Canterbury Earthquakes Royal Commission

Te Komihana Rūwhenua a te Karauna

UNDER **THE COMMISSIONS OF INQUIRY ACT 1908**

IN THE MATTER OF **CANTERBURY EARTHQUAKES ROYAL COMMISSION**

Before: The Honourable Justice M Cooper
Judge of the High Court of New Zealand

Sir Ron Carter
Commissioner

Associate Professor Richard Fenwick
Commissioner

Appearances: S Mills QC, M Zarifeh and M Elliott as Counsel Assisting

H B Rennie QC, W J Palmer and K M Paterson for Alan Reay Consultants

D J S Laing, N D Daines and K G Reid for Christchurch City Council

M J Wallace for D Flewellen

S J Shamy for G Calvert

CANTERBURY TELEVISION (CTV) BUILDING COLLAPSE HEARING

COMMENCING ON 25 JUNE 2012 AT CHRISTCHURCH

JUSTICE COOPER:

Today we begin the hearing into the failure of the CTV building in the earthquake of 22nd February last year – 115 people lost their lives when the building collapsed. We acknowledge the presence here today of many who lost family members in this tragedy and also those relatives who may be watching these proceedings from overseas. We express our deepest sympathy to all of you. We acknowledge too those who survived, some of whom were badly injured but all of whom endured a most traumatic event. Many of you lost colleagues and friends and are still living with the awful memories of that day. Our sympathy goes out to you as well.

Now before we begin the hearing we are going to acknowledge the St Theresa's Parish and school who have allowed the Royal Commission to use these premises since last August. It was the school assembly hall and gym and those activities have been displaced. Children from St Theresa's have prepared tributes to those who lost their lives in the earthquake which are on display in the annex. They include a tribute in the shape of a cross on which there are 185 flowers arranged, one for each person who died in the earthquake and whose names were read out when we commenced our first hearing last October.

The school choir and kapa haka group wanted to welcome you here today into their place and they are going to sing to us now. Some of the children will be carrying flags, the ten flags representing the nationalities of those who died in the CTV building.

ST THERESA'S CHOIR SING

COMMISSION ADJOURNS: 9.40 AM

COMMISSION RESUMES: 9.43 AM

JUSTICE COOPER:

Takes appearances.

JUSTICE COOPER:

Yes, anyone else? Just a few procedural matters first. Just as to the hours we intend to keep. They are on Mondays 10 to 5 notwithstanding we've started, we've begun by starting at 9.30 today but normally we will start at 10 o'clock on a Monday. On every other day we intend to start at 9.30. There's a break mid-morning, at about 11.30, for quarter of an hour. We then resume and go through till lunch which will be between one and 2.15. The hearing will then resume and take place from 2.15 till 3.30. There will be another break then for afternoon tea and we will continue from quarter to four through till five. Those of you who have been following our procedures in previous cases will have observed a degree of flexibility about those hours. We don't want to be so flexible in this hearing because it's going to be a long one and people who are interested in attending it as well as counsel who will have much work to do I think are entitled to know with some certainty what hours the Commission intends to sit. So we will need a very good reason to depart from those hours. Recognising the length of the hearing counsel can come and go during it without formality. I will shortly ask Mr Mills to make an opening submission on behalf of counsel assisting the Commission. Any other party who is affected and wishes to make an opening may do so at an appropriate time. I invite counsel to confer about that and let us know what is proposed in advance. May I say to those who have been affected directly by this tragedy that the hearing will proceed in an orderly way and one which is designed to achieve its purpose, which is that of an objective enquiry to try to ascertain why it was that this building collapsed so catastrophically. For some of you directly affected by the tragedy it may seem like a cool and dispassionate process. I'm afraid that that is the way it has to be but we do not embark on the process without appreciating the emotional toll that these events will have had on those who are directly affected by them.

Unless anybody has anything they wish to raise at this stage I will ask Mr Mills to open. Thank you. Mr Mills.

MR MILLS OPENS:

Just a few preliminary points before I start into the content of the opening. First just to make sure that the Commissioners have got what I think you've got. You should each have a copy of the opening submission. You should also have a bundle of documents, and I think you do, looking at your desks. That includes hard copies of every document that's referred to in the opening. Not all of those documents will be ones that I'll actually refer to in the course of the opening. Most of them I will but there'll be some that I won't but they're all, all of the ones that are actually identified in the opening are in that bundle that you've got in front of you. You've also been provided, I hope, with a chronology which was put together by the legal staff and counsel assisting. It's not an agreed chronology. It's been provided to all of the affected parties and, of course, if any of those have a comment on any of the aspects of it as the hearing goes along we can add to it but I don't think it will be contentious and I'm hoping it will be helpful for you as the hearing goes along. You'll also find at the back of the written opening what's described as a schedule, a schedule of some frequently used engineering terms. That was put together in recognition of the fact that for people who aren't structural engineers quite a lot of the terms that get used in the structurally engineering field will be entirely unfamiliar. Often they're words you might be familiar with but they have a different meaning in this context and we thought that this might be helpful, not so much for the Commissioners who are familiar with all of this by now but for the media and for others who are trying to follow this hearing and understand it. I will, to the extent that I am capable of doing it, try to explain some of those terms as we go along. At any rate that's at the back of the opening.

JUSTICE COOPER:

Thank you.

MR MILLS CONTINUES:

I turn then to the opening itself.

On 22 February 2011 the CTV Building collapsed under the effects of a magnitude 6.3 aftershock.

The effect on the CTV Building was sudden and shocking. Most of the eye-witnesses to the collapse who have been spoken to by Counsel Assisting have referred to the building collapsing in a matter of seconds. While, of course, it's well understood that a sense of time in a crisis like this can be unreliable the concurrence of the eye-witness views on this strongly suggests that the collapse was almost immediate.

Not only did the building collapse extremely rapidly, it collapsed almost completely. Unlike, to take one example the Commissioners looked at, the PGC Building, where significant cavities were left following the collapse which enabled a number of people to survive, the CTV building appears to have essentially pancaked. All that was left standing was the haunting image that's now come up on the screen which I think most of the country would have seen in one form or another, the haunting image of the north core of the building which contained the lifts and other services and which was designed to provide the principal seismic strength to the building.

The other element of the building that was designed to provide seismic strength to the building was what's referred to as the south coupled shear wall, I mention these terms because they will come up repeatedly, and this collapsed to the north – and there's the remnants of it. It was in behind the emergency, external staircase and we'll see that in other photographs I think as we go through. So in behind that was the so-called south coupled shear wall and that appears to have collapsed to the north on top of the floors. The photographs that we've seen post-collapse, and again we'll see some of those during the course of the hearing, showed that some remnants of the floor diaphragms remained connected to the north shear core following the collapse but most did not.

The eye-witness accounts and the observable evidence following the collapse also suggest the conclusion that the building collapsed almost vertically, as though it had been a controlled demolition is how some of the witnesses have referred to it. There's a photograph, I thought we'd had another one but we couldn't find it when we were searching in the course of this opening. You can see there that red car. These cars were in front of the southern side of the building and the evidence was that they were essentially untouched when the building came down despite the fact that they were parked quite close to it.

Now as Your Honour mentioned 115 died as a result of the building collapse. Other than Maryanne Jackson, who was the receptionist at CTV who ran from the building just before it collapsed there were, tragically, no survivors within the building on Levels 1 and 2 where CTV was located. The highest number of survivors was on the top floor. Now there is an issue here about how floors are being referred to. Some people have referred to the bottom floor as the ground floor.

0955

We've tried as far as possible to refer to the bottom ground floor as the first floor and that's the reference here to level 6, that involves counting the ground floor as level 1 which I said is what most of the witnesses do but occasionally I'll just have to draw your attention to the fact that somebody's giving a number which uses the ground as the ground floor. So I say again that the highest number of survivors was on the top floor, level 6 which was occupied by Relationship Services. People there survived because the floor came down sufficiently intact for them to virtually walk out at street level and that photograph is actually of Kendall Mitchell who will be giving evidence who was on level 6 at Relationship Services when the earthquake struck and there she is being carried out really at street level with her two little children.

It is a matter really of great good fortunate that at the time of the collapse not all of the space in the building was tenanted. Fortunate too that because of the hour of the day some people who would otherwise have been in the building and who would almost certainly have died in the collapse were out at lunch and the Commission will hear evidence from some of those people

including two of the CTV staff who observed the collapse, and one of them in particular was extremely fortunate to have gone out to lunch.

Now turning to the occupants of the building. As I mentioned a moment ago levels 1 and 2 were occupied by CTV, they had been a tenant since 2000. Going Places Education had occupied level 3 of the building but moved out on somewhere round the 20th or the 21st of December 2010. I do emphasise that the move had nothing to do with the condition of the building. As a result of that level 3 remained vacant on 22 February. Now I also do just pause there to note that the fact that Going Places Education potentially raised the question of a change of use of the building when they moved in as an educational facility will come up in the course of other aspects of the evidence, so I just flag that for the moment, that the fact that were an educational establishment, even though not there it's an issue that does come up again in the hearing.

The principal tenancy in the building on the 22nd of February was on level 4. This was Kings Education and that operated a variety of language and aged care education programmes. On level 5 there was a medical centre called The Clinic. They moved in in early January 2011 and as a number of people will be aware that was after the existing building they were in in Gloucester Street had been red-stickered.

On the top floor as I mentioned a moment ago was Relationship Services. They had been there for some years and occupied only about half of level 6, the balance of that floor as well being unoccupied on the 22nd of February.

