

COMMISSION RESUMES ON WEDNESDAY 29 FEBRUARY AT 9.30 AM**753 -759 COLOMBO STREET****5 JUSTICE COOPER:**

Today the Royal Commission is enquiring into the failure of the buildings situated at 753 to 759 Colombo Street. In the February earthquake last year substantial parts of the front façade of the building collapsed into Colombo Street. Marielle Falardeau, a pedestrian on the west side of Colombo Street
10 lost her life as a result. Her body was found under collapsed masonry outside number 753. Her family live in the United States and Canada and cannot be here today. They may, however, be watching on our website and to them we would like to extend our deepest sympathy for the loss that they have suffered. May I also acknowledge the presence of the Bishop here this
15 morning.

Yes, Mr Zarifeh, you appear. Mr Laing and Ms Daines the counsel.

MR ZARIFEH:

The building that was situated at 753–759 Colombo Street and which can be
20 seen on the aerial photograph on the screen at the moment, was a two storey unreinforced masonry building on the west side of Colombo Street between Gloucester and Armagh Streets and the building had both heritage and historic places status. Structural strengthening had been carried out to various parts of the building in the past and there were four tenancies in the
25 building, 753, 755, 757 and 759. My understanding is that 753 and 755 were interconnected at ground floor in one shop and 753 had had structural strengthening in 1994 with the installation of two concrete frames and diaphragm on the first floor with steel members to strengthen the walls, and the walls and roof were also tied to the structures with steel members and
30 Chemset bolts. 755 appears to have had some strengthening to the ground floor by the installation of two concrete frames in 1994. 759, as I understand it, had some strengthening done in 1999 that may have been the result of a fire that occurred when some construction work was being carried out for a re-

fit and resulted in similar strengthening to that I have described in 753. Of course all of this strengthening work that was done, such that it was, was carried out prior to the introduction of the Council's earthquake prone policy in 2006. I just wonder whether I can ask for a photo to be brought up – 0010.9
 5 might be a good one to show the face of the building. While that's coming up, given the increased earthquake prone trigger it's probable that all of the tenancies in the whole of the building would have been regarded as earthquake prone for the purposes of the policy. No applications for building consents for significant alterations had been made after the introduction of the
 10 policy so the requirements to consider strengthening in terms of the policy had never been triggered. So the building –

JUSTICE COOPER TO MR ZARIFEH:

Q. Mr Zarifeh this is, has this, this photograph has the suffix 19.1 which I
 15 don't think is precisely what you asked for. I think it is the best photo.

A. It's good, yes sir.

Q. I think it's the right one.

A. Yes it is.

Q. Can I just, interrupting I know, but may I just ask you to confirm my
 20 understanding that the taller building at what I think must be the southern extremity is number 751.

A. Yes sir.

Q. And then next to that 753 and so on as one travels north.

A. Yes sir. The, 751 is the portion to the left and the peaked roof, and 753
 25 to 759 is the balance of the red brick building, a long oblong building with the peak towards the middle.

Q. Yes.

A. And with the tenancies Colombo Souvenirs, Kiwi South and City
 30 Convenience Store. So they're separate tenancies. As I said, 753 and 755 appear to have been interconnected for the souvenir shop but it's a separate, although it's attached, separate building from 751 which is obviously an historic building as well.

Q. Yes. I think that some of the materials that have been collected for our file may relate to 751 as opposed to the other buildings but that may emerge.

5 A. Well, in particular, I think the older Council records may have combined them. There's a photo which shows the roof of 751 on the Council's survey in the early '90s.

Q. Well can we just have a look at that because that's why I'm interested in this.

10 A. That's 753.0011.3. That's something I was going to ask Mr McCarthy about. I think that's what Your Honour's picked up on.

Q. Yes it is. You were probably going to tell me about it anyway but I've interrupted I'm sorry. But here, I was just thinking, very hazardous chimney is referred to well that seems to me a chimney that must be, I think, in context a chimney that is part of the roof structure of 751.

15 A. Yes although its –

Q. There's a party wall there is there?

A. Yes and it's chimneyed on the boundary so that could be debateable.

Q. Yes right.

20 A. But there are some chimneys removed which we'll hear from the engineer on the building we're concerned with so I was going to clarify those when we come to them.

Q. It's the wrong, pointing out to me that there are flues going up in that chimney which would appear to relate to 753 as well.

A. To be shared, a shared chimney.

25 Q. Yeah.

A. Yes sir.

Q. A party chimney which I've not come across before.

A. But I'm hoping to clarify those with the engineer and Mr McCarthy.

Q. Yeah. Right oh.

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0940

MR ZARIFEH:

Following the September 2010 earthquake a level 1 rapid assessment was carried out on 5 September and minor damage was noted and the building was green placarded. A structural inspection was carried out by Lewis and Bradford, Consulting Engineers, on behalf of the owners as arranged by a property management company on the 8th of September. In relation to three of the tenancies, 753, 755 and 759 nothing was noted structurally that would compromise the building. In relation to 757, some damage was noted at the rear of the building which required strengthening or repair and between the 18th and the 21st of October strengthening was completed on 757 under the supervision of Lewis and Bradford. And as I understand it once those repairs were effected the position as far as the engineer's view was that all of the tenancies, all of the building was occupiable and was returned essentially to the state it had been pre-September earthquake. That remained the position until Boxing Day. After Boxing Day there were no inspections by the Council and we've heard about the position in relation to that. There was not as I understand it any engineering inspection, post the Boxing Day aftershock, of the building. The building owners relied on the report from their property management company, Knight Frank who relied on the tenants advising them and they were advised of some damage. I think it was a flashing and some plumbing, and that was repaired. In the February earthquake 2011 the building suffered severe structural damage including the collapse of the upper storey façade and there's some photos that can be brought up that show that. Perhaps 0010.12 to 16 could be brought up. I thought it was 0010.12 but I'll just check that in case I've given you the wrong number. Look, perhaps 0004.10. If you could highlight the bottom photo please, and the Commissioners can see the upper storey façade that's collapsed out onto the street. Another view of it is, a later view is 0017.15.

JUSTICE COOPER TO MR ZARIFEH:

30 Q. What was the number?

A. Well perhaps actually before you go to that number just try the next one, 0004.11. The top photo shows, see 751 to the left and the upper storey façade of 753 to 759 which has come off and landed in the street.

Some of the underneath of the veranda and the signs is evidence, Colombo Souvenir sign.

5 Q. Is the façade that fell out from 753 to 759, is the façade on what appears to have been, was it a roof space or an attic because in the photo that we've just previously been looking at, 4.10, it seems that one can see flooring.

A. On 759?

Q. No, on 757 and 759. If that lower photo can be expanded, looks like flooring to me.

10 A. Looks like an attic, yes, or a mezzanine.

Q. Yes, and the next door one as well, so, and yet if one looks at the photograph which we had, 19.1, there wouldn't have been much light getting into that. I don't – there are unlikely to have been habitable rooms I would thought.

15 A. Yes Sir, I agree, and I'm not sure what that was, but perhaps Ms Clarke for the owner or the engineers will explain that.

Q. Yes, somebody will know. I just wanted to – the point I think is the failure has occurred, Mr Smith may know all this already, but the failure has occurred at the point of the connection or above the connection of the floor in the front wall.

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A. Yes Sir, definitely.

Q. Which is interesting isn't it?

A. Definitely Sir.

Q. So the floor seems to have had, or may have had some role in restraining that part of the façade which was below, and the other observation one can make on the basis of the bottom photo on 4.10 is that the transverse walls appear to be in reasonable shape dividing off the tenancies don't they, for the various parts of the building.

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A. (overtalking 09:48:14) clearing away of the bricks, yes Sir. As Your Honour has indicated Ms Falardeau appears to have been a pedestrian on the footpath on the west side of Colombo Street at the time of the February earthquake. Her body was found under collapsed building

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material outside 753 Colombo Street which housed the shop known as Colombo Souvenirs.

Sir the likely issues that the Commission will have to consider in relation to this building are that application of the Christchurch City Council's earthquake prone policy to this building. Secondly assessments of the building following the September earthquake. And thirdly the efficacy of any structural strengthening that had been carried out in the past and whether that had any effect on restraining the elements of the building in the February earthquake.

The witnesses, proposed witnesses are firstly Ms Elizabeth Clarke, who is the owner's representative, she's the property manager for the Church Property Trustees who were part owners of the property with the Richards Trust, and she will give evidence of the ownership of the building, her understanding of previous strengthening and events post-September.

0950

Secondly, the engineers I mentioned before Lewis Bradford. Firstly Hamish Mackinven who conducted an inspection shortly after the September earthquake and recommended repairs to 757 and saw those were completed and signed off. Craig Lewis who is a director of Lewis Bradford will also give brief evidence confirming that work and the approach to the inspections that Lewis Bradford took following the September earthquake. Then the Commissioners will hear from Stephen McCarthy, the Environmental Policy and Approvals Manager from the Council. And finally from Peter Smith, structural engineer for Spencer Holmes Limited who has conducted an independent assessment of the building failure.

The first witness, if I can move to that, is Elizabeth Clarke.

MR ZARIFEH CALLS**ELIZABETH ENGO CLARKE (SWORN)**

Q. Ms Clarke, is your full name Elizabeth Engo Clarke?

A. Yes.

5 Q. You reside here in Christchurch?

A. Yes.

Q. And are you employed as the property manager for Church Property Trustees?

A. Yes I am.

10 Q. And I think you've held that position since June 2009?

A. That's right.

Q. And I think in your written statement you've got 2010. That should be 2009?

A. Yes it should.

15 Q. Now you've got two written statements as part of your evidence?

A. Yes.

Q. One dated the 2nd of February and the other one dated the 24th of February?

A. That's right.

20 Q. Can I ask you please to read those out, the first one obviously in time, and starting at paragraph 2 on that statement and when we come to the document that, I won't get you to refer to every document but one that needs to be referred to, we will get it on the screen and you might have to pause okay? Thank you.

25 WITNESS READS BRIEF OF EVIDENCE FROM PARAGRAPH 2

A. "753–759 Colombo Street is jointly owned by Church Property Trustees and Timothy Michael Gresson, Simon James Gorman; both of Timaru, Solicitors, and Michael Allan McPhail of Christchurch, Chartered Accountant, as Trustees of the Jason Richards Trust, as shown in the
30 Certificate of Title annexed and marked "A".

CPT administers the properties of the Anglican Diocese of Christchurch through the Anglican (Diocese of Christchurch) Church Property Trust Act 2003. These properties are located throughout Canterbury and

include 753–759 Colombo Street. I am responsible for the overall administration of these buildings.

Simes Property Management (now known as Knight Frank) was engaged in 2003 to manage properties on behalf of the owners.

5 The property was originally owned by the father and two uncles of the late Jason Richards, formerly of Timaru and Christchurch and retired solicitor.

10 Following the death of Jason’s two uncles the property passed by ownership to his father, Richard [*sic*] Slater Richards, in 1961 and at this time the H S Richards Settlement Trust was formed and Henry Richards’ share was transferred to the Trust.”

JUSTICE COOPER:

15 Q. In that paragraph the second line you said ‘ownership’, it is written ‘survivorship’.

A. ‘Survivorship’.

Q. ‘Survivorship’ is correct?

A. Yes it is.

20 **WITNESS CONTINUES READING BRIEF OF EVIDENCE FROM PARAGRAPH 7**

A. “In 1977 one third share of the property was transferred to Jason Richards and his wife, the late Sheila Mary Richards.

In 1979 the H S Richards Settlement Trust transferred the Trust’s share to Pyne Gould Guinness Limited.

25 In 1995 the share owned by Jason and Sheila Richards was transferred to the Trustees of the Jason Richards Family Trust.

In 1996 the share owned by Pyne Gould Guinness Limited, now known as PGG Trust Limited, was transferred to Church Property Trustees.

30 And in 1998 Church Property Trustees transferred a one-sixth share to the Trustees of the Jason Richards Trust resulting in the current 50/50 ownership.”

JUSTICE COOPER:

Q. Was the Church Property Trustees, is that a Trust established by the statute?

A. Yes, it is.

Q. Right.

5 A. All of the property owned within the Anglican Diocese of Christchurch is held in Trust by the Church Property Trustees.

Q. Okay, I understand that, thank you.

WITNESS CONTINUES READING BRIEF OF EVIDENCE

10 A. "It appears in approximately 1992, 753 Colombo Street was identified in a "Hazardous Appendage Survey" as having a hazardous chimney, with a comment noting the building to be *"one of the worst examples in Christchurch."*

In April 1994 Christchurch City Council confirmed the building at 753 Colombo Street was an earthquake prone building.

15 Following this advice in June 1994 Powell Fenwick Consultants Limited produced a plan (entitled, *"Re-strengthening of 753 Colombo Street"*, and it's annexed and marked "B"). Although not to my knowledge I understand from correspondence from Mark Whiteside of Holmes Consulting Group (annexed "C") that the statement of Stephen
20 McCarthy's strengthening work included the installation of a new concrete frame to the front of 753 Colombo Street and steel post wall supports to strengthen the walls. Diaphragm ties to the walls and ceiling level ties to the walls were also installed on the first floor.

25 Although not to my knowledge, I understand from the statement of Stephen McCarthy that 755 Colombo Street was also strengthened in 1994, with concrete frames installed.

30 759 Colombo Street was strengthened after discussions regarding earthquake strengthening in July 1999. I understand that fire damaged the property during construction; however strengthening work was completed in the late 1999/2000. And although not to my knowledge, Hamish Mackinven's report of the 9th of September 2010 stated *"Inspection within the roof space indicates that this part of the building may have previously been seismically strengthened."* A further letter to

the Commission of the 2nd of December 2011 from Mr Mackinven noted:
*“During the inspection of the roof space of 759 Colombo Street it was noted that the roof structure consisted of DHS purlins spanning between boundary and intertenancy walls and secured to an equal angle ledger.
 5 In addition a PFC (approx 300mm deep) had been installed at ceiling level to the perimeter of this tenancy. The PFC section was on the flat indicating that it may have been installed to carry wall face loadings...”*

On the 8th of September 2010 a “walk-through” inspection was carried out on the property by Lewis Bradford Consulting Engineers, who were
 10 engaged by the owners of the property following the earthquake which occurred on 4 September 2010.

On 9 September 2010 Church Property Trustees received from the Simes Property Manager an initial structural report completed by Lewis Bradford Consulting Engineers on 753–759 Colombo Street.

15 1000

The report stated in relation to 753 and 755 Colombo Street:

*“I have not seen anything structurally that would indicate the building structure has been compromised. There is however a chimney above this property that has some cracks in it. The chimney is not in
 20 immediate danger of falling however I would recommend that it be removed in the near future. Following this inspection it would appear that structurally there is no reason this building cannot be occupied”.*

In relation to 757 Colombo Street some damage was reported:

*“There is some damage to an in situ concrete wall at the rear of the building and will require strengthening. The in situ concrete wall has
 25 also pulled away from a masonry wall and will need to be structurally tied together. If the building is currently not tenanted these works do not need to be completed immediately, however they will need to be completed before the building is re-tenanted”.*

30 Inspection of the roof space within 759 Colombo Street on the 8th of September, 2010 revealed previous seismic strengthening and the report concluded “... structurally there is no reason this building cannot be occupied”.

On the 10th of September, 2010 the Simes property manager confirmed to Church Property Trustees that both the interior and exterior of the building (753 to 759 Colombo Street) had been inspected.

5 A further structural report in relation to 757 Colombo Street dated the 8th of October, 2010 (annexed and marked "D") was completed by Lewis Bradford and recorded:

10 *"Two chimneys located on the roof of the building have suffered cracking due to the recent seismic activity. They are not in immediate danger of falling however it is recommended that they be removed as part of the repair work to 757 Colombo Street".*

Strengthening work to 757 Colombo Street was completed in October 2010.

15 The chimneys above 753 and 755 Colombo Street were removed as recommended by the Lewis Bradford reports. On the 19th of October, 2010, an invoice for the removal of the chimneys was received by Church Property Trustees and that is annexed and marked "E".

20 On the 22nd [sic] of January, 2011 the Knight Frank property manager (formally Simes) advised Church Property Trustees that following the 26th of December 2010 aftershock of a roof leak in relation to 753 and 755 Colombo Street. Repair work was arranged at the time. Copies of the emails exchanged are annexed and marked "F".

25 At the time of the 22nd of February, 2011 earthquake the property of 753 to 755 Colombo Street was leased by China New Zealand Trade Consultancy Limited and operating as a souvenir shop.

757 Colombo Street was prepared for tenancy after repair work was carried out in October 2010 following the September 2010 earthquake.

759 Colombo Street was tenanted at the time of the February 2011 earthquake.

30 On the 22nd of March, 2011 a structural inspection of 753 to 755 Colombo Street was completed. The TM Consultants' report concluded that 753 to 755 Colombo Street was not structurally safe to occupy. On the 23rd of March, 2011 a Wilton Joubert Limited report in relation to 753

to 755 Colombo Street annexed hereto and marked "G" noted the building was not safe to enter following an external inspection.

On the 23rd of June, 2011 an urgent demolition notice for the building at 753 to 759 Colombo Street was received from CERA annexed hereto and marked "H".

And in July 2011 demolition was completed of 753 to 759 Colombo Street.

The Church Property Trustees and the trustees of the Jason Richards Trust are deeply saddened knowing that a person was killed by the masonry that fell from 753 Colombo Street. It is hoped that lessons are learned from the Royal Commission enquiry that can be applied in New Zealand and worldwide to prevent similar tragedies."

EXAMINATION CONTINUES: MR ZARIFEH

Q. Thank you and can I ask you to read the additional statement now please?

WITNESS READS ADDITIONAL STATEMENT

A "The relationship between Knight Frank and Church Property Trustees. This supplementary statement of evidence is in response to specific questions addressed to me by counsel assisting the Commission. The Church Property Trustees (or CPT) had a Property Management Agreement with Knight Frank who managed CPT's commercial buildings at 753 to 759 Colombo Street and also at 67 Riccarton Road, Christchurch. Knight Frank reported to the Church Property Trustees through me, as CPT's property manager.

The Church Property Trustees own over 200 church buildings throughout the Anglican diocese of Christchurch and I am employed directly by CPT as the property manager.

