

BEFORE AN INDEPENDENT HEARINGS PANEL

UNDER the Resource Management Act 1991
IN THE MATTER of proposed Plan Change 14: Housing and Business
Choice to the Christchurch District Plan

EVIDENCE OF RICHARD GARY SMART ON BEHALF OF:

THE MINISTRY OF JUSTICE (Submitter 910)
FIRE AND EMERGENCY NZ (Submitter 842.1-10 only)
NZ POLICE (Submitter 2005)
HATO HONE ST JOHN (Submitter 909)
CANTERBURY CIVIL DEFENCE AND EMERGENCY MANAGEMENT
GROUP (Submitter 912)

19 September 2023

Ministry of Justice's Solicitor
PO Box 4341 CHRISTCHURCH 8140
DX WX11179
Tel +64 3 379 7622
Fax +64 3 379 2467

WYNN WILLIAMS

Solicitor: L F de Latour
(lucy.delatour@wynnwilliams.co.nz)

Introduction:

- 1 My full name is Richard Gary Smart.
- 2 I am a National Telecommunications Engineer employed by Fire and Emergency New Zealand (**FENZ**), a role I have held for three years.
- 3 I hold a NZ Certificate in Engineering (Telecommunications).
- 4 My relevant experience includes:
 - (a) I have previously been employed by the Broadcasting Corporation of NZ (now Kordia) for thirty years maintaining and installing telecommunications equipment (Television, Radio transmitters, Microwave systems and associated equipment). I started with the BCNZ as a Trainee and finished in an Engineering Consultancy role.
 - (b) I have been subsequently employed by FENZ as a Regional Telecommunications Specialist for eight years followed by three years seconded into the National Telecommunications Engineer role.
 - (c) I am listed as an Approved Radio Engineer by Radio Spectrum Management (a business unit within the Ministry of Business, Innovation and Employment) to engineer radio licenses and as a radio examiner.
- 5 I confirm that I have read and am familiar with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. I have complied with the Code of Conduct in preparing this evidence and I agree to comply with it while giving any oral evidence during this hearing. Except where I state that I am relying on the evidence of another person, my evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Scope of Evidence

- 6 I have prepared this evidence on behalf of the following parties:
 - (a) Ministry of Justice, Te Tāhū o te Ture (Submitter 910) (**Ministry of Justice**);

- (b) FENZ (Submitter 842, in respect of Submission points 842.1-10 only);
 - (c) New Zealand Police (Submitter 2005) (**Police**);
 - (d) Hato Hone St John (Submitter 909) (**St John**); and
 - (e) Canterbury Civil Defence and Emergency Management Group (Submitter 912) (**CCDEM**).
- 7 Information on each of these submitters (hereafter referred to as the **Agencies**) and their roles and functions, as well as the specific reasons for their interest in the protection of the radiocommunication pathways is included in their original submissions.
- 8 My evidence supports the provisions in sub-chapter 6.12 Radiocommunication Pathway Protection Corridors and the associated changes to the definition of height and Planning Maps.
- 9 My involvement with Plan Change 14 (**PC14**) to date has been to work with the Ministry of Justice advising on the technical issues as an agency technical representative. The Agencies became aware of the potential for the paths to be blocked because of development after a resource consent was granted for a new building immediately adjacent to the Christchurch Justice and Emergency Services Precinct (**CJESP**). Because there were no provisions in the District Plan to protect the radiocommunication pathways, the Council were not able to consider any effect on these pathways when assessing and granting the resource consent. Fortuitously the building affected only one path (and the affected antenna could be relocated so as to avoid any disruption).
- 10 In preparing my evidence, I have reviewed the following documents:
- (a) Radio Engineering Requirements for CJESP Radio Corridors_V3.0;
 - (b) CJESP Radio Corridor Project Structural Report Draft (22Dec21 V2); and
 - (c) The evidence of prepared by Fiona Small on behalf of the Agencies.