Touching briefly on the report that has been done for the Department of Building and Housing which I have referred to in the opening as the consultants' report and more will be said about this later and much more will be heard about this in the course of the hearing. The report that they did identified both higher than expected horizontal ground motions and exceptionally high vertical ground motions as contributing causes of the collapse. Response spectra records show that the horizontal accelerations to

which the CTV Building was subjected in the September earthquake were around the level contemplated by NZS 4203:1984 which is the loadings code as the Commissioners will be aware, and that's just come up on your screens there and you'll see that the solid blue line that runs across is the design level expected at the time that the CTV building was designed and built and that solid slightly wavy grey line that goes across is effectively capturing the various movements that the building experienced which of course is the spiky thin line underneath that, and the consensus of the evidence I think is that the period, the time period at which the CTV building was effectively susceptible was at one second which of course is that line across the bottom, so one can see that while higher than that blue line, it's not at least at that time period exceptionally higher, so that's September.

When we look at the next one which is February there's a significant difference. So there's the February one and one can see that the line is well above what the building was designed to, or at least required to be designed to and these are the issues that are being referred to as exceptionally high, horizontal and vertical forces that the building was subjected to.

I then note in paragraph 14 of the opening and I can put it more strongly than I have there, the applicable codes that applied at the time at which the CTV building was designed, did not require the structural engineer to take potential vertical accelerations into account and the significance of these high vertical accelerations will get considerable attention from a number of the expert witnesses that the Commission will hear from.

I am going to turn next briefly but I think it's important to the Commission's terms of reference for this hearing, it does I think need to be clearly understood what it is that the Commission is looking into, and it is not looking into. The investigation that the Department of Building and Housing carried out into the reasons for the CTV building collapse described itself as I note there as a technical investigation into the reasons for the collapse. The terms of reference for the Royal Commission encompass a wider enquiry than that and in preparation for this hearing this has involved the Royal Commission's

lawyers and investigators in a close examination of the permit process, construction issues that might explain construction defects that the consultant's report for the Department of Building and Housing identified and a close examination of issues of code compliance. The investigative process that's been carried out has also looked closely into how the design for the CTV building was developed and the circumstances in which remedial measures were taken in 1990 and 91 to address potentially serious inadequacies in the connections between the floor diaphragms and that north shear core which is what we saw in that photograph that remained standing after the collapse. The Commission lawyers and investigators have also looked closely at the assessment process beginning with the post-September assessments.

Now I don't propose to go through paragraph 16 but it think the image will come up so people can look at it. That's my paraphrasing really of the relevant parts of the terms of reference inserting the CTV specifically into the questions that the Royal Commission is enquiring into. One of the things I do just draw attention to with that is sub (d) up there, which refers to legal and best practice requirements and I mention that because one or two of the expert witnesses have been reluctant to express a view on best practice requirements but it is quite specifically part of the enquiry into this, not just what was the legal requirement but would be the best practice requirement in relation to questions of design and construction.

In paragraph 17 of the opening I note that in addition to those quite specific terms of reference that relate to the CTV building, the Royal Commission is also directed to enquire into more general issues of legal and best practice in relation to building design, construction, maintenance, managing of risks and so on, quite generally, and so while the CTV building isn't referred to specifically in that part of the terms of reference, quite clearly to the extent that knowledge is gained from this hearing that has wider, more generic implications, almost systemic implications, that too is part of what the terms of reference require the Commission to be considering in this hearing.

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In paragraph 14 I note, as I've had cause to do in previous, on previous occasions, what it is that the Commission is specifically directed not to enquire into and this is the question of liability. This hearing is specifically not enquiring into or examining questions of legal liability. As I say there that doesn't, in my view, foreclose an enquiry into or a determination of errors or failings in design, inspection, permitting or construction that might have caused or contributed to the collapse of the building and the subsequent deaths and injury but actual findings of legal liability is not part of this process.

I turn then to another issue which I know has been of considerable concern to a number of the families of the bereaved and this is the question of the fire that at some stage occurred after the building collapsed. Now that issue was not addressed as part of the Department of Building and Housing investigation.

Counsel assisting has required the Fire Service to answer the following questions about the fire and I have set them out there and it is a paraphrase of a letter which I think is about to come up so that people who are interested can see the actual text of the response but what we asked the Fire Service was whether an investigation had been carried out into the cause of the fire, whether it was now possible to provide an informed view on the cause of the fire and whether the Fire Service has any records of potential hazardous substances at the CTV building and in reply is the letter that you'll now have on your screens. I'm not sure how visible that will be to people sitting behind me but those who've got screens will be able to read it and essentially it says that no investigation was carried out at the time and this is because the Fire Service officers were focused on the rescue and recovery process. Secondly, the collapse and de-layering of the building during the search and rescue operation prevented any likelihood of gathering useful evidence about when and how the fire started because fire investigations rely heavily on a static scene. The third point made in that letter is that given the depth of the fire no useful conclusions are able to be drawn from videos, photographs or the statements of witnesses and, finally, while it has no record of potentially hazardous substances at the site it did ascertain from the Christchurch City

Council records that there may have been a 9 kilogram gas cylinder in the building and, of course, it's a possibility that gas escaping from that cylinder could have been ignited as a result of the collapse and, of course, as we know there were cars parked underneath as well, all of which would have had inflammable material in them.

So that letter for those who want to look at it again is posted on the Commission's website. It's a public website. People can access it and read it and the Commission has also advised the author of that letter, Mr Paul McGill who's the Chief Executive and National Commander, Acting, that he will be required to appear during the course of the hearing to give evidence and I anticipate that will be towards the end of the hearing.

I turn now again just in a preliminary way trying to lay out a sort of a road map for things that will come up in this hearing to the question of the New Zealand Standards and specifically their legal status. There may be some subsequent dispute over some of these points, I don't anticipate there is but any rate I will run through my view on this.

Now at the time the CTV Building was designed there were two New Zealand Standards that were specifically and particularly relevant as the Commissioners will be aware. They were NZS3101:1982 which is described as the code of practice for the design of concrete structures, CTV building being a concrete structure, and 4204:1984 which is described as the code of practice for general structural design and design loadings for buildings.

JUSTICE COOPER:

I think that might be 4203, 1984.

MR MILLS:

Sorry, have we got an error there. Yes, I think we do. 4203.

JUSTICE COOPER:

It's 4203 just reading ahead.

MR MILLS:

1984.

JUSTICE COOPER:

By the time you get to the next page, they can't both be right.

MR MILLS:

It is 4203. I'm sure it is Your Honour.

JUSTICE COOPER:

Thank you.

MR MILLS:

So the latter is the general one and it's the later one, 1984, the earlier one is specific to concrete buildings is the first point that I note about it. Secondly, where do these New Zealand standards come from? Well, they're issued by the Standards Council and that Council is established under the Standards Act 1965 and when one looks at that Act we find that the legal status of the New Zealand Standards depends upon whether they're incorporated into bylaws and in the present case there is a relevant Christchurch bylaw. It's just come up on the screen again, not terribly easy to read. No, those are the provisions in the Act sorry.

JUSTICE COOPER:

No they can't be can they because the heading refers to the bylaw.

MR MILLS:

No you're quite right. So that's a part of the bylaw. That's part of Christchurch City Council Bylaw No 105 and that does two things that I draw your attention to. The first is that it incorporates specifically into the bylaw parts, but parts only, of the two New Zealand standards that I just referred to. It also lists in the second schedule to the bylaw both of those standards, in effect, in their entirety along with various other standards and so on which

aren't relevant to this hearing and in respect of the various standards and specifications and so on that are referred to in the second schedule they are specifically said to not be part of this bylaw and that's what you've now had extracted or highlighted on the screen from the document in front of you. So they are specifically said to be not part of this bylaw.

JUSTICE COOPER:

Well what's all that about?

MR MILLS:

Why have they done that, is that your -

JUSTICE COOPER:

Mmm.

MR MILLS:

Well I'm not sure of that and we've, we have or are about to ask the Council if there is any material that they have at the time that the decisions around this bylaw, and what was incorporated and what wasn't, took place. That may assist Council itself, in the course of the hearing might be able to assist, but the effect of it certainly is that there is a difference between the portions of the two New Zealand standards which are specifically repeated in the bylaw and become part of the bylaw, which I'll take you to in a moment, and the reference in their entirety to the two standards in the second schedule which don't become part of the bylaw but are used for a different purpose and I'll just take you to that right now and you'll see in paragraph 25 of the opening submission which quotes from clause 5 that it says, "Proof of compliance with the specifications, standards and appendices named in the second schedule shall be deemed in the absence of proof to the contrary sufficient evidence that the relevant degree of compliance required by this bylaw is satisfied." So that's the part I emphasise, "Shall be deemed in the absence of proof to the contrary," and then it goes on to make that point that was just highlighted on your screens. Now –

JUSTICE COOPER:

But then there are particular parts of the standard which are repeated in the bylaw.

MR MILLS:

Yes there are, yes there are.

JUSTICE COOPER:

And those parts become part of the bylaw.

MR MILLS:

That is what in my view happens, yes, that's the effect of it. They have a legal force of the bylaw because they're specifically incorporated into it. Now, and I'll just go through that before I make some further comments on that, if that's all right?

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JUSTICE COOPER:

Yes.

MR MILLS:

I turn then to, well paragraph 29 really is, picks up this point directly. No it doesn't, it's really paragraph 30, 30 and 31. So what I've set out there, particularly in paragraph 31 are parts of the standards which are specifically included within the bylaw in clause 11, and they've just come up on the screen, and the one that – I'm just making sure we're on the, actually the one I want to take you to is the one that's in paragraph 31 of the opening.