757 Colombo Street was tenanted by Maclore Investments Limited.

759 Colombo Street was tenanted by City Trendy Limited.

Hamish Mackinven of Lewis Bradford inspected the building of 753 to 759 Colombo Street following the September 2010 earthquake. I was guided by Knight Frank (formerly Simes) who arranged the inspection. I

was also guided by the engineer's report after the building was inspected as to whether any further inspections or reports were necessary.

5 The inspection and report revealed no issues other than damage to 757 Colombo Street, which was remedied. Once that work was complete the building was safe to tenant.

Chimneys were removed as recommended by Lewis Bradford and as outlined in my earlier statement.

10 The Lewis Bradford engineer's report did not recommend obtaining a detailed structural engineer's report.

Following the Boxing Day 2010 aftershock I requested notification from Knight Frank by email of any damage that was caused to 753 to 759 Colombo Street. This email correspondence is annexed to my earlier statement.

15 The response detailed some plumbing damage that had occurred and repair work that was being undertaken in respect of that damage. Attached and annexed hereto and marked "A" are copies of invoices relating to repair work carried out on 753 to 759 Colombo Street for work completed after the 26th of December, 2010.

20 The building continued to be inspected after the Boxing Day aftershock by SGS and Compliance Fire Protection as part of the normal compliance testing regime. Neither company reported any matters of concern. And to my knowledge SGS are not structural engineers.

25 My understanding was that Knight Frank would have engaged an engineer if it was considered necessary in the same way that Knight Frank had organised the September inspection without any request from me to do so. I was confident that given the process for the determination of potential damage following the September earthquake applied by Knight Frank that this process would have been followed and
30 I did not need to request an engineer.

I was not aware of any substantial damage to the building. Any issues raised in the previous engineer's report from September 2010 were addressed and signed off by the engineers and the email response from

Knight Frank following the 26th of December, 2010 aftershock indicated only minor damage which was repaired.

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5 It was my understanding any further damage would have been reported to me. I expected Knight Frank to organise what they considered was necessary and I was reliant on their advice.

I understand that there was significant work carried out on 753 and 755 Colombo Street.

10 Annexed and marked "B" is a letter dated the 3rd of June 1994 from the Christchurch City Council to PGG Trust Limited advising that building consent had been granted for seismic strengthening at 753 Colombo Street.

15 Annexed and marked "C" is a letter dated the 4th of October 1994 from Powell Fenwick to PGG Trust Limited confirming receipt of an invoice, a final invoice from Mainzeal Property and Construction Limited for \$36,180.

Annexed and marked "D" is a progress payment certificate dated the 4th of October 1994 certifying Mainzeal's costs of \$36,180 for seismic strengthening to 753 Colombo Street.

20 Annexed and marked "E" is a letter and invoice from Mainzeal to PGG Trust Limited dated the 10th of October 1994 for strengthening work carried out on 753 Colombo Street with a gross total of \$36,180. The letter also refers to additional work carried out for the tenant including a wall demolition.

25 Annexed and marked "F" is a letter dated the 11th of April 1996 from Powell Fenwick to PGG Limited regarding seismic strengthening of 755 Colombo Street, enclosing a final invoice which is annexed and marked "G".

30 Attached and marked "H" is a letter dated the 18th of July 1995 from PGG Trust Limited to Mr Jason Richards enclosing a copy of accounts to the 5th of November 1994 and to the 31st of March 1995 annexed and marked "I". These accounts detail payments made by the Jason

Richards Trust in relationship to earthquake strengthening which totalled \$44,594.77. The letter notes:

5 *“... as you were aware we were forced by the Christchurch City Council to carry out earthquake strengthening at 753 Colombo Street due to the change of tenant and the improvements carried out at the lessee’s expense. As shown in the balance sheet the total cost was \$44,000 including engineer’s fees and we were able to finance the cost with interest free loans from Estate W S Richards, \$20,000, and Jason Richards Trust \$10,000”.*

10 Mainzeal is recorded as having carried out the work, corresponding with invoices sent to PGG in annexures “C” to “E”.

Given the annexed documentation regarding seismic strengthening carried out on 753 and 755 Colombo Street, it appears that Mr Smith is incorrect in his assertion that 753 and 755 Colombo Street were not
15 strengthened.”

EXAMINATION CONTINUES: MR ZARIFEH

Q. Thank you. I've got a couple of questions to clarify some matters. Firstly in relation to earthquake strengthening back in the 90s. I take it that you, the evidence that you're giving is based on either what you've
20 been told or the records you've been able to look at?

A. That's right. We've found records showing the – well I enquired first of all to Powell Fenwick to find out if they had some – the plans. We referred to them because of documents that we still have at work that relate to the building at that time, that we inherited I think.

25 Q. Okay, and so where you said for example in your first statement in paragraph 14, following this advice, that's advice in April 94 from the Council that 753 was earthquake prone, in June 1994 Powell Fenwick consultants work produced a plan et cetera. That's information you've been given by Powell Fenwick is it?

30 A. Yes, I enquired to Powell Fenwick and they found the plans and then I asked an engineer, a local engineer, to work out what was actually done

on the plans, and then we've got the copies of the receipts of the work having been done.

Q. All right, now it would appear that earthquake strengthening was carried out if that was a requirement by the Council. Is that fair?

5 A. Yes, I think at the time when there was a change of tenants there, if there was any work that had to be done for the tenancy and it had, if there was a consent required, then that would trigger the requirement to do the earthquake strengthening.

10 Q. And this not a criticism, but there was no earthquake strengthening carried out unless it was a requirement. Is that fair?

A. That's right. I think that from what I can gather with reading back on the information, it was when there was a change in tenancy, otherwise those buildings would have been tenanted.

15 Q. And that's something else I was going to ask you. It would appear that the tenancy 757 has never had any earthquake strengthening, it doesn't appear to have?

20 A. That's – I can't find any record of that either. It was empty just on the time of the September quake and for a short period, and there was repair work that was asked to be done and that was done before it was able to be tenanted.

Q. So it would be, that would be explainable by the fact that there was no change of use or no building consent required for 757 hence no strengthening required?

A. That's right.

25 Q. And presumably no thought was ever given to strengthening the building as a whole because it was, had individual tenancies that presumably would have expired at different times?

A. I think that would be right.

30 Q. On the Council file and in the material that the Commission's got before it, there's a deed of covenant. You've seen that dated 2002?

A. Yes.

Q. With the Council, does that relate to previous earthquake strengthening?

A. My understanding it relates to 759 Colombo Street.

Q. So that was done in 1999?

A. 1999 too.

Q. So the covenant in 2002 relates to the costs of that?

5 A. To that.

Q. Or some of the costs of that?

A. Yes.

Q. And I said in opening, you might have heard that 759 appears to have been strengthened after a fire or more strengthening perhaps done following a fire that was being done as part of a refit – that occurred as a result of construction work in relation to a refit?

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A. That's right.

Q. Is that right?

A. Yes.

15 Q. Can you answer His Honour's question? You would have seen that photo that was referred to of the – what appears to be attics or upstairs parts of the first storey?

A. Yes.

Q. Can you tell us about that, we'll get the photo brought back up.

20 **MR ZARIFEH ADVISED 4.10**

A. I'm not sure that –

Q. So if we look at the bottom photo and get that expanded if we can. So there's obviously the ground floor and then the first floor and then as His Honour was indicating on 757 and 759, there appears to be a floor within the first floor area?

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A. I have never – I haven't been in that building but I – looking at the reports they would be the ceiling that's referred to in the strengthening, one of the strengthening reports.

Q. Right.

30 A. And that they, to me they look like false ceilings.

1020

Q. So you don't know if they were used as such because they appear to be empty there don't they?

- A. They do appear to be empty and in the report from Lewis Mackinven, ah, from the Lewis Bradford report they've referred to looking in at the roof space and I would take that to be the roof space.
- Q. Okay, well we can hear from Lewis Bradford about that. And you also
5 heard the discussion about the chimney between 751 and 753 and reference to that older photo, the early '90s photo, that showed the chimney that appears on the party wall between the two properties.
- A. That's right.
- Q. Do you know anything about that chimney or not? Is that one of the
10 chimneys that was taken down or not?
- A. I don't think so. I think, because if you see the second photo that was brought, that you showed earlier on the chimney was down, already down. There was a photo that you showed that had...
- Q. Oh the....
- 15 A. Taken about 1990 or in 2000. The street view.
- Q. 0019.1.
- A. That chimney has been reduced.
- Q. So where were the chimneys that were taken down post-September earthquake?
- 20 A. From the report they were over 753 and 755 Colombo Street.
- Q. But you're not sure where.
- A. No I'm not sure exactly where but they were removed.
- Q. Okay well perhaps Lewis Bradford can help us with that. Okay the other issue I wanted to talk to you about was following the September
25 earthquake. Now as I understand it you didn't engage Lewis Bradford directly but Knight Frank engaged them as –
- A. That's right.
- Q. – as presumably you would have expected them to.
- A. Yes. They've always, as long as I've been in my job, they've always
30 managed this property and they did just go ahead and organise the inspections. They organised the work to be done and they would copy me in on the information. One report they gave me they just said that an inspection had been completed and I asked them if it was both an

internal and an external inspection and they came back and confirmed that it was both but they just continued on and did all the work.

Q. So effectively they ensured the work was done and you were copied in with emails and reports.

5 A. That's right.

Q. Did you have any direct contact with Lewis Bradford or not?

A. No, none whatsoever.

Q. But you were aware, firstly, that they inspected the building 8 September and they reported, I think, by email and then in a written
10 report?

A. Yes.

Q. And then that the damage that they had recommended be repaired to 757 was completed.

A. Yes.

15 Q. And –

A. I was aware that that had to be completed before it could be tenanted and that was done.

Q. And that, I think, effectively that ended Lewis Bradford's engagement with the building?

20 A. Yes.

Q. In the report from Lewis Bradford of the 8th of October that you referred to, I'll just get that brought up or perhaps the first page. It's 0011.40. That's a letter addressed to Church Property Trustees. That's the letter you're referring to.

25 A. Yes.

Q. And it's essentially a written report following the email report that you got of the 9th of September.

A. That's right.

Q. You'll see under 'Scope of Work'. Well firstly you see under the first
30 paragraph they refer to it as a brief walk-through inspection. Were you aware of the nature of the inspection or the level of it?

A. Not, no, no I don't, I think I just, most of the buildings that I was aware of at the time there was an initial walk-through inspection and then if they

recommended that there be a further inspection then that would have been done.

Q. And I think, to be fair, this is a report that is really on 757.

A. Mmm.

5 Q. 'cos that was the only one they found a problem with.

A. There was any damage to, yes.

Q. If you look at the next page - .41 – under 'Conclusion', it reads:

"Apart from the points raised above there are no apparent structural issues with this building which appears to be in good condition for its age".

10

So presumably when you got that, assuming the work was done –

A. It didn't make, it didn't trigger anything in me to actually ask for a further detailed inspection report.

Q. Which is what you said in your written statement.

15

A. Yes.

Q. You see under 'Limitation' it says:

"It is important to note this report is based on a visual walk-through inspection of the building only. It is possible that there are unobserved issues that may require future remedial work. Such issues should be brought to the attention of the undersigned".

20

When you read that what did you take from that?

A. That if there was any other damage that was reported to us or any other damage that had been found then we would have gone back to Lewis Bradford or to an engineer and had it investigated further.

25

Q. And so if Knight Frank or any of the tenants had brought to your attention damage that appeared to be structural in nature, what would you have done?

A. If it was structural we would have engaged an engineer to do another report on it.

30

Q. And the email report that you received that you referred to in relation to the other three tenancies. I'm not talking about 757. As you've indicated, contained the wording 'following this inspection it would appear that structurally there is no reason this building cannot be occupied', correct?

A. That's right.

Q. And when you read that, what did you take that to mean in relation to the inspection in the building's structural integrity?

5 A. That structurally the building was fine and that it wouldn't have been, it was no, it wasn't damaged in any way as a result of the earthquake in September. That structurally it was fine for the people to continue to be working in there.

Q. So we had the aftershock on Boxing Day.

A. Yes.

10 Q. And you've said in your written statement that following Boxing Day or sometime in January I think, you had some contact with Knight Frank?

A. That's right. I emailed them and asked them what, if there had been any damage and what that was to the building.

Q. And the damage that you were told about was?

15 A. There was some minor plumbing and a piece of flashing on a parapet between 751 and 753 had to be replaced.

Q. And that work was carried out?

A. Yes it was carried out. Knight Frank had already engaged people to do the repairs.

20 Q. Did you give any thought at that stage to getting an engineer in to inspect?

A. At the time I was reliant on Knight Frank and their advice and if they had suggested to me that they thought it needed an engineering report completed that would have been fine. But I also would have expected that they would have just done it automatically if there had been any damage and they believed there needed to be an inspection, in the same way as they did post-September.

Q. And were Knight Frank being notified by tenants of damage?

30 A. Yes my understanding is that the tenants advised them of any damage and they acted on that.

Q. Okay so that's, in fact, how the plumbing and the flashing came to light.

A. Yes it was.

Q. And, as you say, that was repaired early –

A. Straight away.

1030

Q. And the two chimneys that had been recommended to be removed. Your understanding is that they were removed. You referred to an invoice for that.

5

A. Yes they were definitely removed. There is an invoice that shows clearly that the two chimneys had been removed.

Q. You mentioned the building continued to be inspected by SGS and Compliance Fire Protection. Is that two separate entities?

10

A. Yes they are.

Q. And just tell us about that. Was that regular inspections?

A. Yes the building Knight Frank engaged both SGS and Fire Compliance for building warrant of fitness inspections. They're completed quarterly and then at the end of the year or the end of a year there is a building warrant of fitness is signed off and they sign off those certificates. So it's for council compliance, it's looking at escape egresses and things.

15

Q. All right. So it's some kind of walk through the building inspection?

A. Yes.

Q. It's not as you said structural engineers?

20

A. No.

Q. So it's not damage inspection necessarily but –

A. No but I think that if they had seen any damage they would have reported that to Knight Frank.

Q. When was that inspection following Boxing Day, do you know?

25

A. I don't know exactly when it was but there was an inspection by SGS between December and –

Q. So between Boxing Day and the February earthquake?

A. Yes.

30

JUSTICE COOPER:

Is there an invoice?

MR ZARIFEH:

I think there is an invoice from SGS. It says for the month of January and February, 2011 then unable to inspect for March due to the building being inside the cordon. February inspection completed 9/2/11. So 9 February prior to the earthquake of February 22.

5

JUSTICE COOPER:

There's also an email which refers to the plumbing work at suffix 1.16 I note.

MR ZARIFEH:

10 Yes sir.

JUSTICE COOPER:

Which is dated the 26th of January the work had been completed by then.

CROSS-EXAMINATION: MR ELLIOTT

15 Q. Ms Clarke, Marielle Falardeau's family have some questions about the building, many of which you have answered in the detailed evidence that you've given so far, and thank you for that. I'm just going to ask one or two further questions about the inspection of the building in the period following the 4 September 2010 earthquake. The buildings were
20 green stickered, is that right?

A. Yes.

Q. Did you see the green sticker?

A. I don't think I did. I don't recall seeing the green sticker. I was advised by Knight Frank that there was, that the building was green stickered. I
25 don't recall seeing it. I may have. They may have sent me a copy of it but that's all I can say.

Q. You're the property manager for the trust are you?

A. Yes for the Church Property Trustees, yes.

Q. You're managing about 200 properties?

30 A. Yes.

Q. Did you ever see a green sticker after 4 September?

A. Yes I did.

- Q. I'll just refer you to that document ENG.CCC0002F.78. I take it you've read a green sticker after the 4 September –
- A. I've seen them, yes.
- Q. Just note that the sticker, the placard says at the top: "*This building has received a brief inspection only*" and then further down "*Owners are encouraged to obtain a detailed structural engineering assessment of the building as soon as possible*". So following the 4 September earthquake you're aware of that encouragement from the council?
- 5
- A. We had, Knight Frank did engage an engineer and the engineer, everything they recommended was completed. If the engineer had then encouraged us to do a further engineering assessment we would have done that.
- 10
- Q. Just call up the first email from the engineer which is BUI.COL753.0011.37. Highlight the bottom section please. This is the email that you've referred to in your evidence from the engineer reporting on their inspection, is that right?
- 15
- A. That's right.
- Q. Do you see there it says: "*I have completed a brief structural inspection of the buildings*"?
- 20
- A. Yes and following the page after that which is in front of me they've said that it would appear that structurally there is no reason why the building cannot be occupied.
- Q. So if we could highlight the next page please .38, the top section please?
- 25
- A. That's...
- Q. You're referring to the passage there in relation to 753 anyway. It would appear that structurally there is no reason that this building cannot be occupied.
- A. That's right.
- 30
- Q. Although wouldn't it have been evident to you that that conclusion was based upon a brief structural inspection?
- A. That's right. At the time we were engaging engineers, well not just us but everyone in Christchurch, were engaging engineers to do everything

they could and it was initially they would be looking at brief structural and then looking for any damage and if there was any evident damage that was evident then they would be engaged to do further, further engineering reports. I think, well that's all I can say really. They were very busy the engineers.

5

Q. Mr Zarifeh has referred to you the letter from Lewis and Bradford dated 8 October 2010 which is, if that could be brought up again please. WIT.CLA0001.13 of my reference. See the comment in the third paragraph under the heading "Scope of work"?

10

A. Yes.

Q. "This inspection is by no means exhaustive". And Mr Zarifeh has also referred you to the comment, "*The limitation that the report was based on a visual walkthrough inspection*". This was the last report from the engineer to the trustees is that right?

15

A. Yes I think so.

Q. So it would have been evident to you that the first report was based on a brief inspection and the second report was by no means exhaustive and subject to limitations?

A. Yes.

20

Q. And then no further inspection was carried out following the Boxing Day aftershock, is that right?

A. That's right.

Q. So the question really is, in light of those references in the report and the council's encouragement in the green placard, why no detailed inspection was ever enlisted.

25

A. I think that again I can say that the work that was done, anything that was identified that had to be completed or had to be repaired or strengthened the work was done. If they had identified anything to indicate that there had been any further damage we would, it would have been prioritised and it would have been completed.

