UNDER	THE COMMISSIONS OF INQUIRY ACT 1908
IN THE MATTER OF	ROYAL COMMISSION ON INQUIRY INTO BUILDING FAILURE CAUSED BY CANTERBURY EARTHQUAKES KOMIHANA A TE KARAUNA HEI TIROTIRO I NGA WHARE I HORO I NGA RUWHENUA O WAITAHA
AND IN THE MATTER OF	THE CTV BUILDING COLLAPSE

STATEMENT OF EVIDENCE OF MURRAY MITCHELL IN RELATION TO THE CTV BUILDING
DATE OF HEARING: COMMENCING 25 JUNE 2012

Statement of evidence of Murray Mitchell

I, Murray Thomas Mitchell of Christchurch, Structural Engineer, state:

1. I hold a Bachelor of Engineering, Civil (Hons). I am a member of the Institution of Professional Engineers of New Zealand. I have 42 years experience as a Civil and Structural Engineer. From 1971 to the present I have been employed by Opus International Consultants Ltd and hold the position of Senior Structural Engineer. I am a past member of the Structural Engineering Society of New Zealand (SESOC).

2. In 1998 or 1999 I was asked by Opus management to provide comment on premises that Opus was considering leasing in Christchurch. I believe that I considered four buildings which had been short listed as potentially suitable by Opus. One of these was the CTV building. The following is my recollection of the review that I carried out.

3. I was provided with structural drawings of the building and I carried out a desk top review. I cannot recall the exact time that this review took, but it would have been hours not days. As part of this review I examined the symmetry of the seismic load resisting system of the building, and noted that it was asymmetrical. It had a shear core at the north end, and a frame structure elsewhere. I considered how the columns and beams were reinforced, and whether these were in line with design standards and practices applicable at the time the building was constructed.

4. My review presumed that the design would have complied with the standards applicable at the time of construction since a building consent must have been issued, and the design and construction would have been checked through that process.

5. A desk top review involves a qualitative assessment of the robustness of the building. It also involves a consideration of the likely mode of failure if the

building was subjected to a seismic load greater than its design capacity. Because the building's seismic structure was asymmetrical, it would be more heavily loaded in an earthquake than a similar building with a symmetrical seismic structure.

6. I concluded that the interconnections between the floor diaphragm and the shear core were not as strong as I considered they should have been for an asymmetrical design such as this. The building also lacked structural redundancy, meaning that there were no alternative load paths available in the event that the primary load path failed.

7. My conclusions were an initial view only.

8. Counsel assisting the Royal Commission has asked me how serious I considered the issue with the CTV building to be, and would I characterize it as an actual or potential critical structural weakness in the building?

9. "Actual or potential critical structural weakness" was not an expression that was in use at the time of my desktop review. However, to the best of my recollection of my observations, and applying the expression put to me by counsel, I would have characterised the building as having an actual critical structural weakness under seismic load.

10. I have also been asked whether I formed a view on what effect this weakness might have on the building if it was subjected to ground shaking in an earthquake? Again looking back as best I can, my view was that there was a significant risk that the building would be subject to premature and catastrophic collapse in a moderate earthquake.

11. I repeat that my desktop review was brief and lacked the detail of a full structural assessment. Given the other leasing options available, I did not consider that a more detailed assessment was warranted, but having said this, my concerns were such that I thought that the building should not be considered further.

12. I compared the building with others on Opus's short list and, in my opinion, it did not compare favourably. For example, Te Waipounamu House in Hereford Street – which Opus ended up leasing -- had a similar height to the CTV Building, and was originally built as the Reserve Bank building. Compared to the CTV building, it was generously designed and had alternative load paths. Its overall strength appeared to be in excess of that which was typical for buildings of its period.

13. My advice to Opus management was to the effect that the CTV building should not be pursued as a leasing option.

14. In January 2012 I was provided with a copy of a 1990 Holmes Consulting Group report. I did not have a copy of the report when I carried out the desk top review. Section 6.3 of the report deals with the issue of the interconnection between the shear walls and the floor diaphragms. This section summarises the same concerns that I had which I have described above.

15. I have not retained a copy of the desk top review that I carried out, and nor has one been found after a search of Opus's records.

Dated 10 May 2012

Murray Mitchell