

**BEFORE THE INDEPENDENT HEARINGS COMMISSIONER
APPOINTED BY THE INVERCARGILL CITY COUNCIL**

UNDER	the Resource Management Act 1991
IN THE MATTER	of Part 8 of the Act
BY	SPACE OPERATIONS NEW ZEALAND LIMITED
	Requestor

SUMMARY STATEMENT OF GRAHAM HULSTON

Dated: 28 September 2026

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Summary statement of Graham Hulston

Introduction

- [1] My name is Graham Hulston, I prepared evidence dated 15 September 2026.
- [2] I have since reviewed the evidence filed for Stewart Family Assets Limited (SFAL) by Mr Craig Morley (engineering and electromagnetic interference) dated 21 September 2026.

Effects of the Horizon Mask

- [3] In the evidence presented by Mr Morley in particular “Effects of the Horizon Mask” some of key conclusions are based on a poor understanding of the effect of diffraction on radio propagation.
- [4] In paragraph 45 he has attributed one of the main reasons for radio signal degradation is “phasing (Fresnel) effects”. This misunderstanding is highlighted in paragraph 46 where he has confused the effect of reflection with diffraction and again in paragraph 47 where he states ““Earth reflection is one of the primary problems concerning the Fresnel zone”. Reflection and Diffraction are two separate ways that electromagnetic waves (e.g. radio and light) interact with barriers and boundaries affecting the propagation of waves.
- [5] In section 48 of the evidence presented by Mr Morley he states: “It is the area of an obstructing object relative to the circular beam area at a distance.” This is an incorrect, it is the area of the obstruction object relative to the Fresnel zone that determines the diffraction and hence signal loss. As a consequence, he is understating the potential effect of the wind turbines.
- [6] Mr Morley in paragraph 50 concludes that diffraction from the wind turbine blades can be dismissed because they are “transparent to radio waves” when using Glass fibre reinforced polymer (GFRP) and “only cause a small blocking” when carbon fibre is included. This is not my understanding based on a review of engineering research, but a site and turbine type assessment would narrow down the incidence of actual “blocking”.

- [4] In his paragraph 55 Mr Morely states; “Buildings that have significant glassed areas (front and rear if sighted from antenna) become more transparent to radio beams.” This is a generalisation as the trend to use tinted windows can significantly attenuate the signal through reflection and scattering making the windows opaque.
- [5] Mr Morley in paragraph 82: “The proposed 3km Horizon Mask with a 5-degree elevation is excessive and relies on a flawed, blanket approach rather than site-specific analysis.” In making this conclusion he seems to have not understood that the proposed horizon mask is in effect a tool or means to identify obstacles that may potentially cause diffraction loss which will be subject to further analysis as outlined in the proposed Condition 2 (Option A): Penetration of Horizon Mask in the notice of requirement. This the kind of “site-specific analysis” which he acknowledges is required.
- [6] In my earlier statement at [27] I said, “The significance of any penetration depends upon the specific characteristics of the obstruction / obstacle and the affected radio paths.” Whether a penetration is significant or not will depend on a technical assessment such as that proposed in Condition 2 (Option A).

Dated: 28 September 2026

Graham Hulston