JUSTICE COOPER:

I think that was it Mr Mills.

MR MILLS:

Was it?

JUSTICE COOPER:

Yes, because if I look at your paragraph (a) that is referring to clause 11.2.5.1.

MR MILLS:

All right, then let's have that again and I'll look more carefully.

JUSTICE COOPER:

And that is what, you quote the opening paragraph there, "The main elements of the building that resists seismic forces shall, as nearly as practicable, be located symmetrically." And then (b) moved on to, your (b) that you have quoted at the bottom of your page 7 –

MR MILLS:

Ah, yes I see, all right.

JUSTICE COOPER:

– is going into a level 2.5.2.

MR MILLS:

Yes, all right, sorry. Thank you. The provision that I've referred to in paragraph 31 of the opening under (b) is the one that I particularly draw the Commission's attention to, because this is a provision that will be referred to by several of the expert witnesses, not by reference to the bylaw but because of its presence within the New Zealand Standards, and it's this specific wording that may require some further thought. So this is on the question of ductility.

This issue about whether the building needed to be designed for ductility, and I'll come back to that, and this is going to attract quite a lot of attention in the course of the expert evidence because the question of whether there's been code compliance at least in a number of respects turns on, in effect, which road one goes down here and the extent to which the building was required to be designed for ductility. Let me just pause on that, this issue of ductility and

the question of whether the building is capable of going into what as I understand it the structural engineers referred to as that inelastic stage of the building deforming under earthquake forces. The point beyond that stage which again is referred to is the elastic stage where the building or its structural members are expected to return to their original position prior to being hit by the earthquake forces and return to it without damage, and be able to go beyond that into this inelastic stage where the building begins to absorb and dissipate the earthquake forces, does suffer damage and deliberately suffers damage but doesn't collapse.

This question is one that's going to attract a lot of attention, and this particular provision which I've referred to in 31(b) says, "The building as a whole and all of its elements that resist seismic forces or movements, or that in the case of failure are a risk to life, shall be designed to possess ductility…" And the question of the effect of those commas and whether that means that this is an alternative under this gateway provision is one on which the Commission will hear divergent views from expert witnesses when they address this question of whether the building, other than the two principal shear core provisions, the big north core and the south coupled shear wall which were both designed for ductility, whether other parts of the building also were required to be designed for ductility, and part of that difference of view for some of the witnesses turns on the way in which this provision is read.

JUSTICE COOPER:

It must be a difficulty in applying the words rather than in the words themselves I suspect, because that phrase, "…or that in the case of failure are a risk to life…" must be referring to elements that resist seismic forces mustn't it, otherwise why would it be in the plural?

MR MILLS:

I think, as I understand the arguments around this, and I touched on it later in the opening, one view of it is that unless they are elements that are intended to resist seismic forces or movements, then they don't need to be designed to possess ductility.

JUSTICE COOPER:

Well why would you have the next phrase?

MR MILLS:

Well that's the issue which in the end will attract some attention and all I can say to that at the moment with, I want to leave this open really while flagging the issue, is that, this is a lawyer's point, but the interpretation of bylaws is subject to the Interpretation Act. It comes within, in my view, within the definition of regulations under the Interpretation Act and so it is actually, the extent that it's in the bylaws, it is a legal, has a legal effect and it is subject to the normal rules of legal interpretation and I'm sure Your Honour will be reflecting on some of the things that have crossed my mind as well about what that might mean, but the engineers, the structural engineers have quite, it turns out they have quite divided views on this issue of whether all of the elements in this building are required to – needed to be designed for ductility because in the case of failure they were risk to life and this particularly involves the columns which were not designed for ductility they were designed solely to carry gravity loads, so-called. Just carry the weight of the building. They weren't designed for ductility.

Some of the engineers will say, some of the experts will say, but in the event of failure they clearly involved a risk to life, so in our view they should have been designed for ductility. The contrary view is no it doesn't have that effect, and the concrete standards contain some quite specific provisions which deal with ductility and they're complicated, at least I find them complicated, and apparently some of the structural engineers do as well because there's a difference of view about what they mean, but where that trail subsequently leads, as the two structural engineers on the Commission will no doubt be well aware, is into the question of whether a number of these elements were what are described as "secondary elements" and that in turn leads to certain requirements for ductility or not.

So I hadn't intended to go through it in detail, but there's, so it's a fork in the road in effect which some of the experts will take on this issue of the extent to which various elements of the building needed to be designed for ductility or could simply be designed to carry gravity which is as the Commissioners will hear when you hear from Mr David Harding who was the, I think it's fair to say, the principal designer of the building, the columns were designed solely to carry gravity and the only elements of the building that were specifically designed for ductility were the north shear core and the south coupled shear wall. The question of whether that met the requirements of the standards is a very live issue.

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Now I've really covered what's in paragraph 32 of the opening at this point and I turn then, again it picks up this issue of ductility to paragraph 33 in the opening, where I say that Dr Hyland who is one of the co-authors of the Department of Building and Housing consultants' report, has expressed the view in that report that the CTV building design did not comply with the applicable building codes in some respects and his co-author of that report, Ashley Smith, has provided his own brief of evidence in which he says that it did not comply but for different reasons to those put forward by Dr Hyland so again early on we've got differences of view between those two experts about the correct interpretation of the New Zealand standards, code provisions. They both say however that at least some of the columns in the CTV building should have been designed for ductility which it's acknowledged they were not.

Now there's a useful brief that's come in from Mr Arthur O'Leary, who's being called by the Christchurch City Council and again differences of view on the correct interpretation of the code provisions but he is expected to say that the columns and beam joints on line F which is the eastern side of the building should have been designed for ductility, and the connection between the floor diaphragm and the north shear core as permitted and built did not comply with the code although that remedial work which the Commissioners will be aware of in 1991 which involved the retrofitting of drag bars into the connection

between the floors and the north shear wall did bring it into code compliance and those issues will be dealt with in more detail later in this opening.

The Royal Commission has also retained Dr Murray Jacobs who is a very experienced Auckland based structural engineer to look at the issue of code compliance and he will also give evidence that in a number of respects the CTV building did not comply with code and he's one of the expert witnesses who reads that provision that you and I were just discussing Your Honour as dictating the direction on ductility because there was a risk for life if the columns collapsed.

Now there's a contrary opinion on these code compliance issues which will come from Professor John Mander who is being called by Alan Reay Consultants Limited. He says in his written brief that the building was designed in compliance with the applicable design and building codes.

In paragraph 37 I touch briefly on the evidence that I understand is likely to be given by Dr Alan Reay and his firm which was back then Alan Reay Consulting Engineer designed the building and he's expected to give evidence that with the passage of time there is now no certainty about the documentation used for the permit application for the building and as a result it is not possible to definitively state whether the building complied with the bylaw. It is correct that there is some confusion in the documentation. Council records are not perfect and we'll come to that but there is some uncertainty about some aspects of the documents that went in for the permitting.

At this point I thought what it might be useful to do is to bring up the model which has been prepared for this hearing and I just want to use this, it's a bit of a walkthrough of the building to again try and familiarise not so much for the Commissioners but others who were interested in this hearing with some of the features of the building that will get repeated attention. Now of course that's the exterior of the building and at the right, if you could just spin it the other way, that big white section we're looking at now that is the north shear

core which was probably the principal part of the building that was designed to resist the lateral movement of earthquake forces.

What we're looking at now just below those slotted windows is what gets referred to in the evidence as the western wall and there will be attention given to that and that is in part because it was apparently intended in the structural design to be separated from the rest of the building, in effect a seismic gap from the rest of the building and there's – so that it wouldn't affect the response of the building in an earthquake. There is controversy about whether as built it was seismically separated and the DBH consultants' report took the view that it was not and factored that into their analysis. That is disputed by other parties and evidence on it is mixed and in the end it may not enable a conclusive conclusion, but I identify that there because it will come up repeatedly so that's the western wall.

I think we're now going round to the south coupled shear wall. Yes, we're not looking at it quite as full on as I would like to but there we go, that's better, so there's the south coupled shear wall behind the external exit stairs and you'll observe that there are couplings in effect that run between the two shear walls where that – effectively where it's connected above those slots. So that was the other principal seismic resistant element of the building and the Commissioners will hear in the course of Mr Harding's evidence that he added that south coupled shear wall after receiving some original very preliminary plans apparently which didn't have it, and he did a so-called ETABS analysis of the building and realised that it would not meet code with just the north shear core and so this was added during the course of the design process and it then apparently met the required performance standards when it was run through the computer system, the ERSA system, so that's the south coupled shear wall, then I'm just going to go into a few of the internal elements of the building that will get considerable attention.

So that is the north, or just there, there's the lift so that's in the north shear core and we will be hearing, I think it's at some time today from a Mr Godkin and he describes himself standing in front of the lifts and so that's where he

would have been standing and that's part of the building that remained standing after the rest of it fell away. There's a column, again columns come up repeatedly and that's a look inside it and I've asked for that to be done because there's question of column confinement which is the combination of those vertical steel rods and the spiral reinforcement. That will be referred to and get considerable attention as to whether that so-called confinement was code compliant, whether it was sufficient to contain those columns. That in part turns on whether they're gravity only or are required to have ductility.

1035

I think we're going to go next to the beam column connections, another issue that gets a great deal of attention. So there's the beam, typical beam column connection and although it didn't get as much attention in the DBH consultants' report as the columns did, the DBH consultants' report seems to have concluded early on that the columns are really the issue and so focussed on those. I think there's evidence emerging now from several quarters which will focus much more on the beam column connections and the lack of, possibly the lack of sufficient connecting rods running right through the column along the beams. So that's the structure of that.