30

1040

Q. And secondly and finally, more general question that the families of those who died have almost unanimously expressed a desire that

- 5 lessons have been learnt from what happened as we move forward and these hearings in the Royal Commission have shown a difference between these more brief damaged based assessments and more detailed assessments of buildings which can show the capacity of the building to withstand earthquakes. You mentioned that the Church has 200 buildings throughout Christchurch?
- A. Throughout Canterbury. the Diocese spreads from the West Coast up to Cheviot and down to Waimate.
- Q. Would they include unreinforced masonry buildings?
- 10 A. Yes.
- Q. Have the trustees enlisted detailed engineering inspections of those buildings?
- A. Some of them. Are you talking about following September or –
- Q. Following February?
- 15 A. Following February. We're continually working with engineers. We've already had to demolition about nine buildings. We are working with the engineers. We've done – we do initial engineering reports and then do further repair and strengthening engineer's reports. They're not being treated in anyway indifferently to how this building was being treated,
- 20 but the work is continuing to be done and at the moment we're not going to have repairs and strengthening reports completed for months because there aren't enough engineers out there to do everything at once. But the minute we know that a building is less than 33 percent now, we – it's no longer occupied, but as you say, I mean there's
- 25 lessons that have been learnt and in hindsight there's a lot of things that we possibly would have done differently.
- Q. So are potentially dangerous building cordoned off at this point until detailed inspections are carried out?
- A. If there's a building that we're aware of that is less than 33 percent of
- 30 the current building code, we ask that that is not tenanted. Just recently we closed the Timaru Church because that was a determination there, the main church in Timaru.

Q. And that awareness of its – the extent to which it complies with code is based upon an engineer's advice. Is that –

A. Yes.

CROSS-EXAMINATION: MR LAING

5 Q. Good morning Ms Clarke, just one point of clarification. Could I ask you to go to paragraph 23 of your first statement of evidence. My question for you relates to the use of the word 'strengthening work' in paragraph 23. You say that strengthening work to 757 was completed in October 2010. Now could you just clarify for me which work you are referring to?

10 A. I'm referring there to the work that the engineer asked – was done on 757 Colombo Street as a result of the earthquake.

Q. Yes, now would it be helpful to go back to your paragraph 19 and you quote there from the initial Lewis Bradford report I think. Is that the work you're referring to, it says there are some damage to an in situ concrete wall at the rear building requires strengthening. Is that what you're referring to?

15 A. Yes it is.

JUSTICE COOPER:

20 Q. Just on that last point, if we could have a look at WIT.CLA0001.13.

WITNESS REFERRED TO DOCUMENT

Q. This is the actual – this is a later piece of advice than the one to which Mr Laing has just referred you. Is that correct?

A. Sorry, I'm not –

25 Q. Well this is a letter dated the 8th of October?

A. Yes.

Q. The quotation at paragraph 19 to which Mr Laing referred you was I think advice that you received on the 9th of September.

A. That's right, it was in their earlier report.

30 Q. Yes, so on the 8th of October there was advice focused in relation to 757 Colombo Street.

A. Yes.

Q. And in that at the bottom there's a heading 'structural damage'. You see that?

A. Yes.

5 Q. And there's a recommendation for repair work there, and then over the page there are two further paragraphs under the same heading, separation has occurred and two chimneys on the roof. Do you see those two paragraphs?

A. Yes.

10 Q. So that slightly more comprehensive recipe for repair work, was that the one that was actually, were they the repairs that were actually carried out?

A. The repair work, the report, this report on the 8th of October, shows that they recommend that the – the chimneys removed and that was done, and then the repair work that they've suggested is to be completed was
15 also done.

Q. Right, so the work that was carried out was the work identified in this letter of the 8th October. Is that correct?

A. Yes, yes.

RE-EXAMINATION: MR ZARIFEH

20 Q. Just one question. Ms Clarke, I take it from what you said to Mr Elliott that you were relying on Lewis Bradford Engineers when they reported that the building was safe to occupy and that there were no structural problems with it?

A. That's right.

25 Q. Were you aware of the level of inspection, what was actually done or where in the building the engineer went?

A. I haven't spoken to the engineer myself. I would have known, so I wasn't aware that where exactly he'd been and it had been – I would have assumed that he had inspected the building and reported on any
30 damage.

COMMISSIONER CARTER:

Q. Just clarification of the percentage below which you – of strength below which you ask your building not to be tenanted, is that 33 percent?

A. Thirty-three percent following the February earthquake. Anything under 33 percent we now ask everyone to move out.

5

WITNESS EXCUSED

MR ZARIFEH CALLS**HAMISH DAVID MACKINVEN (AFFIRMED)**

Q. Is your full name Hamish David Mackinven?

A. That is correct.

5 Q. And you have a Bachelor of Engineering with Honours in Civil engineering?

A. I do.

Q. And you're a member of IPENZ?

A. Correct.

10 Q. And you've got the qualification of Chartered Professional Engineer?

A. That is correct.

Q. And I think you've had over five years' experience working as a structural engineer?

A. Yes.

15 Q. Now I just think the best way for you to give evidence is perhaps to refer you to a document that we've got in front of us, and I don't know if you've got a copy. It's a letter from yourself and Craig Lewis, director of Lewis Bradford dated 2 December 2011. Do you have that in front of you?

20 A. I do have a copy here.

1050

A. I do have a copy here.

Q. I just wonder if I can get you to read that, starting at paragraph 2, and we'll stop and refer to documents and photos when we get to the
25 appropriate point?

WITNESS READS LETTER

A. Okay. "Lewis Bradford Consulting Engineers were engaged by Andy Bell on 6th of September 2010 on behalf of Simes Property Management (now Knight Frank) to carry out visual structural inspections on buildings
30 managed by Simes to determine if they were safe for the building tenants to occupy. An email report was provided on 9th of September," it reads 2011, it should in fact be 2010, "outlining that apart from 757 Colombo Street the remainder of the building was safe to occupy. This

ended our engagement with Simes with regards to this particular building.”

JUSTICE COOPER:

- 5 Can I just ask you to pause there? Just for the record can I record that the witness is reading from document BUI.COL753.0012.1.

EXAMINATION CONTINUES: MR ZARIFEH

- Q. Now if I can just get you to refer to that email please which is 0011.37? So you can see at the bottom there it contains your email from yourself
10 to Andy Bell of Knight Frank?
- A. Correct.
- Q. Or Simes as it was then, and you reference at the bottom of that page to having completed a brief structural inspection –
- Q. Correct.
- 15 Q. - of the four tenancies in that building?
- A. That's correct.
- Q. Can you tell us firstly what, was there any definition of a brief structural inspection in the engineering fraternity?
- A. Not that I'm aware of. We did, as a company, sit down on the Monday
20 and discuss our approach to these inspections.
- Q. That's Monday the 6th of September?
- A. Monday the 6th, that's correct.
- Q. And how is that relevant to the definition of –
- A. Basically from that was to carry out inspections on these buildings,
25 looking both internally and externally at them and observing the damage that has occurred.
- Q. So you've said that Simes Property Management wanted you to inspect the buildings to determine if they were safe for the building tenants to occupy?
- 30 A. That's correct.
- Q. So that was essentially their concern?
- A. Yes, that's correct.

Q. And you're aware of level 1, level 2 assessments, rapid assessments that were being carried out on behalf of the council?

A. I am.

Q. How would you place the inspection that you carried out of this building?

5 A. I'd actually place it higher than a level 2. With this building I inspected both the interior and exterior of the building. I also went out onto the canopy to inspect the front façade and I also climbed up on the roof to inspect the roof structure, obviously noted in previous evidence that there was two chimneys up there and to also look at the front façade from the roof level. And then the following day due to lack of access to
10 the tenancy at 757 being unoccupied we had to go back and inspect that part. I, at that point, I actually inspected the front façade from the opposite side of the street with a pair of binoculars and again climbed back up on the roof just to confirm again to check that front façade and to check the roof structure.

Q. So firstly how many hours do you think that you would have spent at the building or (inaudible 10:54:21)?

A. Well I actually reviewed my time sheets. On the 8th I spent approximately two hours at the building, and then again on the 9th when
20 I returned to inspect 757 and that re-inspection front façade I spent approximately an hour and a half at the building.

Q. You didn't look at plans for the building?

A. I did not look at plans for the building and at that stage, as I understood, no plans were actually available from the council due to damage to their
25 storage facilities.

Q. Did that affect or hinder your inspection in your eyes, at all?

A. No I don't believe it did. We were looking for damage that had occurred to the structure and whether that damage had diminished the capacity of the structure as to how the structure was on the 3rd of September.

30 Q. So just on that, we've heard a lot of engineers before the hearing before the Commission talk about the tests that they apply and that it was essentially a damage based test. So they weren't analysing the capacity of the building or the strength of the building, they were simply looking at

the damage and determining whether that damage had affected the structural integrity of the building, so was it compromised from its pre-4 September level?

A. That's –

5 Q. Is that the test you apply?

A. That was the test that I was applying because on, and our approach was that on the 3rd of September that that was in a state that was safe to occupy. The damage that was observed was minor in nature and did not diminish the capacity of that structure.

10 Q. Has that, your thinking, changed post-February earthquake in relation, just in relation to that test?

A. Yes it has in that that now you are more looking at what is the capacity of that structure? Is it potentially earthquake prone and that?

Q. So more of a risk-based test?

15 A. Yes, but there is still nothing to say that the building that's undamaged and below 33% can't be occupied.

Q. Again, the damage based test?

A. Mmm.

20 Q. And I've probably jumped ahead because I think in paragraph 4 you come to describe what you did with the binoculars but you've raised it now. What's the purpose of looking at the façade with binoculars?

A. My approach was that you are looking at something that is two and a half storeys up and I wanted to be sure that there was no damage to the front façade.

25 Q. Right.

A. Because that is risk of that falling off and my approach was to use binoculars and to give a good look at that façade.

Q. And so in that email looking at the next page, .38, 0011.38, you itemise the four tenancies, or set out the four tenancies?

30 A. That's correct.

Q. And 753, "I've not seen anything structurally that would indicate the building structure has been compromised," and then you refer to the

chimney above probably has some cracks in it and recommend that it be removed?

A. Correct.

5 Q. "And following this inspection it would appear that structurally there is no reason the building cannot be occupied." So that deals with the safe to occupy issue that the Simes were asking you about?

A. That's correct.

Q. The chimney, you've probably seen the photos that we're referring to earlier?

10 A. Mhm.

Q. Can you describe where that chimney was if we get the photo brought up?

A. I think there's actually a plan view that you showed at the start would probably give the best view and indicate where those chimneys were.

15 Q. Okay. That's 0004.3. I don't know if it's on there, but do you mean the aerial photo?

A. The aerial photo I think showed –

Q. I'll get it brought up. That one?

A. That's correct.

20 Q. Mr Elliot's referred me to perhaps a better one, Sir if we can bring that up?

A. Okay.

Q. It's an aerial photo, 0017.9. This is attached to I think Mr Smith's report. 0017.9. Is that better?

25 A. That's better. Can I use the mouse?

1100

Q. Yes, once it's enlarged thanks. Is it on?

30 A. The mouse is turned on yes. So the chimney that's been referred to and shown in previous photos has been the chimney at 751 and that, now it isn't a common party wall. There's actually two separate walls between the two buildings. That chimney was removed or had prior to my inspection had been removed basically down to roof level.

Q. As we saw on one of the photos?

- A. That's correct. The two chimneys I'm talking about is this particular chimney just here which is between on the common tenancy wall between 753 and 755, then there is another chimney up in here underneath this square box between 753, sorry 755 and 757 and those
5 are the two chimneys that I'm referring to.
- Q. Okay.

JUSTICE COOPER:

- Q. So the first of those chimneys just for the record is sort of two thirds of
10 the way back from, away from Colombo Street?
- A. That's, I'd actually say it's roughly halfway past the doorway, the building comes back to here.
- Q. Does it?
- A. Yes.
- 15 Q. I wasn't sure about that because of the colouring so it's halfway of the building length back from Colombo Street?
- A. That is correct.
- Q. And the chimney that we were looking at before between 751 and 753 you said it wasn't a party wall, it was two separate walls so is that
20 chimney any part of 753 or not?
- A. It was difficult to tell because of the chimney had actually stepped out from the wall between or the wall of 751 and because of roof flashings it was difficult to tell if that somehow impeded or encroached into 753.

25 **JUSTICE COOPER :**

- Q. But the chimney was serving, there was a, to the lay guy anyway. There was a chimney?
- A. Yes correct.
- Q. Serving two properties.
- 30 A. Unsure. I don't know if there was any indication it was serving two or whether I know there was two chimney pots at the top that may be related to the first floor and ground floor of 751. I did not see any indication that it was serving 753.

EXAMINATION CONTINUES: MR ZARIFEH

- Q. And the chimney was on the what appears to be a party wall but perhaps there's two walls?
- A. That's correct.
- 5 Q. Alright so 753 subject to your comments about the chimney was structurally safe. 755 again you referred to a chimney above this property had some cracks in it, recommend it be removed and again following this inspection there's nothing that would appear to be structurally no reason it can't be occupied?
- 10 A. Correct.
- Q. 757 you recorded that there was some damage to an in situ concrete wall of the rear of the building that would require strengthening. The in situ concrete wall has also pulled away from the masonry wall and will need to be structurally tied together. The building is currently not
- 15 tenanted. These works do not need to be completed immediately however they will need to be completed before the building is re-tenanted.
- A. I think don't I refer to repair/strengthening?
- Q. In the email?
- 20 A. Yes.
- Q. Sorry we'll get it brought back up 0011.38.
- A. No, you are right, I do say strengthening.
- Q. All right but it was essentially referring to repair work that had to be done?
- 25 A. That's correct.
- Q. I was going to ask you we'll come to that repair work in a moment but was that repair work strengthening the building or that part of the building or simply repairing it back to its previous state?
- A. It was simply repairing it.
- 30 Q. And 759 there was no indication of any structural problems?
- A. No there wasn't.

Q. And you noted there that when you were in the roof space you could see indications that the building may have previously been seismically strengthened?

A. That is correct.

5 Q. So did you see any indications in relation to the 753 and 755 of previous strengthening?

A. I did not any indications of any previous strengthening.

Q. All right and would that be unusual in terms of the level of inspection if you didn't look behind linings or things like that?

10 A. No a lot of times the strengthening works are hidden behind wall linings, ceiling linings and are not obvious or immediately obvious.

Q. Right. Alright now sorry back to your letter 001.21 you were about to read the second paragraph that was in paragraph 2, paragraph number 2.

15 A. So that's the Lewis Bradford?

Q. Yes.

WITNESS CONTINUES READING LETTER

A. "Lewis Bradford was subsequently engaged for Ivan Hatton of Hawkins on 7th of October, 2010 to provide a report for 757 Colombo Street
20 outlining the structural damage to the building and required repairs. These are repairs completed by Barry Nuttridge from Hawkins on 21st of October, 2010 and a letter report was provided to Ivan Hatton on the 26th of October, 2010 (this is incorrectly dated 8th of October, see attachment A) that the repairs had been completed to a satisfactory
25 standard and that 757 was now safe to occupy. This ended Lewis Bradford's involvement with Hawkins and this building.

EXAMINATION CONTINUES: MR ZARIFEH

Q. Alright now can we get that report brought up please? And it's 0011.40. That's your letter?

30 A. That's correct.

Q. And it's the report as it says only on 757?

A. Correct.

- Q. And it says under scope of work in the third paragraph *“This inspection is by no means exhaustive and is not intended as a pre-purchase inspection”*. What do you mean by that?
- 5 A. Well meaning that it’s not exhaustive. There may be unobserved damage within the building. Obviously that’s only a visual inspection. It wasn’t involving moving of linings and that. I guess the “not intended as a pre-purchase inspection” was a carryover from I was carrying out other inspections and pre-purchase inspections for home owners. A carryover shouldn’t be in this report.
- 10 Q. Okay. But the level of inspection that you’ve described, the level two plus if you like, that was what you applied to all four tenancies when you inspected the building wasn’t it?
- A. That’s correct. 759 I did actually look up in the roof space as they had a suspended ceiling which enabled me to look up in there. I don’t, I did
- 15 not look up in the other ceiling spaces and that is most likely due to lack of access.
- Q. Okay. Just on that ceiling space issue. You’ve seen the photo that we were referring to?
- A. Correct.
- 20 Q. I can get it brought up if you need to, but can you tell us about, you only looked up in 759 you said.
- A. That’s correct.
- Q. Was that that ceiling space that we saw in the photo?
- A. Yes that’s correct. So there is effectively there’s two storeys and there’s
- 25 quite a large ceiling space above that so where you’re sort of talking in and Your Honour was talking about another floor area was actually the top of the ceiling and that was the ceiling structure and then there was a large space, the actual roof structure and which came to the top of the front façade.
- 30 Q. Right and if we look at that photo 0004.10, the bottom photo. Can you just indicate once we’ve got that expanded with your mouse so we’re clear what you’re talking about?

A. So obviously the tenancies, as we've previously talked about 753, 55, 57, 59, here is basically the ceiling line running through and we can see the original, possibly the original timber roof structure through these two tenancies and then we can see in here the strengthening works that

5

1110

Q. Just indicate, what were they?

A. Basically from my observations this was a what's called a steel parallel flange channel or a PFC and it laid on the flat which means its basic, it is put in to carry what are called face loadings and then to transfer them into the perpendicular walls. In addition there were steel purlins across the building –

10

Q. You're indicating a building on the face of –

A. So there's a steel purlin running across between the boundary wall and the inter-tenancy wall and then these steel channels were round at the ceiling level.

15

Q. Right and how were they tied to the façade?

A. From my observations these steel channels were basic Chemset anchor bolts into the façade and then down the side walls.

20

JUSTICE COOPER:

Q. That space is high enough to stand up in I take it.

A. Yes you could stand up in that space.

Q. And were you, did you go into the same part of any other of the four tenancies or...

25

A. No I did not and most likely it's due to lack of access.

Q. And was it empty?

A. The space that I observed in 759 was empty.

Q. Historically its function would have been as a storage area do you think, or would there not have been enough strength in the floor or the ceiling I should say.

30

A. I guess hard to say without having seen the structure in the other tenancies. Certainly in 759 with the suspended ceiling you couldn't store anything up there.

5 **COMMISSIONER CARTER:**

Q. Was there permanent stairway access to that space or did you have to go up in a ladder or something?

A. I believe I clambered up on some piece of furniture that was there and due to the suspended ceiling being lower you could quickly get up.