Reasons for radiocommunication pathways

- 11 The radiocommunication facilities installed on the roof of CJESP provide fixed radiocommunication pathways to key radiocommunication sites around Christchurch (including Mt Pleasant, Victoria Park and Sugarloaf which are the pathways protected by the provisions in sub-chapter 6.12).
- 12 When a radio signal is transmitted from one location to another, the signal occupies an elliptically shaped volume of space between the transmitting antenna and the receiving antenna. If an object such as a building protrudes into the space that the signal needs it will be reduced in strength or completely blocked.
- 13 Microwave frequency signals are used to carry radio traffic between the radiocommunication sites at Mt Pleasant, Victoria Park and Sugarloaf and the CJESP. For microwave frequencies in particular, the area needed by the signal is not very large compared to the dimensions of a building. If a building penetrates the signal path, the radio signal will either be completely blocked or reduced so much that there is not enough signal remaining to form a reliable communications path. The area required changes along the length of the path from transmitting antenna to receiving antenna. The required space is smallest at either end of the path and is largest at the middle of the path. Therefore, any intrusion into the radiocommunication pathways that are protected under sub-chapter 6.12 are likely to completely block the pathway and severely disrupt communications.
- 14 The corridors define the maximum height above mean sea-level (AMSL) that a building can reach before the structure will start to protrude into the space needed by the radio signal to reach the far-end. The corridor dimensions (and resulting maximum heights above A.M.S.L) were calculated by a Consulting Radio engineer based on International Telecommunications Union (ITU) recommendations for microwave path planning.

Reasons why other ways to mitigate effects of intrusions on radiocommunication pathways are not a feasible option

- 15 Given the potential for intrusions into the radiocommunication pathways to severely disrupt communication, other mitigation options were considered to mitigate the effects of potential intrusions into the radiocommunication pathways.

- 16 Mitigation options considered were:
- (a) to relocate antennas and/or increase the size of the microwave antennas;
 - (b) build an intermediate site on a proposed building that would block the path (or a nearby building to one side); or
 - (c) to build a new greenfield site at a different location from the CJESP and then connect that new site and the CJESP.
- 17 However, these other options were not considered to be realistic or feasible for the reasons I explain below.
- 18 The radio engineer's report noted that relocation of one or more antennas was restricted to moving the antennas to pole 10. The engineer noted that this was only effective if the obstructing building was close to CJESP (within 100m) and to the south (only the path to Cashmere meets these conditions). This option would also require replacement of pole 10 and strengthening to the building. Increasing the size of antennas would require replacement of an existing pole with a stiffer pole and combining two microwave services (Police and Ambulance) into a single antenna. The combining of services is subject to equipment details, and channel availability and licensing.
- 19 Considering installation of antenna and telecommunications equipment on top of a proposed new building, all the antennas and communications equipment at the CJESP are part of the buildings IL4 resilience (NZ Building code) requirement.¹ The Structural Engineers report noted "*An intermediate site building, is likely to require strengthening to meet IL4 requirements. The building would also require a mount and equipment installation on the roof, along with design and local strengthening requirements. The cost to redesign and then strengthen a building to IL4 is significant.*"

¹ Clause A3 of the Building Code defines the significance of a building by its importance level. IL4 is Level of Importance 4 which means "*Buildings that are essential to post-disaster recovery or associated with hazardous facilities.*" It includes "*Fire, rescue, and police stations and emergency vehicle garages*" and "*Buildings intended by the owner to contribute to emergency preparedness, or to be used for communication, and operation centres in an emergency, and other facilities required for emergency response.*" (Clause A3, Building Regulations 1992).

- 20 Building a greenfield site in another part of the city was considered. The Middleton railyards area was identified as being a potentially good location. The radio engineer noted:
- (a) The path to Middleton had a low probability of being obstructed (much of the path was outside the 'four avenues').
 - (b) The location already had two high communications towers, so resource consent for another 40 to 50m structure was likely to be possible.
 - (c) The engineer did also note that this option would limit the height of buildings between CJESP and Hagley Park to approximately 40m AMSL (assuming the link antenna at Middleton was mounted 40m AGL).
 - (d) This option was of course dependant on a suitable site being available for development.
- 21 However, this option had significant costs associated with it, as well as many risks and uncertainties, for example obtaining funding for a new IL4 tower, any relevant resource consents required for the building, and the agreement of all agencies for such a project. Further, there was also the issue of the time it would take to design, consent, and build a new facility and ensuring communications were maintained in the interim.
- 22 In conclusion, there were no mitigation options identified that could guarantee a solution for all the microwave paths or that any of the mitigation options could be achieved for any specific situation. Accordingly, I consider that the protection of these radiocommunication pathways through the provisions in sub-chapter 6.12 is the most realistic and feasible option.

Richard Gary Smart

19 September 2023