Then we're going to go into the connection between the floors and the north shear core again I think. We're back to the beam column joint. What I'm hoping to show you is the, ah, okay, what I'm hoping to show you is the, simply the connection as designed between the north shear core and the rest of the building and then the position of the drag bars that were installed in 1991 to try and strengthen that connection. Just while we're looking I just observe – and I should have mentioned this before – that one of the things that's apparent looking at the external view of the building is that the so-called north shear core sits outside the building envelope. It's attached, in effect, off the back of the building rather than being within the four walls of the building and the Commission will hear evidence in relation to the significance of that and the extent to which that made the building more vulnerable to twisting and to other movements as a result of the earthquake.

Now that shows the connections going into, I think it's looking up underneath the floor, going into the north shear core and I'm sure that the two structural engineers at least on the Commission will pick up more from this than I'm about to describe but what we can see there is that over, underneath the concrete, over the top of the beams, running across the floor there was steel mesh, we can see the steel mesh there and, again, this will get referred to, it's referred to as 664 mesh and we'll give an example of that and, sitting over there, we'll show that at some point during the hearing and then one can see also some connecting rods that run across the connection. We can see them running next to the north-south direction of the, of the mesh and we then go into the actual north shear core and I think we might then have a look at the drag bars and where they went in. So we can see them there just emerging, there's one, the dark object up there on the, up there, that's one of them. There's another view of them, the two so-called drag bars and one can see that they have run from the north shear core, there it is there, that's part of the north shear core, and these big metal bars have been fastened to that and then fastened to the floor itself and much more detail will be given about that but that's what has been meant when there's a reference to drag bars. They were installed in 1991 after Holmes Consulting Group had identified a concern with the existing connection between the floor diaphragm and the north shear core when they did a due diligence on the building for a prospective purchaser. They identified a concern and out of that came the drag bars. There are some significant differences probably, possibly, between what Holmes recommended and what was done, in particular as we'll, as I'll take you to in more detail momentarily, the Holmes' recommendation was that those drag bars be installed on every floor of the building, from the first floor up. So 2, 3, 4, 5, 6 were all to have these drag bars installed. What actually was done, only put them in on levels 4, 5 and 6, didn't put them in on levels 2 and 3 and that will attract some attention during the course of the evidence. But that's the structure of it and I thought it might be helpful just to go through that now so that people could get some sense of terminology and what it's referring to and I'll now go back to the history of the CTV building.

So, the history of the CTV building. The architectural design of the building was done by an architectural firm called Alun Wilkie Architects, a Christchurch firm. The original architectural drawings have not been located, although we do have a copy of the permit drawings.

At the time the CTV Building was designed and constructed, as I mentioned previously, Dr Alan Reay was practising on his own account under the name Alan Reay Consulting Engineer. The structural engineering design for the building was carried out by Dr Reay's firm, principally by Mr David Harding, but with some involvement by Dr Reay and the extent of that involvement seems likely to be a matter of dispute between Dr Reay and David Harding, but I do note that we've had some very recently disclosed time sheets which show Dr Reay's time on the CTV file as only 3.5 hours and no doubt Mr Harding will want to give attention to that.

On the 18th of August 1988 Alan Reay Consultants Limited was incorporated with Alan Reay as the sole director and shareholder. So that's the current firm but the design of the building was done by Alan Reay Consulting Engineer, and as I understand it from the company search Dr Reay is now one of five directors and a shareholder in the current company and I do, in fairness, note that the company itself has had no involvement in the original design of the building, the company, but it was involved at the time at which the drag bars were installed in 1991.

At paragraph 41 I note that the Royal Commission will hear evidence that the basic plan layout of the CTV building appears to have had its origins in a floor plan sketch prepared by Mr Michael Brooks who was at the time the managing director of Williams Construction Limited which is the firm that, at least initially, began the construction of the building. Now that is not actually his sketch but it is a useful document to look at and I think Mr Brooks will say that the sketch he did, while it didn't have that detail, was essentially a back of an envelope sketch which looked just like that at least in plan. Now while that's up again just to try to orient people in the aspects of this, a couple of important things to note, maybe a few more than that actually. The first is that the beams in the

building run east-west, not north-south. They run only east-west. Secondly, one can see that south couple shear wall on the left-hand side of that diagram –

JUSTICE COOPER:

I was just going to say, the orientation of this as displayed has north to the right.

MR MILLS:

Yes it does, yes thank you. I should have mentioned that. So we're north to the right, south – and we're looking west, east-side at the bottom. Now the second thing again, just because it will help later as we go through and listen to witnesses, you'll observe that the numbering running north-south, which relates to the columns, is (A), (B), (C), (D), (E), (F). So if we're talking about columns on line (F) which gets a lot of attention, there it is, if it's line 1, line (F), it's in the bottom south-east corner.

1045

So the beams themselves are 1, 2, 3, 4 and then the fifth one being out in the north core, the lines the other way are A, B, C, D, E, F. Finally, just looking at that north shear core, the Commissioners will see that in addition to the outer perimeter of that north shear core, sitting outside the building as I said, there are also shear walls running north south, obviously at the ends of that shear core they run north south, and there's two more inside it. One runs fully across to connect up with the beam on line 4, the other one goes partially in, and it's that area of the north shear wall which is from the eastern end of it, the bottom eastern end, up to that section beyond it where the drag bars went in, that we were looking at a moment ago. They ran into the floor.

So coming back then to my opening at paragraph 42. The evidence that the Commission will hear from Mr Brooks is that the site at 249 Madras Street where the CTV Building was constructed was a vacant site owned by Prime West Ltd, a 1980s property developer that ultimately went into receivership along with so many other 1980s property developers throughout New Zealand. Mr Brooks had an association with Mr Neil Blair of Prime West. Mr

Brooks apparently put to him a proposal for a building on the Madras Street site and, as a result of that initial discussion, in early 1986 Mr Brooks was invited to submit a design-build proposal to Prime West for an office building on the site. That's when he did the basic plan layout sketch that I mentioned a moment ago, and that's the origin of the north shear core sitting outside the building envelope. It appears that this arrangement of the shear core was proposed in order to maximise lettable space. Mr Brooks did a calculation of the cost of construction based on that simple plan and established a price for the building and that was the basis of his proposal to Mr Blair and the basis for what ultimately became a contract to build the building.

Now it appears that it was only after that aspect of the project had been completed that the project was taken to Alun Wilkie Architects to do the architectural design and then after that to Alan Reay's firm to do the structural design. So from the outset the building was a developer led project, and I think that has some consequences as we follow through the history of it.

Mr Wilkie has given a brief of evidence. He says he can't recall Mr Brooks, can't recall the exact nature of the original briefing process.

JUSTICE COOPER:

You say he can recall Mr Brooks?

MR MILLS:

Oh sorry, he can recall Mr Brooks but he can't recall the exact nature of the briefing process, and he's currently overseas so we're not proposing to call him. We've discussed that with parties who might be affected and no-one is requiring him to be called, his evidence will be taken as read, but of course if things come up during the course of the hearing which mean that there are issues on which he needs to be heard we'll have to arrange that at a later date.

I turn now at paragraph 45 to Mr Harding and his role in this. Now as I said before he was employed as by Dr Reay's firm at the time at which he did the

structural design work for the building. It appears, although some of this detail of course will need to be teased out in evidence, but it appears that the structural design work came into Alan Reay's firm and when it did the task of doing the structural engineering work was handed to Mr Harding. Now as I mention in paragraph 45 there is likely to be a dispute between Mr Harding and Dr Reay about the extent to which each was involved in the structural design, although I've mentioned a moment ago the timesheets which record only three and a half hours of Dr Reay's time. Dr Reay is expected to say he had no involvement in the design of the building and that Mr Harding prepared structural drawings, calculations and a structural specification, as well as dealing with the Council and dealing with site inspections during construction. It seems likely Mr Harding will dispute that based on the expectation he will say that the preliminary calculations and concept design involved Dr Reay, and that Dr Reay arranged for the preliminary architectural drawings to be amended, and was involved in discussions about important structural features as well as monitoring draft drawings. However, despite what the detail of this might ultimately prove to be after we hear the evidence there doesn't appear to be any dispute that the lead responsibility for the engineering calculations lay with Mr Harding.

Just a little bit more background on this –

JUSTICE COOPER:

You mean for carrying them out?

MR MILLS:

Yes, Mr Harding was employed initially by Alan Reay's firm between 1978 and May 1980. During that time he had no involvement in any multi-storey buildings. He then worked for the Waimairi District Council, principally in a civil engineering role, before he rejoined Alan Reay's firm in August 1985, shortly before the CTV project came into the firm.

At the time he rejoined the firm, and at the date on which he commenced the engineering calculations for the CTV Building, Mr Harding has said he was

inexperienced in the design of multi-storey buildings and had had no experience of designing a multi-storey building using the ETABS, a computer system which I mentioned earlier on. I have given the reference that confirms that but I won't go to it. I just note there that ETABS is an acronym for Extended Three-Dimensional Analysis of Building Systems, and this also raises an issue that will be a source of some disagreement amongst the expert structural engineers who will give evidence, and this is over which clause of NZS 4203:1984 applied to this building, and I have brought up for the Commissioners the relevant provision, and the dispute turns on whether it is 3.4.7.1 (B) or (C) that applies to the CTV Building, and you will see that (b) says, "Reasonably regular structures more than four storeys high with a high degree of eccentricity, horizontal torsional effects shall be taken into account either by the static method of clause 3.4.7.2 or by the two dimensional modal analysis method of clause 3.5.222. However it is recommended that the three dimension modal analysis of clause 3.5 be used for such structures."