10 Q. So I would interpret your answer to say that there wasn't any form of permanent access to get into that space.

A. No there was no permanent access to those spaces.

Q. And just looking at the photograph again and that parallel flange channel, or PFC in your report, that you observed in number 759, is that
15 correct?

A. That's correct.

Q. Would you think that that would have restrained that part of the façade because it looks as if that's the level at which the building broke apart?

A. Given, given the evidence here of where that front façade has broken
20 away from, quite possibly.

Q. And so, indeed, the façades of the other tenancies were also still intact below that ceiling line level.

A. That's correct.

25 **JUSTICE COOPER:**

Q. Can I ask just if you would compare the appearance of the window surrounds in 759 with those of 757. What's the explanation for the lighter colour of that part of the structure in 759?

A. I believe if you look at the police photos that were taken that's actually
30 plywood lining that has possibly been put on as an internal lining of some sort so that's hence the lighter colour.

Q. Can I just, Mr Zarifeh, whilst we're on this subject ask for the photograph 19.1 to be displayed. I'm not sure when it was taken, possibly 10 years

earlier or even more. I was trying to look at the car number plates but I couldn't really see them but what I'd like to know is if, the top of the building, well that tells us not much. Just go back. I'd just, looking at the top of the building there, was that as it was in October/September 2010?

5 A. So that there is the same as what I observed in September 2010.

COMMISSIONER CARTER:

10 Q. So the upper part of the façade of 759 has fallen away to expose that light coloured lining material that we saw in the after collapse pictures. Is that your -

A. So that was to 757 in that there was that light coloured and I believe that that's, there is a photo of the police photos that it appears to be plywood that may have been put on the inside as inside lining internally.

15 Q. And so we've had more of the façade is broken away in that tenancy than in the ones adjacent?

A. Correct.

JUSTICE COOPER:

20 Q. So the triangular part of the structure on 755. That was there in September 2010?

A. That's correct.

Q. And the height of the façade was the same as shown in this photograph.

A. What isn't show here is the roofline actually comes up to the top of the façade.

25 Q. Right, that's what I think I was –

A. So there's no actual parapet above roof level, apart from a small area on that triangular piece at 755.

30 Q. So if we go back to the photograph which is 4.10 that, what I described as the triangular part of the façade at 755 must have, to some extent, been higher than the roofline that we now see once the earthquake's done it's work?

A. From memory it extended possibly 3–400mm above.

Q. Well if we got back to 19.1 you can see a line running above 757 and 759 and disappearing behind that triangular aspect and then continuing over 753.

A. Correct.

5 Q. There's only 3 or 400mm that has marked the –

A. I think this photo is deceptive in that in the angle it is taken.

Q. Because of the angle.

A. Yes, correct.

Q. Right okay.

10 A. So that triangular piece did not extend that far above the actual roofline.

Q. It's the angle's accentuating or exaggerating the difference.

A. Correct.

COMMISSIONER CARTER:

15 Q. And while we've got those photos on the screen the left-hand one shows quite a high wall up above the roofing which you described as a separate wall separating 751 and 753.

A. That's correct.

20 Q. And so that is an unrestrained wall of some height that did not show any signs of –

A. No during my inspection to get onto the roof of 753–759 I had to actually clamber up the back of 751's fire escape and when I was there I saw damage to that building so I went and talked to the tenants and they showed me through the building and 751 had actually, in fact, been
25 seismically strengthened.

Q. It may have been holding on to the wall of 753 then seeing that wall which is quite a high wall did not come –

A. It is quite a high wall but the roofline actually comes to the top of that wall and there was strengthening works on the inside of 751 providing
30 restraint to that wall.

Q. If it was a completely separate wall would it have been attached to the wall of 751 or tied to it in some way?

A. This particular high wall that we're seeing here is 751's, so where the wall extends above the roof I believe that's actually 751's wall.

Q. Oh okay, I follow, so the separate wall for 753 terminates at the roofline of 753.

5 A. Correct, correct.
112000

Q. I follow, so the separate wall for 753 terminates at the roof line of 753?

A. Correct.

Q. Okay that's clear.

10

JUSTICE COOPER:

Q. I hadn't understood that either. I had thought that you had said earlier that there were two walls there and one, alongside each other.

A. Yes.

15 Q. One belonging to 751, one belonging to 753, for their full height?

A. No, sorry, 751 goes to the full height as seen by the photo on the left. 753 just goes to roof level.

Q. Because I couldn't understand the point of that from the point of view of the developer, 753. It's of interest to us however that it is from what we've seen in other cases that it is unsupported on the 753 side and yet intact after the earthquake.

20

A. But that wall, what, had internal strengthening to it.

Q. Yes. Well it's an interesting example of the efficacy of such works.

EXAMINATION CONTINUES: MR ZARIFEH

25 Q. Did you actually inspect 751. You said you'd talked to the tenants and had a look?

A. I talked to the tenants. I had a brief look through in that, and I had some concern, with some of the cracking I had observed on the back of that property. I spoke to the actual building owner and raised my concerns with him in that, and he said he was going to get his engineer back to have a look at that damage.

30

Q. Do you know what strengthening had been carried out or not?

A. All I can remember is seeing PFC channels once again on the flats when I walked up the stairwell area.

Q. Because after the February shocks show the façade almost intact don't they, seemingly intact?

5 A. That's correct, yes.

Q. And that wall as you've described?

A. Yes, correct.

JUSTICE COOPER:

10 Q. Sorry Mr Zarifeh, but just while this photo's up. The strengthening works that you've described to 759. You considered that they could have had an effect of generally strengthening the building or the other tenancies to the south, because one can't help but observing that the transverse walls marking the boundaries between all four parts of the building appear to have also withstood the earthquake?

15

A. Potentially, because the way when I inspected this building and viewed it, I viewed it as one structure. I did not view it as four separate structures.

Q. Yes.

20 A. To me it is one structure in that, so any work that you do on one tenancy, will provide or potentially provide some supports to those other tenancies.

Q. But one has to take into account the direction of the shaking as well.

A. Correct.

25 Q. But in other cases we've observed that whilst shaking in one direction may have predominated there was definitely shaking in the other direction as well.

A. Yep.

EXAMINATION CONTINUES: MR ZARIFEH

30 Q. I was just thinking there's a photo in terms of the height of the façade that Your Honour was interested in, 0011.4. One of the 1991 photos that was looking from the roof in the middle of the building, and that might

assist with the height of the building. Is that the peak that we can see in the middle of 753 to 759?

A. That is correct.

Q. From the roof?

5 A. Correct.

JUSTICE COOPER ADDRESSES MR ZARIFEH

You're looking at the top photo.

10 **MR ZARIFEH:**

Top photo yes Sir.

JUSTICE COOPER:

Can that be expanded? Well again that looks like more than 400 millimetres to me but again you'd say it was the angle we were looking at? It's a question of whether you're trained as an engineer or a lawyer I've just been told.

15

EXAMINATION CONTINUES: MR ZARIFEH

Q. Well back to your report of 8 October, on 757. I just wanted you to describe to us if you can the repair work that was done on 757 and there are some photographs that we have. I don't know if you've got any others but if they assist in that description?

20

A. Are you putting those photos up?

Q. We can do, I'll get you to start describing it and then –

A. So in 757, like the rest of the buildings, bits have been added on and that over time. When I carried out my initial inspection on, when I went through 757 on the 9th, it appeared to be what looked like a concrete frame that had cracked under what's called flexure. So basically the frame rocking over and getting flexural cracks within that frame. My reasoning for believing that it was concrete was that due to the surface finish and that on it, I did note that these cracks had previously been plastered indicating that they were to a certain degree existing that may have opened up during the earthquakes. When we started into the

25

30

repair works and started removing some of that plaster finish to the outside, we actually found that it was brick or unreinforced masonry with a concrete lintel and basically the cracking that had actually occurred was along the mortar lines to that unreinforced masonry.

5 Q. So was that an indication of the strength of the mortar?

A. That is an indication of the strength of the mortar in that, and we basically raked out that mortar, replaced some bricks with a new cement based mortar.

10 Q. So this is, just so we're clear which wall. Is this the rear, the western wall of the 757? The back wall?

A. Not the exterior wall. At the back of 757 there was a small room, it was probably two metres to two and a half metres in length and basically it was the internal wall to that room where the cracking had occurred.

Q. So was it a structural wall?

15 A. I do not believe so, given the door openings and window openings that are adjacent to this area where the cracking had occurred.

Q. All right, nevertheless you directed that it should be repaired?

A. Yes I did, because initially we were believing that it was actually a concrete frame.

20 Q. And I think, I'm correct, there's a photo 0011.42.

WITNESS REFERRED TO PHOTOGRAPH

A. That photo that's shown is actually the cracking to one of the chimneys on the roof.

Q. Right.

25 A. And I'm just indicating some of the I guess red brick dust at the crack location.

Q. So is that the one of the two that you were concerned over?

A. That's correct.

30 Q. And I think let's have a look at the others while we're here, 43, the next page is obviously a chimney.

A. That's correct.

Q. Needs to be turned around, but that's a chimney?

A. That's correct.

Q. And 44, is this the wall that you're referring to?

A. Yes, that's the wall that I'm referring to.

Q. And the cracking?

A. That is correct, that's cracking.

5 Q. And the concrete lintel, was that where the cracking is, or what appeared to be the concrete lintel?

A. So the concrete – when initially looking at this, this is all plastered so it appeared like concrete, but the concrete, once we opened up the concrete lintel came through to about here, and there's another crack
10 you can see in this location. This is actually an opening within the wall as well in that.

Q. So that was the – just how was it repaired, was it epoxy?

A. No, we, initially we – our initial thoughts were to epoxy inject it in the belief that it was concrete and then put a steel PFC frame around that
15 door opening because we believed that it was concrete and with the size of the cracking any reinforcement would have possibly, well potentially snapped and that, however in opening up and that on site we found that it was red brick and we took the approach of breaking out the mortar joints, replacing some loose bricks in that with new bricks and a
20 new cement based mortar.

1130

Q. And all of that work was completed to your satisfaction?

A. Correct.

Q. And I think you've, I won't get you to refer to them, but there's various
25 email correspondence that you've referred the Commission to and between yourself and Simes and the contractor over the work.

A. Yes, correct there's several site reports.

Q. And a site report from yourself of 21 October, referring to that repair work. I'll get it brought up, 0011.52.

30 **WITNESS REFERRED TO SITE REPORT**

A. Yes, that's one of my site reports.

Q. And essentially covers what you've just told us?

- A. Yes that's correct, and also in the last paragraph the actual rear wall to 757 was a concrete masonry block wall, that's obviously been added after the original building's been built. During my initial inspection noticed that there was a crack at the junction or a separation at a junction between the block wall and then what would be the common party wall to 759 and that further investigations on site found that that was of unfilled construction and that I did further investigations and it was well tied at roof level and I was happy that to not proceed with installing equal angle as I'd previously specified.
- 5
- 10 Q. And once that work was completed you'd said that 757 would be in the same position as the other tenancies. In other words there was no structural concerns and safe to occupy?
- A. That's correct, and I believe in my final report I have said that it brings it back to the condition it was in before the earthquake.
- 15 Q. Again this, the damage based test.

COMMISSION ADJOURNS: 11.33 AM

COMMISSION RESUMES: 11.48 AM

20 EXAMINATION CONTINUES: MR ZARIFEH

- Q. Mr Mackinven, we have I think covered most of the material in your letter that we were using as a template for your evidence. Just a couple of things in that letter that I'll cover. You say in there that you provided advice to Andy Bell, that's of Simes as it was then, that potential tenants could be shown through 757 but that it shouldn't be tenanted until those works that you've described have been completed?
- 25
- A. That's correct.
- Q. And you say in the letter that you're not aware of the recommendation to remove the chimneys to 753 and 755 were carried out. You've heard the evidence of Ms Clarke?
- 30

A. Correct.

Q. So that obviously occurred after your recommendations were made and hence you weren't aware of it -

A. Yes.

5 Q. – being carried out?

A. That's correct.

Q. And I think you were asked a little about the testing and you've told us about that that you applied and whether you took into account the aftershocks that were occurring. Just tell us in general terms, I don't
10 want you to go over the test again but in general terms did you in coming to a view that a building was structurally sound, if that's the right word, did you take into account aftershocks that were occurring and were likely to occur?

A. Yes I did take into account aftershocks and I guess that, at that point it
15 was the first week after the earthquake of 4th of September. At that stage we believed in, I guess, the information being given was that it is all concentrated on the Greendale fault and then obviously with the Boxing Day event that certainly changed the industry's thinking and the realisation that we're actually dealing with sort of a multi-fault situation.

20 Q. And after your oversight of the repair work to 757 and you report back, that ended your involvement with the building?

A. That's correct.

Q. Just finally an issue that Mr Smith, Peter Smith is going to raise and that's an issue over perhaps a lack of clarity or possibility for
25 misunderstanding in relation to this previous strengthening work and some of the plans, but I think you've looked at some of them. I just wanted to bring up two plans, WIT.CLA0001.10, and when it comes up you'll see that on the bottom right it is said to be re-strengthening of 753 Colombo Street, correct?

30 A. Correct.

Q. And if we just look at the next page please or if it can be brought up together? .11. That similarly second page of those plans said to be re-strengthening of 753?

A. Correct.

Q. When you looked at those plans and bearing in mind what you saw of the building, from your inspections in September, did that appear to be correct that it was showing 753?

5 A. When I first saw these plans my thoughts are that these are actually for 759 Colombo Street. That's based on the floor plans and that as well as the detail shown on the previous page.

Q. What do you mean by the floor plan?

A. Well when, if we can go back to the .10?

10 Q. To the previous page, yes.

A. Basically looking at this floor plan due to the 753 and 755, basically the intertenancy wall on the ground level has actually been removed. So looking at these I do not believe that these are actually for 753 and also based on the floor plan, the ground floor plan on the left-hand side it shows several sort of rooms extending to the back of the building. Now 759 actually extended further back than 753 and hence that is why I believe that this is actually 759.

15

Q. Now and you said something about the detail was the other reason? Is that what you're talking about or?

20 A. Yes correct, just the fact that it's showing the 300 PFC which is in detail C and in fact in detail D that is what I observed at 759.

Q. So did you see any other examples in any of the Powell Fenwick plans that you saw where the numbering might have been incorrect?

A. Not that I'm aware of, but I guess there may be some confusion that in the end this is one building and that has just been referenced as 753 where that is in fact the whole building.

25

Q. I'll just get you to have a quick look at BUI.COL753.0011.13. Now that's got written on it 755 Colombo Street at the top?

A. That's correct.

30 Q. Can you make any comment about that?

A. No I can't make any comment about that with regards to was it put into 755 or not, I do not know.

Q. If I can just get you to go back sorry to WIT.CLA0001.10, the first plan I showed you? And I don't know if we can enlarge the diagram in the second from the right at the top. What's your understanding of what's meant by U/S roof level with the arrow?

5 A. I believe if this is based, if this is in fact 759, that that is actually meant to be the ceiling level. However actually on site the ceiling level was a suspended ceiling and it actually sat below the 300 x 90 channel.

Q. And is that the suspended ceiling that you pointed out to us before?

A. That's correct.

10 Q. So when it refers to roof level you think it should be suspended ceiling level?

A. Correct.

CROSS-EXAMINATION: MR ELLIOT

15 Q. You may have heard my reference earlier on to Ms Falardeau's family's questions just about the nature of the inspections following the 4 September earthquake and it appears the building had a level 1 assessment by the council which resulted in a green placard. There was your assessment which you described in your email as brief and then there was a further inspection by you of 759 although even that was, I think, described as by no means exhaustive?

20 A. Sorry that was 757.

Q. 757, right. The owner gave evidence that no detailed assessment was done because the engineer didn't recommend it. Am I right that you would say that you didn't do a detailed assessment because you weren't asked?

25 A. That's correct and I'd also believe that we would be guided by the council's earthquake prone policy building and that would come up as part of any consenting issues and that required for any repair works or alterations.

30 1158

Q. So you agree that you didn't actually recommend a detailed assessment to the owner?

A. Correct.

Q. You've mentioned that you reached the conclusion that 753 and the others there was no reason or it would appear structurally there is no reason the building cannot be occupied. That was your conclusion as at
5 least 9 September 2010?

A. Correct.

Q. And I think you agreed that you were conscious that the owner would have been looking to know whether the buildings were safe to occupy. Is that right?

10 A. Correct.

Q. In reaching the conclusion expressed in your email I think you've agreed that that was based upon a damage based assessment of the building?

A. That's correct.

Q. In doing that you've done precisely what it seems every other engineer did in carrying out assessments of buildings so I suppose these questions aren't really personal criticism so much as a criticism of the test applied by the profession as a whole but in this case you've reached that conclusion about the buildings being occupied and my question really is whether in hindsight at least you would agree that you should not have reached that conclusion on the basis of the information which you had which was only a brief visual non invasive examination of an unreinforced masonry building?
15

A. Like most people say hindsight's a wonderful thing. To me from that inspection there was no damage to indicate that the building structure or the structural capacity of that building had been diminished. So to me I would possibly come to the same conclusion.
20

Q. Even if you carried out a full detailed assessment?

A. Full detailed assessment is certainly a lot different from the inspections I was carrying out and from a full assessment it may be different.

30 Q. Were you aware that the council had recommended at least on the green placard or encouraged owners to carry out a detailed engineering assessment as soon as possible?

A. Yes I was aware.

Q. Did that not prompt to recommend a detailed assessment to the owners who you were assisting?

A. No it did not.

5 Q. You refer in your letter to the Royal Commission to the Boxing Day aftershock, and I'll just quote what you've said. *"We did not have reason to believe the building's capacity to withstand future aftershocks which at the time were believed to be confined as the Greendale fault diminished. This general assumption across the industry was significant*
10 *changed by the Boxing Day aftershock and the realisation that we were dealing with multiple faults and also given the different orientation of strong shaking to the September 4 event"*. Other engineers have expressed an underlying assumption that aftershocks would be less than the main shock and the aftershock sequence would decay. You're saying that your assumptions changed following the Boxing Day
15 aftershock.

