

IN THE MATTER OF  
THE CANTERBURY EARTHQUAKES ROYAL COMMISSION

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**BRIEF OF EVIDENCE OF WARREN RICHARD LEWIS**

24 January 2012

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**Duncan Cotterill**  
Solicitor acting: Helen Smith  
PO Box 5, Christchurch

Phone +64 3 379 2430  
Fax +64 3 379 7097  
h.smith@duncancotterill.com

1. My full name is Warren Richard Lewis.
2. I hold a Bachelor of Engineering (Civil) with 1<sup>st</sup> Class Honours. I am a member of the Institute of Professional Engineers of New Zealand. I am a Chartered Professional Engineer and have 40 years experience as a Civil and Structural Engineer.
3. I am the Managing Director of Lewis and Barrow Ltd (Lewis and Barrow), a medium sized Civil and Structural Engineering Consultancy that was commenced as a sole practice in 1972.
4. Lewis and Barrow's offices in IBIS House were damaged in the earthquake on 22 February 2011. We have not been able to recover our full files including that relating to the Iconic Bar building. We do have plans and some papers from the Iconic Bar building files.

#### **2004 Alterations**

5. In 2004, I was engaged by Bob Pelham of Extreme Ltd (trading as Iconic) to provide the structural engineering design required for proposed alterations/bar fit-out at 200 – 204 Manchester Street, known as the Iconic Bar building.
6. The structure was originally one building with an eastern single storey area approximately 20m square. The western, two storey part shared a high brick firewall with the eastern, single storey part. The lower storey of the west part had two brick dividing walls that divided the ground floor into three separate tenancies. In the past those two dividing walls were removed and replaced with concrete frames to resupport the first floor. Also, in the past, the high brick firewall had two openings created to create one large ground floor space.
7. The western part had a light steel roof with timber sarking and timber purlins on large timber trusses which sat into the brick side walls. The first floor comprised tongue and grooved flooring on large timber joists supported on two concrete frames and the north and south walls. The external walls were double or treble plastered brick walls on concrete foundations. Internal walls apart from each side of the south stairwell (brick) were all light timber framed partitions.

8. The proposed bar fit-out had been designed by R M Designs. The work involved creating a bar and an entertainment area on the first floor which had previously been used for storage and offices.
9. I had read the report prepared by Holmes Consulting Group dated 14 May 1993 which concerned the seismic strengthening of the building (BUI.MAN2000.0004.20). Holmes Consulting Group had determined the building to be 67% of the Building Code requirements once their recommendations had been implemented. This was an acceptable level at the time.
10. Part of Lewis and Barrow's brief was to design the support structure to allow for two voids in the floor. One was at the south east corner of the two storey building. This was to accommodate a large television screen. The other was midway along the north wall to allow for a new stair.
11. I identified that the floor and roof required strengthening as a result of the proposed alterations. In particular, I noted that the top floor ceiling bracing was not as strong as required by my calculations. I also checked the floor diaphragm and found that it was not as strong as my calculations required. I also inspected the roof space and noted that the trusses were not performing as effectively as they could.
12. I advised the bar owner (Mr Pelham) that some structural strengthening was required over and above that already present. In particular, I recommended installing extra steel braces in the roof, extra plywood diaphragm over the first floor, and additional fixings of roof and floor members to the brick and Oamaru stone walls (BUI.MAN200.0004.129 – 130). I advised Mr Pelham that we could not continue with the proposed work to the void unless extra bracing was put into the roof.
13. The work I recommended was not intended to increase the strength of the building, but rather to accommodate the alterations being made to the floor. Mr Pelham agreed to proceed in these specific areas.
14. Lewis and Barrow also designed a roof opening over the Level 1 smokers area and designed a wall to go around the first floor smokers area. The roofing was removed over part of the smokers area but the purlins and other framing

remained in place. Extra struts and bolting was provided to at least replace the roofing diaphragm strength lost to this area (BUI.MAN200.0004.129). I understand that some time later clear roofing was added. The tongue and grooved flooring was removed and replaced with plywood flooring to falls and a waterproof layer added. That is, the structure of the building was not reduced by the creation of the smokers' area.

15. The Lewis and Barrow designs are shown on Lewis and Barrow drawings numbered 12646/1 - 6 dated August 2004 (BUI.MAN200.0004.129 - BUI.MAN200.0004.134). R M Designs applied and obtained a Building Consent on behalf of the owner
16. Lewis and Barrow completed the structural calculations and design, prepared structural plans and specifications. We did not tender out the work and did not select the contractor. I carried out site inspections of the preparation for steelwork, concrete foundations, bolting to brick walls and truss strengthening. Eight site inspection reports were issued during the course of the work to detail interpretations, modifications and give instructions.
17. I issued a producer statement construction review was dated 23 November 2004 (BUI.MAN200.0004.83). A final code compliance certificate was issued on 17 March 2005 (BUI.MAN200.0004.80).