Now, some of the experts you will hear from say that's the CTV Building. It's a reasonably regular structure. It is more than four storeys high. Whether it has a high degree of eccentricity, again some disagreement on that, some say it does, some say a reasonable degree, but all say it had some elements of eccentricity to it, and that didn't require – although it recommended – a three dimensional modal analysis which is ETABS.

The contrary view, which is (C), which I will just go back to, is that it was not a regular structure. It was more than four storeys high and so there did have to be the three dimensional modal analysis, namely ETABS. And there's a difference of view on that. What I can say to you is that irrespective of who might have the better of that argument, Mr Harding treated it under (C) and undertook a three dimensional modal analysis using ETABS. Now he did that, as I mentioned a moment ago, with no previous experience of doing this.

1055

I come now to paragraph 49 of the opening, the paragraphs before that I've really covered in that brief exchange. Now what Mr Harding is expected to say at any rate is that one of the reasons he was attracted back to

Alan Reay's firm in 1985 was his desire to gain experience in multi-storey buildings and in the use of ETABS and he was given to understand by Dr Reay that the firm could offer that kind of work. Now, again, there may be some disagreement between Mr Harding and Dr Reay about the circumstances of his re-employment but as I read it at any rate the broad picture is largely agreed, that he came with no experience of ETABS, no experience of multi-level buildings, wanting that experience and was given to understand he could get that experience or get work that would give him that experience within Alan Reay's firm.

Now it appears that the CTV building in terms of its architectural design was to be based on an existing building known as the Contours building and there it is there. It's just come up on your screens. So that apparently was the basis for the architectural design of the CTV building and one can see some common elements. It's got the spandrels along the face, the columns that we can see are surrounded by the spandrels, I suppose, for want of a better word. The CTV building's obviously higher. It's also got the open areas outside the windows that we also saw on the CTV building. So that apparently was the architectural basis.

However, the building that formed the template for the structural calculations and for the information on how to carry out the ETABS analysis was not that building but another building called Landsborough House and there's Landsborough House and Mr Harding will say that that's the building which had also been done by Alan Reay's firm which provided the template for the structural calculations and how to carry out the ETABS work.

Now in paragraph 51 I turn to the history of Landsborough House which has considerable significance for the CTV building for the reasons I've just mentioned. That building was designed by Alan Reay's firm before Mr Harding rejoined it in 1985 and the engineering calculations for that building had been done by a Mr John Henry. Mr Henry came to the firm from Holmes Consulting Group where he had had substantial experience in designing multi-level shear core buildings and also in using ETABS and what

apparently happened when Mr Harding was given this job to do on the CTV building was that he used both the calculations and the computer input and output files, and I've mentioned this in paragraph 52 of the opening, from Landsborough House as templates to prepare the calculations and carry out the ETABS analysis for CTV. Now whether he did this on instructions from Dr Reay or took the initiative to rely on Landsborough will need to be clarified during the course of the hearing. Mr Harding is certainly expected to say that Dr Reay gave him the calculations and the computer sheets and told him to use these as a method template for the computer modelling of the CTV building and I'm not sure whether that's going to be disputed. What is clear though, as I say in paragraph 53, is that it appears there will be quite a sharp dispute between Mr Harding and Dr Reay on the level of supervision that Dr Reay exercised over the work Mr Harding was doing, and I've touched on this previously with the reference to the timesheets. Mr Harding is expected to say that he was instructed to confer with Dr Reay if he had any queries and to keep him apprised of his progress with the design. Dr Reay on the other hand seems to have regarded the job as one that he had handed over to David Harding and I do just observe in paragraph 54 that if that is the correct position, if the Commission does accept that evidence from Dr Reay it may give rise to an issue the Commission will want to consider regarding appropriate levels of staff supervision by a principal in a structural engineering firm.

Paragraph 55, because of its significance as the source of the calculations for the CTV building and the extent to which it's been relied on the Royal Commission is going to hear evidence from John Henry, as the structural designer for the Landsborough House, and one of the significant differences between the structural design of Landsborough House and the CTV building which I've mentioned previously in reference to the north shear core that's immediately apparent is the placement of that shear core, and as I've already noted on the CTV building it's placed outside the building envelope, just as Mr Brooks first sketched it. In Landsborough House it was placed within the envelope of the building and the effect that that may have had on the torsional response of the CTV building will be dealt with in the course of evidence.

As I mentioned earlier when we were looking at the key building elements of the CTV building, I say in paragraph 56, when the architectural drawings and the concept design were given to Mr Harding the north shear core was the only seismic resistant element shown, at least according to his evidence, or what I expect to be his evidence. However, he did an initial ETABS analysis and that showed that the inter-storey deflections of the building were excessive. In other words, for those who aren't familiar with these terms, that the movement from floor to floor as the building moved sideways in lateral earthquake forces, that the level of that movement from the bottom of one floor to the top of the next was excessive and that led to the decision to add this south coupled shear wall. There it is, it's just come up in the sketch, or in the structural drawing. You can see how it was built. This is the one that was in behind the staircase and we can see the elements of it including the cross-bracing and its intended purpose of absorbing and dissipating the earthquake forces. So that and the north shear core were the two that were designed to do that, to take on board the energy, dissipate it and let it flow ultimately into the ground.

Paragraph 57 - just keep that up for a moment, I'll just comment on that briefly. This is taken from the DBH Consultants report and for the moment all I want to draw attention to is in relation to that last sentence in my paragraph 56 about the purpose of the south coupled shear wall being to try to reduce the torsional rotation of the building when it got these lateral, or horizontal, seismic forces hitting it and this diagram's interesting because, as the Commission will observe, the red dot on it is what's described as the centre of mass of the building, which is, of course, at the centre of the building but the green dot is described as the centre of rotation, and the centre of rotation, as I understand it, is the point from which the building is endeavouring to rotate and so preventing that from happening is the goal of the two shear walls and one obviously observes that it's well off-centre.

1105

Now coming back then to paragraph 57 of the opening. Mr Harding's position appears to be that the size of the south coupled shear wall was dictated by a

combination of Alan Reay as the architect, sorry Alan Reay as the structural engineer, Alan Wilkie as the architect and the owner of the site. It's not clear to me at this point whether this will be contested. In any event when Mr Harding ran a further ETABS programme with the south coupled shear wall in place he concluded that with that wall the inter-storey deflections were now compliant with the code standards.

Now there's an issue here of some significance I think for much of what comes later on the issues of the design of the building and whether it needed to be ductile or not and whether it complied or not and this is whether Mr Harding accurately calculated the building deflections from which he then made various decisions about whether the columns could simply be gravity columns or whether they needed to be ductile, and so on. Now Mr John Henry, the Landsborough House structural designer, has looked carefully at the calculations Mr Harding did for the CTV building and at the request of counsel assisting he has for the purposes of this hearing re-familiarised himself with the calculations he did for Landsborough House and he will say that Mr Harding did not accurately calculate the deflections and in particular he will say that this is because Mr Harding appears to have calculated the deflections at the centre of mass which was that red dot that we just looked at in the middle of the building and apparently the ETABS computer model which was being used at that time, and it's more sophisticated now, but that's exactly what it did, it calculated the deflections at the centre of mass.

What Mr Henry says is that because of that there's a need after you get the results of the ETABS analysis to do additional hand calculations which are aimed at determining the levels of deflection, particularly at the corners of buildings where deflections are expected to be greater and I've just brought up the commentary from the New Zealand Standards, 4203:1984 which the highlighted part makes that observation. Horizontal torsional effects are difficult to estimate and so on, the effects are important however, a number of failures have been caused by horizontal torsion particularly at the ends and corners of buildings, so that is the evidence you'll hear from Mr Henry, that the calculations should have then after the ETABS analysis was done involve

what would have to have been a hand calculation because the computer model wouldn't then do it, to look at the deflections in the corners and there doesn't seem to be any dispute that Mr Harding didn't do that and the reason he didn't do it, is because he was following the calculations that had been left behind for the Landsborough House after Mr Henry left Alan Reay's firm which was before Mr Harding came in, Mr Harding effectively came in to replace the departing Mr Henry, so we was following the calculations that had left behind and they didn't have the hand calculations that Mr Henry had done as part of the dots that he was following so he didn't do it.

Now how significant that is of course is a matter that will have to be explored, the impact that has on the deflections, whether that means that the deflections were such that you couldn't even on the view that those columns could in some circumstances be designed just to carry gravity loads and that they didn't need to be designed for ductility, whether the levels of deflections that you get when you look at the corners even on that view took it outside what could be used as gravity columns. That's an issue that will obviously attract considerable attention in the course of the evidence, but certainly there's no dispute that the calculations on deflections that were done were from the centre of mass and didn't, as Mr Henry had done for Landsborough House, involve a further calculation to look at those deflections at the corners of the building that was being designed. And as I note at paragraph 59, at least on one interpretation of the effective Bylaw 105, and the two New Zealand standards that are relevant here whether the building could be designed for no ductility other than in the two shear walls turns on the extent of the calculated deflections.

Now I then come back briefly to the issue of the standards and at least to non-engineers like myself, it does come as a bit of a surprise to find that when building elements were required to be designed for ductility under the codes applicable in 1986, has attracted such substantial disagreement amongst structural engineers, and the Royal Commission will hear a range of views on this from the experts who are being called and again I just observe for those of us who are not structural engineers it does seem surprising that on an issue

as fundamental as this to the design of complex multi-storey buildings, the requirements of the code at least as they existed in 1986 do not engender a shared understanding on this issue, and I then repeat the provision in 3.2.1 which I noted before which on view of it seems clear but it certainly is not.