A. Well to me the Boxing Day aftershock, the general pattern was with aftershocks and I'm sure you've heard this is that they are expected to decay. You can expect one at least in the order of magnitude one less than the main earthquake but with this one to me it was close into the
20 central city. It was not on the Greendale fault so it was on a completely separate fault. So my thinking was that that was changing because we weren't dealing with just a single fault that was off some distance from the city and that with aftershocks concentrated that area.

Q. Well that's a point that perhaps a layperson might agree with but which
25 hasn't necessarily emerged in evidence given by engineers about what they thought at the time so far, and GNS has given evidence to the Royal Commission that peak ground accelerations in the CBD from September were about .3G and at 26 December up to 0.4G in the Botanical Gardens and .2G throughout the remainder of the CBD, so
30 from that perspective it seems that Boxing Day should have prompted a change of thinking about the effect of the aftershocks.

A. Well I guess I can't comment on other engineers thinking and that was my personal thinking. That was the thinking within the company that we were dealing with different, obviously different faults.

5 Q. You say in your letter this general assumption across the industry was significantly changed by the Boxing Day aftershock and I'm wondering if you're aware that that assumption of the possible difference in shaking after Boxing Day was something the profession was aware of as well as you?

10 A. I guess I'm talking there that the general assumption and the realisation that we're dealing with multiple faults and to me even as you say a layperson would see that we're dealing with multiple faults.

Q. So did that change the way that you assessed buildings following Boxing Day?

A. Yes it did.

15 Q. In what way?

A. Just being more aware that you are getting, given that we've got a, what was potentially another fault appearing close to the city and that that had strong shakings you talk about that you're going to start getting damage on damage, that buildings will deteriorate with aftershocks.

20 Q. Did you give some consideration to the potential difference in horizontal accelerations that might result from a closer earthquake following Boxing Day?

25 A. I guess potentially not because I guess that knowledge wasn't immediately available following Boxing Day. You know it does take time for that to get processed and that but from Boxing Day we realised hey hang on you know we've got more than just, to that point everything was concentrated on Greendale out to the west and then when Boxing Day happened the realisation was, hang on we're dealing with multiple faults. I guess when you're talking about accelerations but at that point
30 it doesn't, it's not an instant. Here's your accelerations for that particular event.

Q. Do you think that sort of information in future would assist the profession in making a decision about whether buildings are occupiable following an earthquake and aftershocks?

A. I believe so and I believe you know the more information the better.

5 Q. Ms Falardeau's family also have noted that there was no inspection of this building following Boxing Day. I appreciate that your role ended before Boxing Day but given the change in your assumption following Boxing Day did you consider just going back to the owner of this or other buildings and saying well we should have a look again or perhaps
10 do a detailed assessment?

A. At that time I was still dealing with property managers at Simes for other buildings. I did, I fully expected to come back after Christmas holidays and start all over again with their buildings. I spoke to, there was one particular property manager I was dealing with in terms of the co-
15 ordination of their inspections. I spoke to him and asked what buildings do you require reinspection for. There was a couple of buildings and I believe based on when I carried out those inspections they're actually more driven by the tenants wanting those inspections rather than possibly the property engineer, property manager actually looking at the
20 building.

Q. Who was the property manager?

A. Sam Connell.

Q. And so again that reliance on tenants reflects the damaged based nature of assessments even after Boxing Day?

25 A. Correct and I guess the comment I'd just make is with 759 being a convenience store and our office was actually just around the corner, the property owner she would recognise me when I came in and I would keep expressing to her, have you seen any damage. If you've seen any, talk to your property manager. Get him to get me to come back to
30 have a look if you're concerned.

1208

CROSS-EXAMINATION: MR LAING

Q. Good morning, you were asked some questions about the Powell Fenwick plan which you thought related to 759 Colombo Street?

A. Correct.

5 Q. Now I can't quite unravel the mystery behind this, but hope to in the course of the hearing with Mr Smith and Mr McCarthy, but from your observations there was definitely strengthening work carried out at 753 at some stage?

A. I did not see any strengthening works to 753 when I carried out my inspection. The only strengthening works that I saw were to 759.

10 Q. Yes. It appears that there was a building consent issued in 1994 for strengthening work. What was said to be 753, but you didn't observe anything of that nature?

A. I didn't observe anything but as I previously given as evidence, to me a lot of the time strengthening works are hidden behind wall linings, ceiling
15 linings, things like that so I didn't observe anything to 753.

Q. Yes. The 753, the frontage was opened up across to what would have been two tenancies?

A. That's correct.

20 Q. And so that presumably would have required some structural work at some stage?

A. I believe so.

Q. Yes, but from your point of view at least there was nothing particularly visible in terms of structural work?

A. That's correct.

25 Q. Did you – you didn't go up into the roof cavity of 753?

A. No I did not and that's possibly due to a lack of access.

Q. Yes, and what about the first floor?

A. Yes I was up on the first floor.

RE-EXAMINATION: MR ZARIFEH – NIL

30

QUESTIONS FROM COMMISSIONER CARTER – NIL

WITNESS EXCUSED

MR ZARIFEH CALLS**CRAIG BRIAN LEWIS (SWORN)**

Q. Mr Lewis, can you give the Commission your full name please?

A. Craig Brian Lewis.

5 Q. And briefly, your qualifications and experience?

A. I graduated from Canterbury University B Honours in 1987, had close to 25 years' structural experience largely in Christchurch. I'm a member of IPENZ and a Chartered Professional Engineer and also on the International Professional Engineering register.

10 Q. And just tell us about Lewis Bradford, Consulting Engineers and your position there?

A. Sure, Lewis Bradford is a specialist structural engineer company set up by myself and colleagues in 2003, and offices in Christchurch and Queenstown with a focus on a full range of building work.

15 Q. And –

A. I'm a director and majority shareholder.

Q. Now you've heard the evidence of your employee, Hamish Mackinven about his inspection of the building that we're concerned with. I don't think you were personally involved in the inspection at all.

20 A. No, only in reviewing Hamish's work, but, despite the passage of 18 months I remember Hamish coming back to the office and discussing the particular buildings and office policy is that emails and reports that go out of our office are reviewed by me, so all the correspondence that has been discussed this morning was reviewed by me, and including
25 professional short form engagements which we entered into with Hawkins for the repair work, were signed and reviewed by me.

Q. And I don't want to go into the details of the inspection or the repair work unless we have to. I take it that you agree with the evidence he's given and the references to the documents?

30 A. I do.

Q. Just on this issue of the Powel Fenwick plans and previous strengthening. Have you had the opportunity to look at those plans at all?

A. Just in the past few days as they were loaded onto the Commission website, and as documents for today's hearing. Initially I drew the same conclusion as Peter Smith about the level of those. I admit to being quite confused as well about what had been done. Not saying it's any one party's error or fault, I think dating right back to the early to mid 90s, there's reference to 753 Colombo Street as the whole building. There's piecemeal pieces of correspondence in the Council property file which have a covering letter referring to 753 Colombo Street but there'll be attached a PS1 producer statement or a PS4, or consent application forms which specifically refer to 759, so I think there's certainly an element of confusion about what was done, when it was done and to what parts of the building as a whole.

Q. Thank you. Now can I just ask you about the test that we heard was applied to this building and we've heard from other engineers of this damage based test. Is that your understanding of post September in terms of engineering inspections, the kind of test that was applied?

A. It is. I think through the first weeks after September 4th, the profession had various Canterbury structural group meetings, meetings convened by IPENZ and other industry groups where there was information sharing and basic discussing of it, and whereas I don't think it was a process written down anywhere I think it was a – it was certainly an unwritten sort of philosophy that that was what we were doing, we were basically in the initial phases anyway assessing damage against the pre-September 4th condition. I think it's a philosophy that's embodied in the Building Act as to how we handle alterations to building under section 112 of the Building Act. Rightly or wrongly I think there's a – there is a, historically there has been a mechanism there for altering a building and ensuring that structurally at least that the building is made no worse than before the alterations. So if you consider an earthquake is potentially an altering event, the initial approach again with the benefit of hindsight, rightly or wrongly, to ensure that the building is at least put back to its pre-quake condition. I think past that initial phase I think we all, society relies on central government and local government through

the TA's earthquake-prone building policies as to the immediacy of identifying buildings, setting thresholds for defining earthquake prone buildings and timeframes which buildings should be further assessed and enhanced or strengthened or otherwise handled. So I think that – I
5 don't want to go off the topic of the Commission, but that, and it may just be my personal interpretation of that alteration philosophy embodied in the Building Act, but that is a way that our profession has dealt with alteration work, not significant alteration work on buildings, whereas the attention paid to fire egress, addressing sanitary provisions and disabled
10 access for buildings is more in line with if anything's done to a building bringing it up to full compliance with the building code. So it's really the probabilistic approach and the around timeframes for bringing buildings up to a higher level of protection.

15 **JUSTICE COOPER:**

Q. Mr Lewis, don't be concerned about straying off the precise topic of this hearing. We're very interested in the opinions of experienced engineers such as yourself on these issues.

A. Sure, thanks.

20 Q. I have just to take this discussion a little further, and this doesn't reflect my colleagues' thinking at all, but I've been wondering and I'm interested to hear you talk about what may be the philosophical underpinnings of this approach in the Building Act, but I've been wondering about how significant it is, that a lot of this work as I've
25 understood it in the period after the earthquake has actually been controlled by underwriters through loss adjustors, and of course the issue of vital concern or the issue perhaps of primary concern to the insurance industry is what is the extent of the damage because that relates to what is covered under the policy. Do you think that's been
30 influential?

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A. I would certainly hope it hasn't been influential to our profession. I think it sits in behind everything that's been done that most insurance policies

will basically bring a property or part of a property back to its pre-event condition. I think that sits in behind it, but certainly wouldn't expect that it's coloured the thinking of any of our profession. I think it really is, and again rightly or wrongly and over the last two, three, four decades in setting the country's earthquake prone policy, based on submissions from our profession, the New Zealand Society of Earthquake Engineers and ACENZ, and various industry bodies as to where the bar should be set with dealing with these. The Society of Earthquake Engineering had previously recommended two-thirds be set as the definition that the boundary for an earthquake prone building and but for economic and political reasons and they're always set lower. I'm not saying whether that's right or wrong, but it's, I think that initial phase and I just want to go on a bit from where Hamish got to, that, when I say those initial period, we were dealing with a, for New Zealand, quite a unique event, where we had such a significant event as September 4th close to a main centre, you know, globally it was a significant event. For those first couple of months it definitely did. We heard from the geo-physicists and the geological fraternity that it was following a text book aftershock sequence. I think in reading and preparing for today at the weekend there was 12, maybe 13 aftershocks between September 4th and the end of October, and between magnitude 5 and magnitude five and a half. They were all dotted along the Greendale fault. There was one which was seen at the time as a bit of an oddity, which was near Kennedy's Bush which was the only one away from the Greendale fault. I think there was nothing highlighted not only to our profession but society that indicated that it was anything but that. Boxing Day –

Q. What did you say the figure was, above what level?

A. Between magnitude 5 and five and a half. So Boxing Day and then towards the end of January I think, or the Boxing Day event was seen as – it was several weeks before GNS and the other geophysical bodies really deciphered what that meant, but it was a bit of a wake-up call, that hang on, we've got something else here that's quite a small event, magnitude wise, but very shallow and very close to the city. Obviously

on a different fault, the directionality of the shaking was different, and you know with the break of Christmas and people not coming back to mid to late January, and just comparing stories and perceptions of shaking. Cashel Mall was a classic example where a lot of those
5 buildings suffered very little damage in September 4th because of the north-south orientation and along came the smaller Boxing Day event, sort of with reasonably significant shaking in the opposite direction and caused a lot of damage. Not necessarily damage on damage damage, but just hitting certain buildings in their weaker direction. So that was
10 really – it just started to build a picture that, hang on, we're dealing with a mult – you know, multiple events here, we don't necessarily know what nature has in store.

EXAMINATION CONTINUES: MR ZARIFEH

Q. And in terms of your approach post Boxing Day, or your firm's approach,
15 how did that change?

A. We were taking a decidedly more cautious approach and rather than just assessing buildings as against where they may have potentially sat on September 3rd, we were recommending greater degree of assessment for – for buildings that were less regular, less robust,
20 potentially earthquake prone, those buildings that didn't have you know the resilience of other more modern buildings.

Q. And were you doing that off your own bat or were you doing it as a result of advice from GNS or anyone else?

A. No, it was really just after talking with other colleagues around town.
25 You know, the first couple of structural group meetings in the New Year, which were probably the end of January, getting into February by that stage, by the time everyone got back.

Q. So this is after it was apparent that it was on a different fault line and the directionality was different?

30 A. Yeah.

Q. And you said that talking to other colleagues. Were you aware of other engineers adopting the same approach?

A. I believe a lot of engineers were taking a more cautious approach and you know, in fairness to the full profession, I don't want this to sound like I'm sticking up for the profession as a whole, I think it's about what individual its engineers had experienced through that, depending on what buildings they were looking after, because if, in the first weeks after Boxing Day, if engineer X or Y had been handling maybe modern buildings or that sort of thing, he may not have seen the effect of the different Boxing Day event to the same degree as engineer Z might have. So it's you know, what we as a profession what we've learned in the last 18 months is really just a building of a vast array of information over significant events effecting significant number of buildings and each building behaves quite differently. It's been said before in this Commission you might have two apparently identical buildings standing side by side. One will be significantly affected and the one may be unaffected.

Q. Were you treating the Boxing Day then as a new earthquake rather than an aftershock?

A. Yes I think so, I think it's a bit immaterial and I think it was through the mid-part of last year, I think there was still quite a lot of discussion right up at the top level of GNS about whether the Boxing Day events, certainly the extraordinary event on February 22, whether they were earthquakes in their own right or aftershock events. I think it was sort of mid to late last year that collectively everything after September 4th was being referred to as part of the aftershock sequence and that they were on different faults, I think they'd been proven to be completely different faults but the activity on the subsequent faults was triggered by the larger Greendale event.

Q. And in terms of the different approach then post Boxing Day, you said a more cautious approach, what recommending to clients that a more detailed inspection be carried out in general?

A. Yes. Not in general, for those buildings which we had more doubt about, if they weren't buildings we were directly involved in.

Q. So what about buildings such as this one, unreinforced masonry building?

5 A. If we had, I think we would have taken a different approach. If we'd inspected this building post Boxing Day rather than post September 4th, I think we would have taken a slightly different approach and that we would have probably recommended that drawings be accessed and just see what had been done to it.

Q. So what, a more of a risk based assessment than just damage based?

A. I think so.

10 Q. And did you make any, give any consideration to going back to clients who you'd done inspections for pre-Boxing Day?

A. We haven't, then with the benefit of hindsight which is a wonderful thing after such a tragic event as February, I often think I wish I'd picked up the phone and rung you know a number of clients or even buildings that we'd had absolutely nothing to do with, picked up the phone and call Council or tried to track down the building owner and have you looked at this or that, but in reality and given the time commitments unfortunately we didn't do that and I doubt whether a lot of our colleagues had the time to do it.

20 1228

Q. What about post-February then in terms of other changes or further changes in the way building assessments were approached?

A. For a start, February was such an extraordinary event. I don't think there's any blueprint for what happened in February anywhere. I've spoken to a number of senior colleagues who have been part of reconnaissance teams overseas over the years in Kobe and Turkey and China and Mexico City, Northridge, and I've yet to speak to anyone who has heard, let alone been involved, in a sequence of events like we had here where we had a globally significant event in September followed by an event generating greater shaking. So there was no blueprint for that but it certainly did highlight that, you know, we might think we, you know, we go through years of very sound training, in my opinion. I think the engineering profession is very good at disseminating what it knows,

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what it learns from overseas. I think globally the engineering fraternity is very well linked but along comes nature and tells us that we actually know bugger all and we don't know as much as we think we do. So I think February 22nd was just a total game changer for everyone and I think everyone was then into a risk-based assessment as evidenced by the setting up of CERA and the approach in the red zone to the buildings, you know the letters that, right to this present day, with the notification letters that have been sent to every commercial property owner round Canterbury and the follow-up for that in assessing exactly where buildings sit. I think there's still a bit of a, and again just talking a bit further to, sir, your discussions with Peter Smith yesterday at the end of the hearing just about where to for the future. I think there's still a bit of a hole in the tools for us engineers that even under the, you know, quite robust CERA legislation at the moment if a building, even if it is earthquake prone but is, through good luck or good management has got to this point in time in an undamaged state, there is still no real legal means for CERA or an engineer to point to that building as being earthquake prone, have it vacated and, you know, assessed to a higher level.

20 Q. What even if there's a detailed engineering evaluation though?

A. I believe so. I think if there's, if we carry work through under the s 29 and s 51 requirements of the current CERA Act, go through the process, identify either through detailed assessment or an approximate IEP process, Initial Engineering Procedure, and identify that it's sitting less than 33% I still don't believe that there's means for CERA to effectively have that building shut down until it's either strengthened or assessed to a higher level of accuracy to demonstrate that it is over the earthquake prone threshold or to, you know, in the worst case scenario, have that building, have the hazard removed and have it demolished.

30 Q. Is that something you've experienced in relation to buildings?

A. Um, not personally. I think we've been pretty fortunate in the clientele that we've been working with since February 22nd have been very proactive and I think, by and large, there's been a complete awakening

of the seismic hazard for the population at large so February 22nd took away any complacency but I suppose what I'm getting at is just so there's no confusion between members of our profession about, you know, where the line should be drawn, what's safe and what's not, you know. There's been a lot of discussion about this word 'safe'. What is 'safe'? I think there needs to be clearer definition, especially in such turbulent times as this with the uncertainty, there needs to be clearer definition of where the lower bound bar needs to be set both in evaluating buildings but, for society's expectations as a whole. In my personal opinion, and it's only my personal opinion, is that that bar should be set at least at the 33% of earthquake prone threshold and just because a building has survived to date through multiple very different events and maybe seemingly undamaged I don't think that's a guarantee that that building's going to be fine for when other events such as the Alpine fault and North Canterbury faults may go in the future. So....

