differ from that implied by the noise contours when the reader interpolates between two contour lines. It is therefore not recommended that high-resolution noise level predictions are based on noise contour interpolation.