I then just in 63 just touch on the what I've described as a labyrinth, I'm sure it wouldn't be to structural engineers, but to non-structural engineers it pretty quickly becomes a labyrinth as to where one goes in the standards if that 3.2.1 is not the controlling principle, and you then go into the concrete structures, that takes you into clause 3.5.1.1 which makes provision for both ductile structures and structures of limited ductility and that then takes you to secondary structural elements and that takes you to whether they're group 1 or group 2 and depending on what you are you get different levels of ductility that are required and that little pathway will be covered in much more detail and complexity as we hear from the expert evidence on this. And 64 I've really covered already.

I turn then to the building permit at paragraph 65. Now of course the Christchurch City Council is the regulatory authority that granted the permit. As part of the Royal Commission's investigation the Council was required to provide copies of all its files relating to the CTV building but as I mentioned earlier it's clear the Council records relating to the building are not complete and for just one example of that the structural drawings that we received from Alan Reay Consultants Limited were not entirely identical to those received from the Council. Now I don't think anything of great significance turned on the differences but it is simply underscoring the fact that there's a bit of a disconnect here on the document trail which I think in a moment you'll see why that may matter.

So the Council's been asked to explain the reason for this. Mr Steven McCarthy who the Commissioner's heard from in a number of these hearings, will give evidence that the storage of Council files has been an issue over the years and made worse I think by the September earthquake. In any event as I say in paragraph 67 the permit application was dated 17 July 1986 and there

it is, the application was put in by the architect. The date on the structural drawings is August 1986 and they're signed by David Harding. We'll come back to the one on the right here in a moment but I'd just like you to be able to sight the date on the structural drawings.

1115

JUSTICE COOPER:

Was the date inserted by the designer? Is that right? Why is it after the date of the permit application? Is there a simple answer to that?

MR MILLS:

Sorry did I miss something, I obviously did.

JUSTICE COOPER:

Well perhaps it's me but you say the permit application for the building is dated the 17th of July.

MR MILLS:

Yes.

JUSTICE COOPER:

The date on the structural drawings is August. One would have thought they'd be contemporary.

MR MILLS:

Yes well – well, yes one might have thought so and if you just bear with me a moment this will come up in the letter I think from Mr Tapper. So that's the date on that. Now let's just look at the structural drawings. I just want to confirm that they were designed by David Harding. So you'll see there under approved the initials "DH", I take it there's no dispute that that is David Harding. It doesn't have a –

JUSTICE COOPER:

The bottom left there?

MR MILLS:

Yes, bottom left and there's the stamp on it by the Christchurch City Council approving it. Now I say at paragraph 68 that Mr McCarthy for the Council will say, I think, that the permit application was received and processed at the Council by Mr Leo O'Loughlin but his role was, essentially, a co-ordinating role and he didn't process the permit itself and he will give evidence. The Council officer, as I say at the top of page 16, paragraph 69 still, was Bryan Bluck. He was, at the time, the chief building engineer and immediately below him was Graeme Tapper who was at the time the Assistant Buildings Engineer and it was Mr Tapper who dealt with the application for the permit for the CTV building.

I'm just wondering whether I need to take you back. No, we'll come to it in a moment. Now I'm going to take you now to a letter from Mr Tapper which I referred to in paragraph 70 and this is dated 27 August and it goes to Alan M Reay, consulting engineer and what this is, you'll see when you look at it, is that it's listing concerns Mr Tapper had with the proposed building. So this is after the structural drawings that we saw a moment ago which were initialled off by David Harding and, presumably, this is a response to that, it's got the application number on it, and the one that I particularly draw the Commission's attention to is the reference to drawings 15 and 16 and these both involve –

JUSTICE COOPER:

It might be helpful if you were to read this letter out Mr Mills I think.

MR MILLS:

All right. So, the letter says, "Please provide the calculations to support the design. We also require a foundation report and a specification which describes the required quality standards for materials and workmanship. Please note that Christchurch City Council," – we go back to the other one, just go back to the main letter, all right, I'll keep reading – "Please note -

JUSTICE COOPER:

It was (overtalking 11:19:24).

MR MILLS:

I realised it was, yes, but it – "Please note that the Christchurch City Council Bylaw 105 requires in clause 28.1 that, 'All drawings, computations and other data submitted shall be signed by the architect, engineer or designer responsible for their production and shall clearly identify him and his firm or organisation.' There is no indication on the plans that they have been checked and approved for issue and construction. Please attend to the following matters. First on drawing 9 –

JUSTICE COOPER:

"Sh" stands for sheet I take it?

MR MILLS:

Yes it does, yes. "No sub-grade information and the 125 slab is both unreinforced and unjointed. Sheet 14, stirrups to columns 4, 20, 10 and 16," and if we could go to the next page, "Sheet or drawing 15 incomplete notes. Reference line 1, high-bond mesh, reinforced in casting does not provide restraint to the high bond for FRR," which is fire rating, "purposes. Also," and I draw the Commissioners attention to this, "Also floor connection to shear wall system and general connection between floor, slab and walls. Drawing 16, shear core floor slab and stair landing details are missing." Again, I draw your attention to shear core floor slab because of the significance that is attached to the adequacy of the connection between the north shear core and the floors. The next one says, "Thioflex 600 and PEF backing strip has not fire rating." Next, "Not to micro-filmable standards." Next, "Size of fixing A and we note that there are no notes. Drawing 25, reinforcing of spandrels and fixing details," and then drawing 26 the question is, "Is there one?" Drawing 28, "How's the web welded?" Drawing 29, "Details 7 and 8, 1 and 12," I think high HD is – Professor Fenwick will know this.

PROFESSOR FENWICK:

High strength.

MR MILLS:

High strength, high strength bulb, and then drawing 30, "All weld plate details and detail to stringers," I think that's a weld plate, "Weld size and type, also baluster fixings and, finally, hand rails and weld plate type 6 details." So that's all concerns that Mr Tapper had with what one assumes was at least the initial structural drawings that came in. Now that is followed, and I refer to this in paragraph 71 and it'll come up on your screens momentarily, this was followed by a document transfer form, here it is here, dated 5 September 1986. It comes to the attention of Mr Tapper and it does indicate that further information went to Mr Tapper in response to that letter and, again, David Harding's name is on that form. You'll see that it says, "Two sets structural drawings, 1 to 39 inclusive, including amendments as requested," and then calculations relating to bond deck structure after fire which, as you will recall, was one of the issues that was raised in relation to the diaphragm north shear core connections but only one of them.

Now there's a bit of a mystery about this. The documents that we've been able to obtain from both the Council and from Alan Reay Consultants Limited provide no evidence of Mr Tapper's recorded concerns being met as far as I can tell and we've not been able to establish what these documents were that came in with the document transfer form. Certainly there doesn't appear to be any change to the issues around the connections between the shear core and the floors but despite this on the 10th of September the structural drawings for the building were signed off.

1125

Now I want to take you back to the document you saw before. So there's the signoff by the various Council officers who had to sign off individual parts of the building, and you'll see there highlighted the structural aspects of the building are signed off and the initials are Graeme Tapper's.

So for the moment there remains considerable uncertainty about what's happened in here and unfortunately as I observe at paragraph 74, both Mr Tapper and Mr Bluck are dead. However –

JUSTICE COOPER:

What about the calculations that Mr Tapper asked for, was there any suggestion that they were provided?

MR MILLS:

Well the difficulty we have is that we do have calculations and we do have structural drawings, but what we've not been able to trace is any change that occurred. We've not been able to see a trail that shows initial ones coming in to which Mr Tapper's responding, then new ones coming in that are different which then need the signoff.

JUSTICE COOPER:

Yes, I know, but I am asking a slightly different question I think, which is that the cover sheet we have just been looking at refers to his two sets of plans –

MR MILLS:

It does.

JUSTICE COOPER:

– making the amendments that have been sought, whereas Mr Tapper's 27th of August letter asks for the calculations to support the design and you have not showed us, or perhaps we have not been able to find, is that the case –

MR MILLS:

No.

JUSTICE COOPER:

– a communication from Mr Harding or Dr Reay's firm saying, "Yes here are the calculations."

MR MILLS:

Well only the document transfer form, and of course the Council did have calculations.

JUSTICE COOPER:

Well am I missing that? Where is the document transfer form? Can we just display that again? Calculations, what is that?

MR MILLS:

Calculations relating to Bondek. This was the fire –

JUSTICE COOPER:

Oh, you mean structure after the fire, well that is not, the very first point if you go back to 0141.14 –

MR MILLS:

Yes.

JUSTICE COOPER:

– is, "please provide the calculations to support the design".

MR MILLS:

Yes, well there must've been some went in because there were calculations in the Council file, although as I said they were slightly different to those which we got from Alan Reay Consultants Limited. So at some point certainly calculations have gone in.

JUSTICE COOPER:

The ones that you are referring to as having been obtained from the consulting engineers are dated?

MR MILLS:

I don't have that at my fingertips.

JUSTICE COOPER:

All right, well in due course?

MR MILLS:

I could give it to you after the break I would think. So, and the oth – as I said before, the other issue that's caused us confusion at any rate is that there does not appear to be any change in relation to the wider concerns that Mr Tapper had expressed about the connections as shown in drawings 15 and 16 which deal with the connection to the north shear core, and yet despite that it's signed off, so... Other than what I'm about to refer to I can't explain that to you, and maybe somebody, maybe somebody else will in the course of the evidence.