Q. You don't think it should be higher?

A. I definitely think it should be higher but –

Q. Set higher I mean?

A. Yeah I definitely think it should be set higher, especially for the Canterbury region because of the period of heightened seismicity we're in and we're going to continue to be in. Where that number should be, whether it should be 40 or 50 or 67% I think is a wee bit immaterial. I think that the important thing is to have a filter to capture the most prone buildings as quickly as possible in the immediate future, not necessarily in the next few weeks but, you know, in the coming months or one or two or three years rather than the sort of time frames that historically have been embodied in earthquake prone policies of 10/20/30 years. I think they're arguable okay for areas of the country which are operating in a benign earthquake period and, you know, 10 or 20 or 30 years when you're talking about geological time frames may be acceptable from a probabilistic point of view but not in the active period that we're currently in. So I definitely think there needs to be more immediacy and

sort of more defined boundaries I suppose for engineers to work within and I think Peter Smith mentioned that as to okay we've had an earthquake sequence, it might be like the Newcastle earthquake in Australia in 1999 – one event, zero aftershocks – you know we might be taking a conservative approach with this or else we may have an extremely complicated array of aftershocks like we've had here but, I mean, it's better to be cautious than suffer the tragic events that happened on February 22nd.

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Q. And presumably you'd agree with him when he recommends the need for a different test post a significant earthquake, however you define that.

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A. Yep. I think that's what I'm sort of suggesting that, you know, after an event and the whole of New Zealand for when the next seismic event happens will be better armed but I think immediately it needs to be okay we've had an event, you know, we don't expect the geologists to process all the information overnight, it's something that takes weeks and months, but here's a line in the sand. From now on, from the first hours after the event when engineers and other professions are assessing buildings that this is the level. This is the litmus test if you like. Forget about putting it back to where it was. Put it back to where it was but this needs to be an absolute minimum base-line.

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CROSS-EXAMINATION: MR ELLIOTT

Q. Mr Lewis, just further to your discussion about the location of aftershocks, I'll show you a slide that GNS produced to the Royal Commission – SEI.GNS0010A.8. That, as I understand it, shows the state of seismicity up until the 21st of February 2011.

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JUSTICE COOPER:

Except that isn't this diagram problematic because doesn't it show the 22nd February fault as well?

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MR ELLIOTT:

My recollection, Your Honour, was that that yellow line was added effectively after the event.

JUSTICE COOPER:

5 Yes that's what I'm saying. You've said to Mr Lewis that this is showing the position up until February the 21st but does it? That's not all it shows is it or have I got that wrong?

MR LEWIS:

10 I think we can assume that. I think that that probably is, sir, accurate up until and including the 21st of February.

MR ELLIOTT

Well the title on the bottom just says that but I think, sir, the yellow dots obviously represent the locations of the epicentres of aftershocks.

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JUSTICE COOPER:

That's not all it shows is it, or have I got that wrong?

20 **MR LEWIS**

I think we can assume that. I think that probably is Sir accurate up to and including the 21st of February.

CROSS-EXAMINATION CONTINUES: MR ELLIOTT

25 Q. Well the title on the bottom just says that but I think the – so the yellow dots obviously represent the locations of the epicentres of aftershocks, but then they've added the yellow dotted line after, which of course represents the fault line which they discovered after the 21st of February.

30 **JUSTICE COOPER:**

Q. The next day?

A. So yes, in that sense it shows, I suppose what I'm referring to up until 21 February, are the green dots.

Q. Yes, okay.

5 A. Which show the location of the epicentres of aftershocks up to the 21st
and including the 21st of February apparently, and I suppose illustrates
your point. We see there some aftershocks located directly below
Christchurch, I think you made the point that there had been, well
perhaps you didn't make the point that there's the larger green
10 aftershock to the bottom right in the Lyttelton region which indicates 5 to
5.9 magnitude, which as it turned out was in the vicinity of where the
February 22 aftershock was located.

MR ELLIOTT ADDRESSES THE COMMISSION

15 Your Honour, I can, the next diagram if you like as well, which shows –

JUSTICE COOPER:

Q. No, look I just didn't want, well I was checking my own understanding of
the position as well. It was just the way you introduced the question, as
20 well. We all understand now thanks.

CROSS-EXAMINATION CONTINUES: MR ELLIOTT

A. Before you leave that slide Mr Elliott, that – I can't recall exactly but I
think that magnitude 5 to 5.9 under Lyttelton occurred towards the end
of January. Maybe have been on the 19th or 21st of January and the
25 cluster of, recognising that this seismicity is for everything above a
magnitude 3. The cluster under the City, the 24 hours after the Boxing
Day event was a hugely active period, I think there was something like
12 or 15 magnitude sort of three and a half to four and a half, all centred
right around that Moorhouse Ave event, the magnitude 4.9. So –

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JUSTICE COOPER:

Q. And there were other, I mean there were three big ones on Boxing Day itself, closely following each other, 4.7 and 4.6.

A. So if this map was up to and including the 21st of December 2010, I think, well what I do recall seeing previous versions of this, a very
5 different array you know concentrated down the Greendale fault with a huge cluster around the Rolleston Weedons area at the tip of the fault.

Q. Yes.

CROSS-EXAMINATION CONTINUES: MR ELLIOTT

Q. The question I had really was, I suppose this illustrates the point you're
10 making, that there were aftershocks located closer to the CBD of Christchurch as the aftershock sequence developed and my question really was that the code strength of a building is predicated on that formula that includes the ground accelerations that a building could face. So it's not so much magnitude as ground accelerations that
15 engineers are interested in, but it doesn't seem that engineers sought information or were given information about ground accelerations that Christchurch was experiencing at any point or which it might experience so as to incorporate that into their assessments. Could you comment on that?

A. It's an extremely complex area. Our design spectrum which are
20 embodied in our current versions of our building code and dealing with earthquake prone buildings and dealing with the percentage of our new building standard if you like, that the spectrum are a very complex combination of ground shaking, peak ground accelerations, the peak
25 pulses associated with that shaking, the duration of shaking, the depth of an event, the directionality probably comes into it as well, so there is a, it's not just purely especially now with our response spectrums, it's not all about just a single horizontal acceleration as in a thrust that a building feels, so those, you know those PGAs that were recorded on
30 Boxing Day, I think .4 at the Botanic Gardens was mentioned and lesser .2 or that in different parts of the city, very hard just to give a straight correlation, with, okay we've had an event this size, how does that relate

to what strength we can expect out of a building young or old. The other thing which further confuses that is that throughout all the events the huge variability around the city in the recorded PGAs in fact varies by a factor of three. For the February 22nd event for example, the ground accelerations recorded on the hospital and the police station sites was around the .3, .36 G level and that varies right up to, up at the corner of Colombo and Bealey Ave, at .76 I think. Cathedral College might have been up around .9 so hugely variable depending on the ground that they sit on and the surrounding substrata.

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10 Q. So ground accelerations might provide some assistance but not the full story –

A. No.

Q. – when you're coming to assess buildings?

A. No. I think that's why there still needs to be a lot of engineering judgement in opening up this issue as Mr Smith did about setting levels for the future, that because of the number of variables involved you still are relying rather than just taking an absolute conservative approach and shutting down a city, or a town, after an event like this, you are still relying on our profession to use their expertise and judgement to make case by case qualifications on buildings and also work out even if you've got an unreinforced masonry building. It's really identifying where the critical weaknesses are of it. Just because a building is old and a URM building, doesn't necessarily mean that it hasn't got a lot of inherent strength in certain elements. It's a matter of eliminating those critical weaknesses, and façades and parapets and appendages are definitely a something to focus on for the future because they you know, (a) they put the public at large, you can shut down a building, or tenants can make their own judgement about what level of integrity they want in a building. Owners can decide how far they want to go with strengthening measures, but if a building is fronting onto a public space, then the public at large don't have the benefit of that knowledge to make that decision themselves.

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JUSTICE COOPER:

Q. If you'd had an active earthquake prone policy which had resulted in buildings being strengthened, and the creation of records as to the strengthening that had occurred, it strikes me that the post earthquake situation would be much easier to deal with. At least theoretically it should be because you would be able to go to buildings which, might be far fewer buildings which hadn't been subject to such strengthening on the basis that they were likely to be potentially problematic in a strong aftershock.

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10 A. Yes, yes. I think any level of strengthening or securing on buildings is a good thing. Anything is better than nothing and that's been proven in other buildings around the city, even buildings that in previous periods and under previous policies that had been strengthened to 33 percent or 50 percent. I'm sure there's still examples around, but they may have been subsequently demolished because of the CERA provisions. Even buildings that predated strengthening as we know it now were secured, have held together and it's really a matter of knitting buildings together to embody their inherent strength in different directions to stop weak elements falling off. The February 22nd was such an extraordinary event but even if buildings like 753 Colombo Street had been strengthened to even 67 percent, for argument sake, of the code before it was increased in May 2011, the result may well have been the same, and I think others in the Commission have spoken to that. You know, it was such an extraordinary level of shaking, both vertical and multi-directional that it may not have helped, but I think there's plenty of examples of buildings throughout Christchurch from different eras that had a degree of strengthening done to them which came through September 4th and Boxing Day and others. Technically moderate level earthquakes, which it served the purpose but I don't think as a country, the country can't afford to strengthen our total building stock to withstand February 22nd type events. Unfortunately it's just not economically feasible to do that but I think the quicker and the higher you can get the lower bound bar to pick up the more statistically probable smaller events which will continue

to happen throughout New Zealand the more of these tragic events we can hopefully capture and avoid.

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5 Q. Just finally from me. Mr Smith has made this recommendation, which you may have heard, that territorial authority in the post-earthquake situation could determine a minimum strength requirement for occupancy of unreinforced masonry buildings. Do you think that's possible to do so, and if so how?

10 A. I do think it's possible and I wonder if it needs to come from central government level really in the event of future events like this that there is a level defined and it's where I'm probably saying that as a starting point maybe that needs to be the earthquake prone threshold. That if the engineers of the country are inspecting these buildings and they are thought to be earthquake prone then that should apply, that they aren't
15 occupied, that they are safely cordoned off until either more detailed assessment proves they're not. The means that we assess buildings, the initial engineering evaluation procedures are, by nature, conservative, as they have to be, and I think it's far better that way than the other. So I think it's far better to identify buildings that are potentially
20 earthquake prone and then demonstrate them with greater analysis and greater assessment not to be and to actually have those hazards quarantined if you like until a future time. I think the difficulty for the country as a whole is just what sort of event or series of events would trigger that policy, if you like, either triggered by the local authorities or
25 maybe at central government level. If you have it too simplistically set, there was a reasonably large earthquake in June 1994 which was centred in the Arthurs Pass region. You wouldn't want to trigger that mindset for something like that. Not that close to a centre like Christchurch. A too cautious approach back then would have crippled a
30 lot of the commerce in the city while buildings were assessed and detailed assessments were carried out or strengthening carried out to bring them up over that level. It is a very tricky issue, just where to set that bar and what events should trigger it.

JUSTICE COOPER:

Q. What do you think of the idea that a declaration of a state of emergency might be the trigger?

5 A. I think that's a very good starting point and my notes were around your discussion yesterday with Mr Smith. I think that is potentially, you know, for want of a better trigger, should be an initial line in the sand.

Q. Because I mean an event a long way away in Fiordland would just happen and people just get on with their lives in Christchurch.

10 A. As the country would need to.

Q. Yes, but if you start saying well if there's an earthquake of such and such a magnitude that's problematic because it doesn't capture the effects of proximity, orientation and directivity.

A. That's right.

15 Q. And it doesn't necessarily capture the situation, the potential for stronger or a more harmful aftershock, and then what's the difference, a bare recitation of a certain magnitude may not be all that useful. Do you agree with that?

A. I do.

20 **CROSS-EXAMINATION: MR LAING**

Q. Mr Lewis just one question and following on from the issue about where you place the bar. Now the focus of a lot of these hearings has been on unreinforced masonry buildings which may or may not have been strengthened. In one case I think we had a building that had been
25 strengthened around 67% but still collapsed. Shouldn't the focus simply be wider than unreinforced masonry buildings? We know that buildings from between 1950 and 1970 may only be 40/50% of code or something like that so what do you think? What buildings should we be looking at?

A. All buildings.

30 Q. All buildings.

A. All buildings. There's, in our engineering industry guidelines there's various design guides that have been put out by SESOC and New

Zealand Society of Earthquake Engineering over the past decade and there is a clear focus in that that it's easy to categorise the unreinforced masonry buildings because they make up a large part of that at-risk building stock but if there's irregular or very modern buildings with critical structural weaknesses they shouldn't escape the net. They should all be addressed.

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Q. So what you're saying is that after a specified event, and it may be a declaration of emergency as Your Honour has indicated or it may be some other mechanism, you're really saying that all buildings, commercial buildings, should then be inspected, is that what you're really saying?

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A. Yes and I think the process, especially the initial process, for more modern buildings can be very very quick. It can be done on the basis of a level 2 visual inspection. It's far easier to do a thorough level 2 inspection of a modern building and place a green sticker on it with a high level of confidence – not an absolute level of confidence but a high level of confidence – for a modern building if there's no apparent structural weaknesses, you know if there's not a whole lot of torsional irregularity or vertical or plan irregularity. That can still be done by a quick visual inspection. The issue with unreinforced masonry buildings is the greater degree of uncertainty. We know as a starting point, unless there has been some securing or strengthening work done in subsequent years to when it was built, that there'll be very little tying the parts of the building together just to maximise the inherent strength of the building. But anything, certainly anything post-1976, which was a quantum shift in the approaches and levels of our codes, should be a much quicker process to develop a degree of confidence that you're at least over the one-third earthquake-prone threshold if, in fact, that is where the bar's going to be set.

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30 Q. Yes, so you see 1976 as being a sort of fairly important milestone.

A. Yes.

Q. Because of the change in the earthquake codes.

A. Yes.

RE-EXAMINATION: MR ZARIFEH – NIL**COMMISSIONER CARTER:**

5 Q. Yes you made an interesting comment in relation to the uniqueness of
this event by comparison with other major earthquakes that were
recognised as being standard setting events for the practice of
earthquake design around the world, and also the more recent
comments you made about how we should now look to the future having
had this particular experience. Have you got any words of wisdom
10 about how one should treat the uniqueness of this event because it can't
be established yet, I wouldn't think, as to whether the repeatability of
what we've seen happen in Christchurch, and my second part of that
question: who is going to determine that as a standard based on some
sort of credible science? Will it be engineers or will it be seismologists?

15 1258

A. Ah, both of the above and academics and be a lot of other professions
as well. I still have a lot of faith in this equality of our standards and our
design philosophies in New Zealand and the reason for the capacity
design approach, which had roots at Canterbury University in the late
20 '50s and '60s, is that very premise that we can never tell what nature's
going to throw at us. We might think we know and we can increase our
design codes to cope with extra geotechnical testing and testing at the
universities and to take on board the results of different earthquake
events around the world but we never know, like what happened on
25 February 22nd, what nature is going to throw at us. And so having a
robust design philosophy which takes that into account and can
accommodate a response of all manner of buildings in a measured and
signing a hierarchy of yielding to different elements, even to a point
where, as with a lot of the more modern buildings in town from the '80s
30 that they're damaged beyond repair, at least to save life I think the basis
of the road ahead is still there in our current design philosophy, in our
current standards. I think we've learnt a lot so there's going to be, as
there already has been, a very good publication from SESOC issued

recently which is a very good document to, okay, we've learnt some things that don't work quite as well with modern floor systems, wall systems, frame systems and that sort of thing and I think there's going to be a lot more focus on the difference between the ultimate resistance of buildings to preserve life safety, which is at the absolute foundation of what we do as a profession, and damage avoidance moving forward because I think owners and tenants and insurers and re-insurers are going to focus a lot more on, fine you're designing this building to stand up, as most of the modern buildings did, but what's the damage going to be. If moving forward if we try to, if we go too far with that damage avoidance – it's fine to design buildings to cope with February 22nd events with little or no damage – I think the rebuild of Christchurch is going to take a very very long time and in a lot of instances it'll be uneconomic to rebuild a lot of it. So it is going to be a fine line about what sort of events we do design for moving forward and just recognise that we around the globe not just our country, that there are going to be absolute unique events like February 22nd.

JUSTICE COOPER:

20 Q. I understand your answer to Mr Laing about 1976 when the change in the code occurred but with buildings, more modern buildings as opposed to unreinforced masonry buildings the concept of critical structural weakness would apply to some buildings built before 1976, wouldn't it?

25 A. Yes.

Q. I mean we might conclude that there were critical structural weaknesses in the PGC building for example which is early 1960s but we equally might make a conclusion that it was a critical structural weakness in the hotel Grand Chancellor which is a post-1976 building. Do you think it would be a practical exercise to, on a desktop basis by looking at plans, to identify buildings in central business districts that might, from our point of view now, be perceived as having potentially critical structural weaknesses?

30

A. It's certainly possible and that's the process that is occurring as we speak.

Q. The CERA process?

5 A. Through the CERA DEE process. There's been, since May/June last year there's been a lot of focus within the engineering fraternity and structural group meetings and with the Engineering Advisory Group from CERA at what to look out for, what assessments to take and how far to go with it.

10 Q. So one could perhaps envisage a programme whereby that was done nationally whilst we're waiting for the next earthquake.

A. I think it's essential, absolutely essential, the only variable is over what time frame that occurs.

15 Q. But, and you'd have to take some balanced and reasonable approach to that, but if you did do that then when the earthquake struck you would know where to look for problems but you might also have dealt with some of the problems in advance.

20 A. Oh prevention is the key, absolutely the key. We can talk about where to set bars and take an ambulance at the bottom of the cliff approach but the more of these buildings, young and old, that can be identified with what we know now and address those issues before the event, that's absolutely the key.

Q. And the engineers would know what they were looking for?

A. Yes.

25 Q. Look that's been a most interesting contribution to our work Mr Lewis and thank you very much for coming along and saying what you have today.

30 A. You're welcome. I'd just like to say that a lot of this discussion has been technically based which is cold comfort to the families of members of the public that were lost and I'd like to express our condolences to the family of Ms Falardeau.

Q. Thank you for that too.

COMMISSION ADJOURNS: 1.05 PM

COMMISSION RESUMES: 1.45 PM**MR LAING CALLS****5 STEPHEN JAMES MCCARTHY (SWORN)**

Q. Your full name is Stephen James McCarthy?

A. Yes it is.

Q. And you're the environmental policy and approvals manager for the Christchurch City Council?

10 A. Yes I am.

Q. And you've worked for the council since 1 May 2006?

A. Yes.

Q. Could you start reading your evidence at paragraph 6 please?

WITNESS READS BRIEF OF EVIDENCE

15 A. "Events between 4 September 2010 earthquake and 22 February 2011 earthquake.

On 5 September 2010 a level one rapid assessment was carried out and the building received a green placard.