#### **Lewis and Barrow involvement September – November 2010**

18. Lewis and Barrow were not asked to inspect the building to assess damage which had occurred as a result on the earthquake on 4 September 2010.
19. In September 2010, Lewis and Barrow was engaged by Daryl Fraser (the bar manager) to provide the structural design and drawings to reinstate the first floor where the television void was and to undertake minor structural work to soundproof the north stairwell.
20. We were not instructed to undertake a review of the building following the September earthquake. However, I looked for, but did not observe, any earthquake damage when I inspected the building in order to provide the structural engineering design of the extensions to the existing first floor and new ceiling above the north stair.

21. During my inspections in September 2010, I noticed that the lateral support of the east wall would be improved by the addition of extra square hollow sections braces at the South West corner. (Refer BUI.MAN 200.0004.149). It was prudent to install those additional braces where the void was being filled in. I may have advised Mr Fraser that the consent process could take longer if the bracing was not included in the plans. To complete the extra first floor area we designed for steel beams, timber joists and extra bracing from the floor down to the ground.
22. As there was minimal architectural work involved, we prepared all the drawings and applied for a Building Consent on behalf of the owners on 22 November 2010.
23. My producer statement structural design dated 22 November 2010 (BUI.MAN200.0004.138) notes that the following design assumptions were made:
- i. "the ground supporting foundations has an ultimate bearing capacity of at least 300kPa which is to be verified on site,*
  - ii. the Project Information Memorandum (PIM) for the site not revealing any adverse site conditions, that could affect the structural design,*
  - iii. all work not otherwise specified above being in compliance with the NZ Building Code,*
  - iv. all proprietary products meeting the performance specification requirements,*
  - v. this Producer Statement – Structural Design will be valid for 1 year only from the date of issue"*
24. I understand now that on 30 November 2010 Mr Fraser requested a hold on this proposal and that the application has subsequently been withdrawn.
25. In my view, the structural work and strengthening shown on Lewis and Barrow's drawings of 22 November 2010 would have helped in a small way to prevent collapse in the south east corner of the Iconic building, but would have had minimal effect elsewhere.

26. When the television void was designed in 2004, the diaphragm loads were transferred by structural steel work to the ground. Accordingly, the void was not an area of structural concern. Putting the new floor back into the void and installing the two additional braces would have added some structural strengthening to that area of the building but would not have prevented the damage of the scale which occurred as a result of the 22 February earthquake.

#### **Boxing Day Aftershock**

27. I did not inspect the building after the Boxing Day or February 22 earthquakes.
28. Between Christmas and New Year of 2010, I was in Nelson and was phoned by Chris Gordon, the duty Engineer from Lewis and Barrow. He had inspected the Iconic building and had located our previous file. The nature of Mr Gordon's call was to touch base with me and to ensure that there was no information that I knew about the building which he should know. Mr Gordon discussed with me the damage to the East wall he had seen on the building. He questioned me on the strength of the roof bracing and top floor ceiling bracing and discussed the work he proposed, which was to clad over the bricks with plywood and steel angles and bolt these to the east truss, and to provide a platform over the bottom chord of the last three trusses to act as a diaphragm and to stop any future brick failure harming those inside the building. I agreed with the work Mr Gordon proposed.
29. On my return to Christchurch, I briefly discussed the Iconic building with Mr Gordon. Mr Gordon told me about the work that had been done to the building and which he had checked. He advised that a CPEng certificate was signed off by Simon Gifford, of Lewis and Barrow. Mr Gordon had emailed the certificate to Council. He then gave the file back to me.
30. I put the Iconic file in my office. I anticipated that the building owner or their insurer would contact us regarding permanent repair of the east wall. A loss adjuster for the building owner contacted Lewis & Barrow regarding the repair work. I do not have of email from the loss adjuster, it being lost in the 22 February 2011 earthquake. I advised the loss adjuster on 4 February that the work completed was temporary and that we had not been engaged to establish a permanent repair. On 10 February the loss adjuster advised that he wanted us

to provide a design for permanent repairs. I advised that it would be at least a month before we could progress the instruction.

*This statement is true to the best of my knowledge and belief and was made by me knowing that it may be used as evidence for the purposes of the Royal Commission of Inquiry into the Canterbury Earthquakes.*

Dated 24 January 2012

A handwritten signature in black ink, appearing to read 'W. R. Lewis'.

Warren Richard Lewis