Now I say in paragraph 74 that the Commission will hear from Mr Peter Nichol. He's a former employee of the Christchurch City Council and he'll give evidence of a conversation that he had with Mr Bluck about the CTV Building and the issue of the permit. It's a conversation that's simply emerged out of a, according to Mr Nichol, a casual contact on the side of the road triggered by the fact that Mr Nichol will say that he became aware, as did other local authority employees of a volcanic standoff between Bryan Bluck and Mr Tapper over a building which it appears was the CTV Building, and so he went down to have a look at this building and in the course of that had a meeting with Mr Bluck who was out having his daily constitutional and that Mr Nichol will give evidence about that conversation.

Evidence is also going to be called from Mr Tapper's widow, Patricia Tapper, about the continuing concerns that Mr Tapper expressed to her about the structural integrity of the building. Now it's hearsay and there's been no objection to it yet, there may be, but certainly my position on this will be that it is admissible hearsay, it's credible, it will help in understanding of what's happened here, and evidence is also being given by Mr John Henry as part of his evidence about Landsborough House, about his subsequent move to the Christchurch City Council, to the building department and the evidence he will give about the working relationship between Mr Bluck and Mr Tapper which in

my view will also add credibility to the events that Mr Nichol describes, and I have little doubt that aspects of that evidence will be strongly disputed by both Dr Reay and by Mr Harding.

Now, I'll just finish up the last two paragraphs, probably then a sensible time to take the adjournment, but the Council has been asked to state its position on whether the building design complied with the applicable bylaw and standards in 1986 and Mr McCarthy is expected to give evidence that because the building permit was signed by a Council representative, that indicates that the Council did consider that it complied. Whether it did or not, then it seems, will be dealt with by others.

Then the Council will also call Mr O'Leary. I've already referred to him, and he's expected to give evidence that at least some elements of the design in his view were not compliant with code.

COMMISSION ADJOURNS: 11.32 AM

COMMISSION RESUMES: 11.51 AM

MR MILLS CONTINUES:

The Commissioners back over some of these issues around these calculations which Your Honour asked me about. First I did make a mistake and I apologise for it. Mr Laing has just reminded me, it is a reminder, that the Council in fact has not been able to find any calculations and indeed I remember that because we were asked to provide them to the Council. Now on the other hand I don't think there's anything –

JUSTICE COOPER:

So what did we provide?

MR MILLS:

We provided a set that we had had I think from DBH and then we got another set from Alan Reay Consultants. I think that's how it worked.

JUSTICE COOPER:

So where did the Department of Building and Housing get their set of the calculations?

MR MILLS:

From Alan Reay, so Council hasn't had any –

JUSTICE COOPER:

Well it hasn't been able to find any?

MR MILLS:

No. I was just talking to Mr Laing about that. I don't think there's any suggestion that they wouldn't have had them and I'll just take you back to something that I think will – if it isn't, it isn't sort of self-evident that they must have had them at some point that will probably assist with that, but what he

tells me is that at one stage the Council I suppose experimented with putting all of these documents on microfiche. That didn't work so they had to back track out of that and that that may be a factor in the state of some of these Council records. Clearly it's not what we would like but it's what we have –

JUSTICE COOPER :

There's a comment about that with one of the plans in Mr Tapper's letter of the 27th of August.

MR MILLS:

Yes, I was just going to take you back to that letter because what I didn't draw your attention to at the time but it is relevant to this and perhaps we could bring it up again. So it's BUI.MAD249.0141.14, the handwritten letter. Now you'll see down that left-hand margin in a different handwriting, received a day or two after letter sent. Now we have made strenuous efforts to try to identify whose handwriting that is. We've not been able to do so and you'll see up in the top right-hand corner there's different handwriting again, 2503 received 1 September 86. Don't know whose that is either. What we have been told by the Council though is that if you look down that Tapper letter you will see that there are ticks against a number of these although again my reading of this is that the ticks change as we go down page 2 and get to drawing 26. It is not the same ticking that we've seen up above which looks very much to me like Graeme Tapper's ticking up above but not down below and there's also some handwriting there which is not the same handwriting as we see on that received a day or two after letter sent on the first page, this doesn't look to me as though it is, haven't had a handwriting expert on it but it doesn't look to me to be the same, and it's possible I think that the handwriting on that page 2 might be the same as the little annotation at the top right-hand corner on page 1, it just looks like a similar pen but beyond that confusion reigns but what I can tell you is that the original of this document which the Council has, the ticks are in red, at least the principal ticks so that must indicate it was done within the Council, they've got an original document with red ticks on it, so –

JUSTICE COOPER:

But does that follow?

MR MILLS:

Well because they wouldn't have a document with original red ink on it if they hadn't done it one assumes, if someone in the Council hadn't done it. Now you know if one can – there could be other explanations but it's the one that seems most likely and that if you're – if the Commissioners want it I can certainly arrange with Mr Laing I'm sure to make that original available so that the Commissioners can have a look at it.

JUSTICE COOPER:

I think I would like to see it.

MR MILLS:

So that's the first issue I needed to go back over. Then on the question you asked me Your Honour about calculations and the dates on the calculations, first just in case you hadn't already had cause to look at this bundle, just to let you know that it's in this green folder which will be behind you. It's marked CTV core bundle 1, design, and included in that is calculations. They are under tab 1 and 2 and 3 and they're divided as I recall at any rate on the basis of the first tab being the gravity elements, the second tab being seismic loading analysis and the third tab being foundations, and you'll see that index at the very first page under tab 1, it tells you what the order is that this is done in and the answer on dates is that they differ, probably not surprisingly depending upon which set of calculations we're dealing with, so the – I'll give you an example of this, I'll take you to a bit more detail if you wanted to, but if you look at the first document behind that index which is the floor slab, you'll see that's dated 23 May 1986, because none of the other documents and none of the other pages in there are dated I'm assuming that that means everything in there –

JUSTICE COOPER:

It must have been a very busy day.

MR MILLS:

A culmination I think, and then you will see -

JUSTICE COOPER:

Well there's all, I mean you're saying that you're effectively asking us to infer that 82 sheets of closely worked calculations were all done on the 23rd of May.

MR MILLS:

No, I'm going to take you to page 79 and this is the numbering that we've got on it, you'll see there's a different date there, 20 August. I think what will have happened, well I'm assuming this is what's happened and it can be explained by Mr Harding when he gives evidence.

JUSTICE COOPER:

I was going to ask you, this is all his work?

MR MILLS:

Yes it is, and so presumably what's happened is that there's been, all this work's been done and then on the date on which that section's been signed off, the date goes on it, but he'll need to clarify that, so then we've got one for he said the 6th, the one I just took Your Honour to. And then if you go to the first document under tab 2, it's got a different date, so this is the seismic load section and the date there is the 10th of June 1986 and I think that's the only date in that section, and then if you go to the first document under tab 3 which is the foundation calculations, you'll see yet another date there which is 26 June and again I think that's the only date in that section. Looking through it again now and I think that does appear to be right. So we've got different dates for different sections of the calculations.

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JUSTICE COOPER:

All right.

MR MILLS:

All right, I'll come back then to where I left off before the adjournment which is paragraph 78 and I'm dealing now with the question of construction.

The Royal Commission will hear from three former members of Williams Construction Limited. They are Mr Michael Brooks who I've mentioned previously in relation to the origination of the sketch plan and he's the former managing director. Also from Mr Tony Scott who's the former quantity surveyor and Mr Bill Jones who is the site foreman. Efforts have been made to obtain evidence from Mr Gerald Shirtcliff who was the construction manager. He's in Australia and we've not been able to make more than email communication with him. He's not been prepared to disclose his actual location but as the construction manager he was the person who, as I understand it, carried the ultimate responsibility for the contractor, ensuring the building was built to comply with the drawings and calculations and to take any directions from structural engineer, architect or Council. We have advised him formally that he, because the Department of Building and Housing consultant's report has identified some significant construction defects with the building, some of which may have played a role in the building collapse, that he's an affected party and he might find himself the subject of adverse comment either in the hearing or in coverage of the hearings. So we offered him the opportunity to have a video link connection with the Commission and give evidence. He hasn't taken that up although in the last few days he's, out of the blue, requested a copy of the Department of Building and Housing consultant's reports. So it's possible that he might take up that offer to give evidence but at the moment at any rate we've not been able to locate him and not been able to get evidence from him and, of course, it's ultimately a view for the Royal Commission as to what view they take of his role if any. But we have done our best to just make it clear to him that there could be some potential criticism of him by other witnesses.

JUSTICE COOPER:

Well you don't need to be apologetic about it Mr Mills. He is somebody who is affected and he hasn't really co-operated with us.

MR MILLS:

No he hasn't.

JUSTICE COOPER:

So if he is, does end up being criticised he only has himself to blame.

MR MILLS:

That is true.

JUSTICE COOPER:

It's disappointing really.

MR MILLS:

Yes it is.