20 It appears that a further level one assessment is there is another rapid assessment of the building dated the 7th. This assessment resulted in the building maintaining a green placard.

25 It appears that the building owner commissioned a Lewis Bradford report dated 8 October 2010 which notes that a brief walk through was carried out on 8 September 2010. I understand that this report was not on the council's files and was not commissioned by the council.

30 There is no record of any rapid assessment being carried out on the building following the Boxing Day earthquake. The assessment process following the Boxing Day earthquake is detailed at pages 31 to 32 of the council's "Report into Building Safety Evaluation Processes in the Central Business District Following 4 September 2010 earthquake". Not all CBD buildings were assessed after the Boxing Day earthquake but building owners were advised to get their own assessments.

The council has no record of further inspections being carried out on this building following 7 September 2010.

The building comprises four addresses that were subject to different strengthening works. I understand that:

5 (a) 753 Colombo Street had been earthquake strengthened in 1994 with the installation of two concrete frames and an overlay diaphragm on the first floor and steel members to strengthen the walls. The walls and roof were also tied to the structure with steel members and chemset bolts.

10 (b) 755 Colombo Street had been earthquake strengthened in 1994 on the ground floor by the installation of two concrete frames.

(c) Earthquake strengthening works for 759 Colombo Street had initially
15 begun in 1999. However the building suffered a fire during construction. A new project to repair the fire damage and complete the strengthening was consented by the council. The strengthening work consisted of the construction of two concrete frames, a new plyco pynefloor timber first floor diaphragm with steel angle ties around the walls and steel bracing at the roof ceiling level. The angle ties and steel bracing were fixed to the brick walls with
20 chemset anchors. A Conservation Covenant dated 22 February 2002 was entered into as a result of the grant to assist with the cost of the earthquake strengthening to 759 Colombo Street in 1999/2000.

The strengthening work for 735, 755 and 759 Colombo Street was
25 undertaken prior to introduction of the council's earthquake prone building policy 2006.

757 Colombo Street does not appear to have been strengthened.

The building specified systems, change of use and earthquake prone
30 buildings regulations 2005 commenced on 31 March 2005 and raised the required strength levels for buildings. Given the increased earthquake prone figure level in the 2005 regulations it is probable that all the buildings would have been regarded as earthquake prone for the purpose of the earthquake prone building policy and section

122 of the Building Act 2004. However there are no assessments on the council file as to whether or not the buildings in fact met 33% of current code requirements.

5 After the commencement of the earthquake prone policy 2006 the building consent application for significant alteration had been received the strength of the building structure would have been assessed and the application would have been dealt with in accordance with the policy (see in particular section 1.7). However I understand that no application for building consents for significant alterations had been made after the earthquake prone building policy 10 2006 so the requirement to consider strengthening in terms of the policy had not been triggered.

CROSS-EXAMINATION: MR ZARIFEH

15 Q. Mr McCarthy, I understand that there is, there was some confusion over which tenancies of this particular building had been strengthened.

A. Yes.

20 Q. And I think you spent some time with Mr Smith this morning and then at lunchtime trying to resolve that by reference to the council records, Powell Fenwick plans and as I understand it, what you read out in your brief appears to be the correct position?

A. Yes it is.

Q. So that 753 strengthened at both levels ground and first floor?

A. That's correct.

Q. 755 just at ground level?

25 A. Yes.

Q. And Ms Clarke talked about 753 and 755 being interconnected at ground level I think that came at some point after the strengthening of 753?

30 A. Yes, and the strengthening of both those buildings had in mind that the tenancy was going to occupy both ground floor tenancies.

Q. 757 no evidence of strengthening?

A. No.

Q. 759 ground and first floor as well?

A. Yes there was a fire, a fire that I mentioned in the evidence and at that point the second floor was strengthened.

Q. So the 753 was the first one to be strengthened in 1994?

5 A. Yes.

Q. And Ms Clarke's evidence was that that was she believed as a result of a letter from the council. Is that your understanding from council records?

10 A. Yes there was an application for a building consent in 1994. The council wrote to the owners and said this is an earthquake prone building. This is a change of use or words to that effect and you need to consider strengthening the building so that was I think that prompted the owners to undertake the strengthening work.

15 Q. Let's just bring that letter up I think it's BUI.COL753.0011.6. Is that the council letter that you're referring to?

A. Yes it is.

Q. And refers to a conversation that the council officer had. Is it Tony Enwright structural engineer?

A. Yes.

20 Q. So the council is saying that it believed that the building, and it's got in brackets, as a whole could be earthquake prone.

A. Yes.

25 Q. What I was going to ask you is why at that point would the council not insist on the building as a whole being strengthened rather than just that tenancy 753?

30 A. In general the council often with these types of buildings used different tenancies and different owners for each of the tenancies so the approach taken is to treat each tenancy as a or each part of the building as a separate building. That's the only way to satisfactorily get any strengthening. You have to start somewhere so we focus on the individual tenancies. Clearly the council would have been encouraging Powell Fenwick and the owners to upgrade the whole building and indeed that seems to have occurred.

Q. But in this case there was one owner of the building as a whole, isn't there?

A. Yes.

5 Q. So would that not make a difference in terms of the council's policy towards restrengthening of the building?

A. I think there would have obviously been negotiation going on between the owners and it may come down to the economics of it, whether it was economically possible for them to do all of the tenancies and do the whole building, but I wasn't a party to those.

10 1355

Q. No, I understand that.

A. – (overtalking 13:55:05) and I can't say much more than that.

15 Q. And is that perhaps what's meant at the end until the owner's satisfactorily addresses this matter. So some kind of a negotiation and agreement with the Council?

A. I believe so.

Q. So from your understanding then would this be how the Council would have applied this policy if you like that there would be piecemeal strengthening of tenancies of the same building?

20 A. Yes, this obviously, the original application was to join two of the tenancies so it's quite major work and so that was the catalyst really for those tenancies to be strengthened.

25 Q. But my question was, is that this example, was that illustrative of how the Council was applying its policy generally but it would only require a tenancy to be strengthened, not the whole building?

A. That's correct.

30 Q. And we've heard reference to the seismic surveys in 1991 and think probably soon after the hazardous appendage survey. The seismic risk survey categorised the building as a 16A which required immediate action.

A. Yes.

Q. But that was unrelated to what happened in 1994. As you say that's generated by a consent application?

A. Yes.

Q. And I think as you've covered in other hearings, there was other than that survey being conducted, there was no follow-up from that at the time in terms of requiring immediate action?

5 A. I can't comment on that other than it does appear that the – at some stage the chimney that was of particular concern has been removed and I'm a little unsure as to in what period that actually occurred. If indeed it was recognised as an immediate danger it may well have been that the approach was made at that point and the chimney was taken down.
10 There's nothing on our records that indicate that to be case.

Q. And the hazardous appendage survey which contains the photos, various photos of the building, including that chimney, is undated, but that would have been in the early 90s?

A. Generally they –

15 Q. Given what we've seen on the building?

A. – (overtalking 13:58:11) 1992.

Q. And that's the form that describes the building as two to three storeys, one of the worst examples in Christchurch. I note on the form, perhaps we can get it up, 0011.3 that looks like it's written 753 to 757 and then
20 overwritten 751 to 757. I'll get you to have a look. Do you see what I mean?

WITNESS REFERRED TO DOCUMENT

A. Yes.

Q. And 751 as we've heard is that portion or that building you can see
25 where the man's on the roof?

A. Yes.

Q. And there's the chimney on the boundary if you like or the walls?

A. Yes.

Q. So do we know when in relation to this hazardous appendage survey
30 whether it – presumably it related to both buildings then, or do you not know?

A. So it would seem there's a seismic risk survey as well which has a little bit more clarity around it.

Q. Well that relates to 753 to 757.

A. Yes.

Q. But the hazardous appendage survey would appear to relate to both buildings. Would you agree with that?

5 A. It seems to.

Q. All right, but again the hazardous appendage survey is unrelated to any strengthening that was done subsequently?

A. So it would appear.

10 Q. Just in relation to the inspections post September. You said that there appeared to be two; one on the 5th and then one on the 7th. The one on the 7th referred to in the comment detailed inspection of corbels and parapets. Do you know what's meant by that, what would have been carried out?

15 A. No, we're working very closely with the whole engineering community at that stage and we – there may have been a conversation with Lewis Bradford that they had been engaged to do a subsequent survey. We may have known about that or we may have triggered that in some way, but we're just not certain really.

20 Q. But I appreciate it's only got – well if we look at the form 0011.36, it's just got the 7th. That presumably must be 7th September?

WITNESS REFERRED TO DOCUMENT

A. Yes.

Q. And the Lewis Bradford walk through inspection as I recall it, wasn't until the 9th of September?

25 A. Yes, 8th or 9th.

Q. And certainly the email's dated the 9th, so the level 1 couldn't have related to that could it?

30 A. I – look we're really quite unsure why this level 1 assessment was done and what eventuated from it. We're quite unclear on that. It may be that there was a conversation with the owners, but that doesn't seem to have come out in evidence this morning, but no, we don't know.

Q. So you don't know what that meant?

A. No.

Q. But presumably it's recording the inspector on that day either having carried that out or being aware of it being carried out?

A. Yes.

5 Q. And it's been green stickered and then there's a tick under further action recommended, a tick of next to structural, level 2 structural. You see that?

A. Yes I do.

Q. So is that recommending that a level 2 structural assessment be carried out?

10 A. It would seem to indicate that, yes.

Q. And was that carried out by the Council or on behalf of the Council?

A. No it wasn't.

Q. Why was that?

15 A. I'm a little unsure about that. I can, as I've explained there may have been some communication with an engineer which may have addressed that but if that were the case you would expect there to be a note on there to say that it had been auctioned in some way. There's no such notation, so I really can't help you with that.

20 Q. And the Lewis Bradford inspections weren't known to the Council until this enquiry?

A. That's right.

CROSS-EXAMINATION: MR ELLIOTT

25 Q. Mr McCarthy, some of Miss Falardeau's family's questions have already been addressed by Mr Zarifeh and I won't go back over those. I'll just deal with two further issues with you.

A. Certainly.

Q. The first in relation to the post Boxing Day period.

A. Yes.

30 Q. So there was no Council-initiated inspection of this building following the Boxing Day aftershock. Is that right?

A. That's correct.

Q. This particular building was about a block away from Cathedral Square wasn't it?

A. Yes it was.

5 Q. You've referred in your evidence to steps that the Council took and you referred to a report, was it – the report says that, *“It became clear that the worst damaged areas were Cashel Mall and Hereford Street, so they were prioritised for rapid assessment.”*

A. Yes.

10 Q. And, *“Priorities also included evaluating buildings in Cathedral Square, inspecting arterial routes, reopening the tram routes and responding to customer service requests relating to potentially dangerous buildings.”* So does that encapsulate the Council's action after Boxing Day?

A. Yes.

15 Q. The building we're dealing with tomorrow, 738 Colombo. I think it's directly across, was directly across the road from this one, I think was inspected after Boxing Day. Is that right?

A. I haven't fully read that file for some time, so I'm sorry I can't help you on that one.

1405

20 Q. Are you able to say why this particular building, which was quite close to Cathedral Square and well within the CBD was not looked at after Boxing Day?

A. We were in the situation that you've described of trying to prioritise our actions. We had a limited number of staff. It was over the holiday period and so our approach was where there's observable damage we would go and respond to that. Where people notified us of a dangerous situation or a changed situation we would clearly go and address that as well. Generally our approach was we went to the media and we said to building owners you should check your buildings yourself before re-
25 occupying them. Council approach has been to target those buildings
30 which are obviously damaged so, really, we had to share that responsibility with the building owner.

Q. Yes, so on the 26th of December there was a media release in which the Council said it's the responsibility of building owners working with their insurers to have their buildings structurally assessed by engineers.

A. Yes.

5 Q. You've mentioned that you were operating under some constraints. What about once people came back to work. Why not initiate some sort of re-examination of buildings such as this once the resources were available after Boxing Day?

10 A. I think by that stage, right through that period we were experiencing aftershocks and this was a more severe one but it was another aftershock so it was considered that once people went back and they looked at the buildings themselves they could contact the Council if they needed some assistance but otherwise it was really up to them and their engineers to resolve any internal issues. There's nothing obvious to us I
15 guess, no collapsed part of this building, nothing obvious that would trigger an inspection from us.

Q. A point that Ms Falardeau's sister makes is that the Boxing Day aftershock was below the city and you heard Mr Mackinven say that the
20 general, his letter said that this general assumption across the industry was significantly changed by the Boxing Day aftershock and the realisation that we were dealing with multiple faults and also given the different orientation of strong shaking to the September 4 event.

A. Yes.

Q. So there are engineers within the Council, or there were engineers
25 within the Council during that period?

A. Yes.

Q. So did their assumptions not change in the same way that Mr Mackinven has described?

30 A. The decision was made at a controller level with engineering input that not to declare a state of emergency after Boxing Day so there was a reduced response to that event and that decision wasn't made lightly. It was fully considered but the Council made a decision not to declare and so our response was a scaled down response to what was clearly a

severe aftershock but not one that adversely affected a huge number of buildings. There was a limited number of buildings that seemed to be affected.

5 Q. So was the decision not to re-inspect all buildings that had been previously inspected tied into the decision not to initiate a state of emergency?

A. There's certainly a linkage there.

Q. Was that because of the indemnity that may have been provided to engineers?

10 A. No not at all, not at all I don't think. It was basically we'd experienced a lot of aftershocks. We'd responded to the aftershocks. If there was damage apparent then we would have responded, but we had to scale down the response because it wasn't a civil defence emergency. For example a number of us rang in and said do you want us to come back,
15 should we come back because this is so serious. The decision was made that we wouldn't do that, so it was a scaled down response.

WITNESS REFERRED TO BUI.COL753.0011.25

20 Q. This is a conservation covenant which was on the Council's documents produced to the Royal Commission and it relates to 759 Colombo Street. Is that right?

A. Yes it is, yes.

25 Q. So according to this document - point E in the preamble deals with it – *"In view of the importance of the property the Council has agreed to pay the owners \$35,000 as a contribution to the seismic upgrade of the building"*. And this document is dated 22nd of February 2002. So this was made pursuant to s 77 of the Reserves Act?

A. Yes it was.

30 Q. And the effect of it was that the Council agreed to pay the \$35,000 which was put towards the seismic upgrade and the quid pro quo for that was that there would be a conservation plan agreed by the parties.

A. Yes.

Q. And that the owner would comply with the restoration, maintenance and conservation provisions set out in the agreed –

JUSTICE COOPER:

Conservation Covenant.

5 **MR ELLIOTT:**

I'm sorry?

JUSTICE COOPER:

In consideration of this contribution the owners have agreed to enter into a
10 Conservation Covenant.

CROSS-EXAMINATION CONTINUES: MR ELLIOTT

Q. I'm sorry Your Honour, a Conservation Covenant, yes, and the owner
would –

15 **JUSTICE COOPER:**

I mean there may have been a conservation plan as well, I don't know, I
suspect there probably was.

MR ELLIOTT:

20 Oh in fact there was Your Honour, it's referred to in the first heading, so I think
the Covenant provided for the drafting an agreement of a plan.

JUSTICE COOPER:

Yes. Oh well your question was right then. I shouldn't have interrupted.

25 **CROSS-EXAMINATION CONTINUES: MR ELLIOTT**

Q. Thank you Your Honour, and so the owner was required to comply with
the restoration, maintenance and conservation obligations set out in the
agreed plan. So that's the way the arrangement worked.

A. Yes.

30 Q. This was a category 4 heritage status building, wasn't it?

A. I believe so.

Q. So that's the lowest category of –

A. Yes.

Q. What sort of criteria would the Council have applied in making the decision to enter this covenant in this case?

5 A. I believe it was, having read heritage evaluation of this building, was that collectively they saw this as being located in a part of the town where they wanted to preserve heritage. It was part of one of the last remaining blocks of buildings which had very ornate façades and was quite a distinctive part of the block between Cathedral Square and
10 Victoria Square so I believe that the owners would have applied to the Council for a heritage grant and explained that that would enable them to preserve that building and that would help them economically to do what they needed to do to upgrade it. So it wasn't uncommon for people to apply to our seismic fund if they had a heritage building.

15 Q. So s 77 of the Reserves Act says that the purchase price of any Conservation Covenant to which a local authority is a party may be paid by the local authority out of its general fund or account or out of a separate account kept for the purchase of land to be held as public reserves or may be apportioned by the authority between that fund or
20 account and that separate account.

A. Yes.

Q. So did the Council have a general fund and within that fund it apportioned a certain amount for people to apply for that sort of assistance?

25 A. Yes it was a fund of a number of hundreds of thousands of dollars that could be, that was topped up every year. It was administered by and governed by the Heritage Committee of the Council. So people would apply to the Council for a grant. A grant would be considered and then a recommendation go to the Heritage Committee who would agree to
30 either make the grant or not, subject to conditions clearly.

1415

Q. Just looking to the future. Unreinforced masonry buildings throughout the country and obviously the tension cost of upgrade is a big issue for

people and there's the heritage issue as well. Is this type of assistance a realistic way to deal with the economic difficulties of upgrades do you think?

5 A. I think realistically it is and I think local Government generally accepts that they have a part to play in making it easier to upgrade unreinforced masonry buildings, indeed any earthquake prone buildings. One of the things that our council was going to do was actually to consider putting aside some, a larger fund over a 20 year period to help, in particular unreinforced masonry, buildings to be upgraded and make it a loan to
10 the owners to facilitate that upgrade. That was going to be part of our long term community plan considerations which would have occurred in 2012, but because of the earthquake our council won't consider that till 2013 .

15 Q. Was that sort of arrangement being contemplated before the September 2010 earthquake?

A. Yes it was linked to our introduction of the timeframes around our earthquake prone policy so when we went out to the community that was one of the community's suggestions and the council was going to further consider that.

20 **RE-EXAMINATION: MR LAING – NIL**

COMMISSIONER CARTER:

25 Q. Just a question around the list of protected properties that the council has developed. Is it a mandatory requirement within that list to have achieved a certain strength in relation to earthquake resistance before one can get on that list?

30 A. We protect – in our city plan – we protect a number of heritage buildings and the importance level of those buildings is paired to its national or local or regional significance. We don't specify the level of strength but obviously the importance level of the buildings would trigger a need to help them to get to a level of strength. So if I took some examples, the cathedral, the art centre, the museum all subject to council grants on

either an annual basis or in a bulk sum to upgrade buildings. So the council was quite generous in regard to those buildings of real national and regional significance and other buildings were encouraged to upgrade and apply to the seismic fund but obviously they got lesser amounts pending on their importance levels. Did we specify a particular strength level? No we didn't, but we were obviously, where buildings had a lot of people going into them, we need to see a greater level of strength and that's what we were moving towards.

5

Q. In the sense that the world changed a bit on the 22nd of February do you think there's something that the council might be reconsidering the sense of preserving a property that does not have a certain level of earthquake resistance?

10

A. I think there's a couple of things there. Obviously the remaining heritage buildings are perhaps more valuable to us in a sense and I'm sure the council will want to consider contributing to getting those to a high level of strength. I know they're sitting back in respect of a couple of buildings – the Canterbury museum in particular, and yes, so we will be looking at those over time and obviously trying to get them to, certainly our target level of 67% which is encapsulated in our earthquake prone building policy.

15

20

Q. Who would you classify as the beneficiaries of the preservation of you know cultural and historic places?

A. I think the council considers the general public the beneficiaries of having those buildings available.

25

Q. Yes. I realise it's a very difficult matter to handle but it just occurs to us that the beneficiaries may be a lot wider than the owner of the building who would on the face of it be subject to the greatest proportion of the cost of preservation. Would you agree with that?

A. I totally agree with that.

30

QUESTIONS FROM JUSTICE COOPER- NIL

WITNESS EXCUSED

MR ZARIFEH CALLS**PETER SMITH (SWORN)**

- 5 Q. Mr Smith, you have prepared a report in relation to the building at 753–759 Colombo Street, an independent assessment of the earthquake performance of that building and that report is before the Commission. I think your report is some 18 pages long?
- A. Yes.
- Q. Dated December 2011?
- A. Correct.
- 10 Q. I want to ask you really about three areas of that report. Firstly the structural failure of the building in the February earthquake. Secondly how or if that was affected by the earthquake strengthening that had been done on the building in the past. And then lastly just to look at some of the others that you see arising from this failure in terms of
- 15 lessons that can be learnt from it. So could we start with the structural failure of the building and could you describe that to us or is it more convenient to start with the earthquake strengthening.
- A. Could I start with the general photograph inside the back as background.
- 20 Q. Just refer to the number?
- A. BUI.COL7530019.1. As we've heard previously the building commences adjoining 751 which is the building with the very steep gable end. 753 I interpret to be the tenancy between those two columns with the hit-and-miss brick and plaster or stone in the vertical direction.
- 25 755 is a wider tenancy which goes between the next two columns. Then we've got 757 which again I think is similar width to 753. And the final one which again appears more similar to the width of 755 at 759. I'll just come back to that point later. We've seen that the building, the first floor of the building, is somewhere in behind that veranda that's concealed I
- 30 think at the present time. At about the band, the stone band above the first floor windows there is a ceiling level and then the roof itself is close to the top of the façade behind that similar stone band. The building has masonry walls returning back into the building at each of those column

lines as we interpret it and they went virtually full depth of the building. At this stage we're uncertain as to the extent to which 753 and 755 were opened up. There doesn't appear to be any documentation before the Commission as to any removal of the ground floor wall between those two tenancies.

5

1425

Q. But we heard from Ms Clarke that that occurred?

A. We understand there was some opening up, correct. If we can now go to the strengthening plans. First of all WIT.CLA0001 –

10

JUSTICE COOPER:

Q. Can I just interrupt, with respect to that opening up. Wouldn't that have needed a building consent?

A. One would expect so Sir.

15

Q. And you haven't been able to find any record of that?

A. We've had great difficulty with the consent documentation in respect of all the strengthening for this building, and I think as we'll go through it we can show a little bit of that.

Q. So the answer to my question is?

20

A. Sorry, can I have your question?

Q. You haven't been able to find any documentation relating to a building consent for the work of opening up that tenancy?

A. No.

CROSS-EXAMINATION CONTINUES: MR ZARIFEH

25

A. If we can go to the plans for the strengthening of 753, which are WIT.CLA0001.10. Now this we've seen this previously this morning. After discussions with Council I'm comfortable that this was the strengthening work to 753. Down the very bottom you'll see a date of 94. That is consistent with the information provided by the owner as to when the Mainzeal did some work, so I think there's a – it's very likely, I'm almost certain that this work shown on this plan related to 753. While I'm on there I will just draw attention to the fixing and the notation

30

in the second to top, in the right-hand corner, the second section out from the right-hand side, if we can enlarge that. It refers to the underside of roof level at what we interpret to be the ceiling level and as we have seen there is a – probably two metre maybe in excess of two

5

metre height from that level to the roof and the documentation appears not to cover any restraint of that upper portion of the façade, which as we'll see later is the portion that failed. If we could now go to –

Q. Just before you do that, where it says roof level, underside roof level, you're saying that that's underside of the ceiling?

10

A. Yes I believe that's intended to be underside of ceiling and I believe that's likely where it was installed. It refers to the – if you look at, there's a comment there, where did I see it, talked about the sarking.

JUSTICE COOPER:

15

Q. We need to have it expanded again.

A. Yes if we could get it –

CROSS-EXAMINATION CONTINUES: MR ZARIFEH

Q. Do you want it –

A. Yes, could we get it –

20

Q. – second to right one expanded again?

A. Yes please. Yes down the bottom of that it refers to existing 20 millimetres tongue and groove ceiling so I think that clarifies the intent of where that restraint was to be provided. If we can go back to the main plan again. I also think, and keep that in mind and look at drawing 11, which is the subsequent one.

25

Q. So you want the next page, .11?

A. Yes please. Thank you. The noticeable absence of the actual structure on these drawings I think has led to the misconception as to securing the building at roof level. I think it's always important that the proportions and location of the structure itself, the existing structure being the masonry structure, if that had been imposed onto that drawing I believe the upper portion of the façade would have been restrained.

30

It's the absence of that information on the drawing which leads one to believe that the restraining work is comprehensive. And if we could then have a look at drawing BUI.COL753.0011.13. Now this drawing I believe relates to 755, there's a handwritten note at the very top of the drawing referring to 755. The width is of concern. If you recall when we looked at the elevation of the building, 755 was a much wider than, or appeared to be much wider than 753, and yet that dimension is only very marginally wider than the width of the drawing for strengthening of 753.

10

JUSTICE COOPER:

Q. Which dimension?

A. The 4900 at the top, the very top dimension.

Q. What about the – what do you make of the legend stair side on the right there?

15

A. I – it's difficult to tell Sir, difficult to tell.

Q. Might that be a staircase?

A. It's possible.

Q. To which the frame was not applied?

20

A. It's not very effective to be able to strengthen if you can't fix to the main wall, but there's certainly, there's just a question mark there in terms of how that relates to the tenancy and we don't have any further information to make that call. It does say in the top right-hand corner, "*Reid threaded bar connection on the end of each bar for stage 2 beam connection*", indicating that there it was proposed to extend that into the upper floor at some stage, but again the documentation around the consent seems to be absent. As for the strengthening and upgrading of 759, which as we understand it, strengthening work was underway, there was a fire and there was subsequent fire reinstatement as well as strengthening. I have yet to sight any documentation for that work.

25

30

CROSS-EXAMINATION CONTINUES: MR ZARIFEH

Q. You mean plans or –

A. Yes, building consent documentation.

Q. Going back to 753. When you talk about the strengthening on the upper level being tied, perhaps not to the roof but to the ceiling?

A. Yes.

5 Q. You recall that photo that showed the suspended ceilings?

A. Yes.

Q. Just wonder if by reference to that you could indicate where you're talking about?

A. Yes, if we could go to that photo of that – after the earthquake.

10 Q. So it's 0004.10?

A. Yes. Now if we get the relationship of the strengthening works, the strengthening works. If you go to 753, the columns would have ceased just above – about the top of the windows just above that, on the boundary wall and similarly on the inter-tenancy wall with 755 and there's this two metre, maybe 2.4 metre height of masonry which is left projecting above that strengthening level, which is unrestrained and which as far as we know there was no securing of that façade back into the roof framing at that level. At least we have no record of any at this stage, and as you can see the façade has failed by an outward rotation about the top of the lintels above the first floor windows. It's torn, there is evidence of sort of metal ties in some of the courses of brickwork on those intermediate walls which have pulled out of the masonry in the front, but there doesn't appear to be any evidence of any other strengthening work back into the building.

25 Q. When would those ties have likely been put in?

A. Almost certainly when the brickwork was laid up, going back to the time that the building was constructed.

1435

30 Q. In the first plan you showed us, you referred us to, it referred to a tongue and groove ceiling.

A. Yes.

Q. So are you saying that would have been the, that ceiling or the upper one?

A. That's, it would have been at the level of just above the level of the windows in the first floor.

Q. But would that not be the false ceiling that might have been put in later?

5 A. I think, when you come to 759, which is the right-hand tenancy, that tenancy had fire damage and it had to be reinstated. By the way the white frames, I think, of the windows are due to fire reinstatement of that tenancy rather than to anything else. It also, I think, we can see in that photograph some steel members running back into the building quite clearly there on what is the south wall of the tenancy 759. So that's the strengthening work that was introduced into 759 and there also appears to be something across the front. It's a bit difficult to tell and there's a subsequent photo I think of 17.18.

10

Q. But there appears to be that false or suspended ceiling on 757 as well there?

15

A. That would be the original ceiling I believe which would be timber-framed with sarking underneath.

Q. So with that gap from the original.

20

A. Yes the space above the ceiling to the roof would have been provided to provide a fall on the roof of these units which do extend quite well back into the section and it simply had a mono-slope from the façade at the front right to the back of the building.

JUSTICE COOPER:

Q. Wouldn't it have been used for any storage purpose?

25

A. No I don't believe so, no. It was really to provide an elegant façade. It's quite possible the architect was governed, was guided by the adjoining building to try and make it appear to integrate with that, in selecting the height of the façade. If you look at that photograph you'll see in the 759 tenancy on the right-hand side the appearance of the roof is different and those, I believe are Brownbuilt purlins which were used to replace the roof framing when, after the fire.

30

Q. Just let's record that we're now looking at another photograph – 17.18.

A. I think it's possible to see the sort of darker timber framing in the other tenancies but in this one they were Brownbuilt purlins which were replacing the burnt out timber purlins.

5 **COMMISSIONER CARTER:**

Q. Do you think that that parallel panel is installed at the head of the window level under the ceiling?

A. On which tenancy?

Q. Right across.

10 A. I think there was a, there was certainly a channel provided, I suspect as drawn below the ceiling in 753. We're surmising an awful lot of this but I don't see any reason why you would try and install that up in the ceiling space which would be much more difficult. It's almost certain they would have put it in the location shown. It's possible they had a ceiling,
15 suspended ceiling underneath that, which concealed it from view. In 755 there was no strengthening above the first floor. In 757 there was no strengthening at all. And 759 we've seen from the other photograph the steel work within the roof space because it was, again, being rebuilt after the fire and it was easy to conceal it up in the roof as it was to put it
20 below the roof level.

Q. So if there was no channel at that point for three of the tenancies, the reason that the wall stayed in place up at that level could have been that it tied back into the ceiling?

A. I suspect so, sir, yes. There were two, actually there was only the two,
25 the two central ones that wouldn't have had a tie at that point.

CROSS-EXAMINATION CONTINUES: MR ZARIFEH

Q. You said before that there was quite a lot of surmising on your part. I was going to ask you how certain you can be about, from the documentation you've got, where the façade was tied back (overtalking
30 14.39.56).

A. We really can't be, all we can do is look at the information available and try and draw what we can from that. The documentation for the

consenting of other than the 753 seems to be quite incomplete at this stage.

Q. Leaving that aside then, it's clear that different levels of strengthening were done for the different tenancies?

5 A. There was a different approach to the strengthening for 755 only that it didn't extend above the first floor. I assume that the level of strengthening was not vastly different.

Q. And none for 757?

A. None, no.

10 Q. So has that had any effect on the failure in February?

A. I don't, it's difficult to see any obvious effect from it. Really the building has lost the upper façade. As far as we can tell there was no securing of the upper level and in that respect they were in very similar condition above that level, whether they'd been strengthened below that level or not.

15

Q. Is there anything else you want to say about the structural failure?

A. I don't believe so.

Q. You've covered it. Turning to the issues that arise and just looking at your report you've talked about the upgrading of unreinforced masonry buildings which you've spoken of before. Just tell us briefly what you're saying there?

20

A. Essentially what we've said and with the building having been strengthened more than we believe at the time there's a little bit of impact, but clearly if we are to prevent the level of loss of life that occurred in the Canterbury February earthquake we need to be addressing the low strength that these buildings have and, in particular, the weakness of the façades and the vulnerability of the façades, whether they're over the street or over an adjoining building, and it's only by taking action to progress the earthquake prone policies of territorial authorities throughout New Zealand that we will help to overcome that loss of life.

25

30

Q. And I think Mr Lewis was echoing those comments this morning wasn't he?

A. Yes.

Q. And the other issue you touch on is the issue of rapid assessments following a substantial earthquake.

5 A. Yes. It's been apparent from looking at many buildings that the rapid assessment process, for a level 1 in particular for these unreinforced masonry buildings it's not robust enough. This building did get another relatively robust inspection which was favourable and I think we can assume that the building was relatively undamaged prior to the February earthquake. Nevertheless the building did have some weaknesses
10 which would have shown up from a more comprehensive assessment. I think we do need to review strengthening work when we look at a minimum strength I think. But if the earthquake is significant enough we should be identifying the strength level that is appropriate for public safety in these unreinforced masonry buildings and that we don't simply refer back to documents but actually do a robust review of the
15 documentation that has been undertaken for strengthening.

Q. And have you got an opinion on the level?

A. I suspect that could change according to circumstance. I think the severity of the earthquake, the location of the earthquake may well
20 determine quite different levels of strengthening. It may be appropriate in some cases to simply look for no damage. In other cases it may be a reasonably high level of strength that's felt appropriate.

CROSS-EXAMINATION: MR ELLIOTT

WITNESS REFERRED TO BUI.COL753.0011.11 – POWELL FENWICK

25 **CONSULTANTS DESIGN FEATURES REPORT**

Q. It is not clear on the face of the document which number of the buildings it refers to. Do you know?

A. I suspect that, my suspicion is it relates to 755 and it's dated, the date in the code at the top right-hand side is 95007 and I suspect that relates to
30 the 95. That's after the consent for 753, so I suspect it relates to 755.

1445

- Q. Well the report was designed or addressed to meeting the provisions of NZS4203 1992. I will just refer you to the second page 0011.12, if the upper paragraph could be highlighted please? It talks there about wall face loads, talking about the brick walls complying with a dynamic analysis method suggested by an article apparently by Professor Nigel Priestley?
- 5
- A. Correct.
- Q. Are you familiar with that article?
- A. Yes.
- 10 Q. And using the method referred to there the expected failure accelerations for the ground first, ground floor, first floor and parapet range between 0.9G and 0.94G. In your report you say that the building was likely to have been subjected to a ground acceleration of 0.9G on the 22nd of February, which would equate to 1.25G at first floor level?
- 15 A. Correct.
- Q. So is it right that the expected failure accelerations contemplated by Powell Fenwick based on Professor Priestley's paper and so on allowed for an expected failure up at about the same level as was experienced on the 22nd of February?
- 20 A. Possibly slightly less. I must admit those figures seem relatively high. I did notice in the documentation that the walls were shown as 400 thick full height where they were showing and I suspect looking at the photos following the earthquake that the upper portion of the walls above ceiling level at least were only 2 to 3 wide and the information may not have
- 25 been totally reliable but without seeing the calculation it's very difficult to be more precise.
- Q. Just perhaps taking a simplistic view of it but the range is between 0.9G and 0.94G. You make the point in your report that accelerations would have equated to 1.25G at first floor level and it was at the upper level
- 30 alone it seems to have failed.
- A. Yes I think the reason for that failure. We do know that earthquake had a significant vertical component and these calculations using the

Priestley method take no account of vertical acceleration so I'm sure that would have been a significant factor.

RE-EXAMINATION: MR LAING – NIL

5 COMMISSIONER CARTER – NIL

WITNESS EXCUSED

MR ZARIFEH:

I do not have any re-examination but it appears to me that Mr Freeman whose name appeared on that Powell Fenwick ledger that Mr Elliott referred
5 Mr Smith to a moment ago is a witness in relation to tomorrow's hearing and it just occurred to me that I wasn't intending on calling him at this hearing because I thought that the issue of what has been strengthened and what hadn't has been sorted, but this other issue as to exact details if it's going to assume any relevance it could perhaps be covered tomorrow in brief terms
10 with Mr Freeman.

JUSTICE COOPER:

We could adjourn this hearing until 9.30 tomorrow on that basis.

15 MR ZARIFEH:

I was thinking just perhaps covering it. He may or may not know because it's sometime ago with the records. That's the difficulty I think he has but I'm in Your Honour's hands.

20 JUSTICE COOPER:

Well what do you want me to do?

MR ZARIFEH

I was just going to cover it when he gave evidence in relation to the other
25 building. I appreciate it's mixing them up a bit.

JUSTICE COOPER:

I suppose it is a discrete point we could deal with it that way yes.

30 MR ZARIFEH:

As I understand it the next of kin and the family are not, are watching it on the internet rather than coming to Court.

JUSTICE COOPER:

Yes they are in North America.

MR ZARIFEH;

- 5 Yes sir so that won't inconvenience them if they want to look at that detail they can watch it tomorrow.

JUSTICE COOPER:

- 10 Well apart from that issue that Mr Zarifeh has just addressed this concludes the enquiry into the failure of the building at 753 to 759 Colombo Street and our conclusions on what we have heard will be set out in our final report when it is released later in the year and we are now adjourned until 9.30 tomorrow morning.

- 15 **COMMISSION ADJOURNS: 2.50 PM**