Paragraph 80 I won't repeat. I've touched on that. Now, again, trying to get the chronology straight on this, paragraph 81, the first date we have for actual work on the ground is the date of the first concrete pour and that was 13 October 1986. The Council inspection date for the foundations has the same date. The date of the contract between Christchurch Steel and Williams Construction is 3 November 1986 and as far as we can tell the date of the first supply of labour and materials from Christchurch Steel is 5 December 1986 and all of those documents that record that are in the Commission's bundle but I won't spend time going to them. I then just make a reference to the relevant clause in the Council bylaw, it's 105 that we've discussed previously, which made it the duty of the owner of the land, the employer for whom work was carried out and the builder to ensure that the provisions of the bylaw were fully complied with in the commencement and execution of building work. Other than inspection of the foundation excavations the bylaw did not specify any particular mandatory inspections and it appears that the nature and frequency of inspections was left to the discretion of the Council engineers and building inspectors and the Council's position is that a Council building inspector is not required to be a clerk of works or a project manager during the

construction of a building and I will produce, or have produced for the Commission when evidence is called from Mr Nichols, Mr Peter Nichols who I mentioned previously, he has provided to us an internal memorandum from Mr Bluck dealing with the role of the Council engineers in dealing with permit plans which is of interest which, again, reflects the view that the Council didn't see itself as really being in charge of the design of the building.

Now paragraph 84, the first inspection, now what we've done here, this is really a composite of the various individual inspection records that we were given. A number of them were duplicates and so on, so what we've done within the Commission's legal team is to try to make it more user friendly by setting out there the various inspections that took place and I've covered these off in the narrative but the Commissioners might just want to take a brief moment to look at that. You'll see the first one, 16 October, set-out by surveyor, okay, steel to finish, engineer due, I think it's engineer, steel to finish, engineer due. Foundations, 11 December '86, last of foundation beams, first floor, 18 February 1987, okay, 8 March '87, shear walls okay, gantry up, 31 March '87, repairing second frames it looks like and then 20 August '87, fixing gib wrong. Card left, new foreman. And I think there's a bit more to come isn't there if we scroll or is that it – I thought there was a bit more than that. In 9 October '87, foreman to approve front columns on site and fill block work. The rest of it escapes my capacity to read it. 16 October, no contact from site – no contact from site so – what is that –

JUSTICE COOPER:

In your chronology, you or somebody has prepared for you, you say, "No contact from site, so visited. Found peg cols to be removed. Foreman advised."

MR MILLS:

I think it will be in two parts. So, visited, found peg, columns to be removed, foreman advised. Now what that appears to relate to, as best as I can stitch this together, was there was an issue about the canopy that went out the side of the building which the Commissioners will remember from the photographs

of the CTV building and it appears to have gone over the boundary and so that's the reference to finding a peg which would mean the boundary peg and the columns were over the boundary and so they had to be removed. So what that tells us is we're well towards the end of the construction by the time we get to that. Otherwise we wouldn't have been dealing with the canopy.

So perhaps I will just revert briefly then to the text of the opening and one of the things that I want to draw the Commissioners' attention to is paragraph 86 of my opening and I mention this because one of the puzzles I think with the construction is how did some of these construction defects that the Department of Building and Housing consultant's report have referred to, which you'll hear more about later, but what might explain that and I say at paragraph 86 that in mid-March 1987 shortly after the Council inspection noting that the shear wall was underway Michael Brooks, Tony Scott and Gerald Shirtcliff incorporated a new company.

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This is Union Construction Limited, so the job is being carried out under contract by Williams, but in mid March 1987 the three key people or two of the three key people, probably the three key people incorporate a new company and what ultimately this leads to, and I mention this in paragraph 88, is the threat of legal proceedings because what they then endeavoured to do so it seems was to take away the CTV contract from Williams and this led to, actually to the proceedings being issued, injunction proceedings being issued by Prime West and, well at the least the company that by then was in charge of this is the owner and so we have a period in here where there is the potential for a reasonable amount of disruption on site and the witnesses will be asked about that, but it also coincides with what seems to be quite a gap in the inspection record that emerges during part of this period at any rate. So just to follow this narrative through, paragraph 87 of the opening from this point until about September 1987 it is unclear what if anything Williams was doing at the CTV site. We know that injunction proceedings against Mr Brooks and Mr Scott and Mr Shirtcliff were issued by the Smart Group which by then was the owner of the site which had, sorry I'm wrong, Smart Group had purchased Williams. Smart Group as you'll remember was a development

company. They purchased Williams Construction at the end of 1986 and so the threatened litigation was between effectively the owners of Williams and these three gentlemen who had created this new company Union and it appears that the proceedings were ultimately resolved in about September when there was a formal assignment of the CTV contract from Williams to Union.

This is what happens, they finally settle it on the basis that Union will take over the continued construction of the CTV building and as I observe at paragraph 88 it does seem clear that this event and related threats of legal proceedings against the three individuals had the potential to be disruptive of the work on site. Exactly what stage the building was at when this occurred and whether it might provide some explanation for the construction defects identified by the consultants' report will need to be explored during the course of the evidence.

Now we then, if we can come back to those inspection records that were up on the screen a moment ago so that the Commissioners can look at the originals if you wish to. The next record of a Council inspection is 31 March 1987 and there's then a gap in the inspection records at any rate of nearly five months before the next inspection on the 20th of August and this is the one that made the reference to 'new foreman'. Now we have our level best to try to find out what this issue of a new foreman was. The three witnesses who will be called from Williams say there was never a change of foreman so I'm not able to explain this, but any rate that was what was left on the card.

Now the next thing of some interest is the point I make in paragraph 90 which is during this apparently five month gap in inspections, there's correspondence from Brian Bluck to Williams Construction and that's dated the 17th of August 1987 and it does two things that might help this narrative. First of all it includes a statement that the building is nearing completion by 17 August. Secondly it refers to a recent inspection. Now it's not clear what that's referring to because the next record of an inspection as I mentioned a moment ago was 20 August and so it looks as though there must have been

an inspection which wasn't recorded. It's certainly what that seems to suggest.

Now I just want you to look at the letter of the 17th of August which has just come up on the screen. This is the letter from Mr Bluck, to the manager of Williams Construction and it expresses concern about the fire rating for the high bond core system. It says it wasn't built in the way in which it was permitted and I don't think I need to take you anymore than that at the moment. You'll see that it's – in terms of Alan Reay Consulting Engineer it's copied to Dr Reay personally, not to Mr Harding but if I take you to the next – to the response from that which is the next document I referred to at the end of paragraph 90, you'll see the response comes from Mr Harding so it appears that the letter must have been passed on from Dr Reay to Mr Harding and he's responded to it and he refers to a recent discussion, presumably with Williams because it's to Williams, refers to the letter and then proceeds to explain why at least in Mr Harding's view, the issue that's been raised about fire rating is a non-issue, and it's some potential interest to the narrative. Paragraph 4 you'll see that he says the question of restraint was discussed in detail with Council officers at the time of building permit applications and so on. Now it doesn't say who had that discussion, whether it was Mr Harding or someone else within Alan Reay Consulting Engineer, within the firm, but it does record that there were detailed discussions and you will recall the issue in Mr Tapper's letter about concerns about the fire rating issue at the point at which he wrote that letter.

I'm going to come back to the opening then at paragraph 91. We've only seen records of four further inspections after that and I've given you the references there. They're all part of that document that I put up showing the various handwritten inspection records, and at paragraph 92 I refer to correspondence that we've had with Mr O'Loughlin from the Council where he describes the level of inspections for a building of the size of the CTV building as being light.

I then just make passing reference to condition 2 of the permit, pretty standard I would think which says, "The engineer responsible for the structural design

(including the foundation system) confirming in writing that the intent of his design has been complied with before the building is occupied." We've not been able to obtain from the Council any record of confirmation in writing in terms of condition 2. Mr McCarthy as I understand it will say that it's simply a standard condition but no record of Alan Reay's firm providing that confirmation.

Now as I say in paragraph 94, in the absence of any confirmation of that kind which would tell us that the construction was finished, the best assessment that we can give you of the completion of the building is early 1988 and that date is really taken from the reference I took you to a few minutes ago about the canopy and the issue with the columns being over the boundary and that does seem to signal that that's pretty close to the end of the construction. So there's nothing more about that aspect of it, I'll move on to Prime West.

The next thing that happens that's relevant to this hearing is that in September 1988, not long after Prime West Corporation went into receivership, KPMG Peat Marwick was appointed as the receiver by the debenture holder and the building at this point is empty, it's then put up for sale, described as an investment property, I don't bother you with the advertising promotions although you have them in your file and it was advertised for sale with a valuation of $4.15 million.

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Now, it didn't sell. It sat empty for more than a year after this, and then on 24 January 1990 Holmes Consulting Group was engaged by Buddle Findlay and Schulz Knight Consultants to prepare a structural report on the building and it's clear that that was part of an engagement by the Canterbury Regional Council, which was interested in buying the building. Holmes was asked to conduct a due diligence.

Paragraph 97 I've given you some document references which I think will come up. They are probably very difficult to read, I'm not sure whether it will be easier with the originals in the file but you'll see there that it's headed, this is all from Holmes, first of all the date. They seem to say something about

that, a Mr Hare who will give evidence will have to deal with this himself, but you'll see that it's dated 25 September 1990. Mr Hare is adamant that date is wrong, he can't explain how it got there but he will say it should be 25 January which certainly fits the narrative.

You'll see that's headed in his handwritten notes, "Approximate Seismic Analysis." So that's what he's doing. He's looking at the building for this due diligence purpose and just doing approximate seismic analysis as he goes through it. Now the ones that are of particular relevance are referred to in paragraph 97 of my opening and they are Line D which as the Commission will be aware is one of the ones where the drag bars were subsequently inserted, it's the, "Lift shaft – stairwell – north south, no steel showing – or not much," is what Mr Hare says. Then he moves across to look at Line D/E and the Commissioners will recall that the plan that I showed you early on, that the letters run north south, so he's at line D/E and he's in the east lift shaft and again, "No steel?" Then he concludes, "Entire shear core slightly dubious." And you'll see that on your screen in front of you.

After that, and this is paragraph 98 of the opening, and at this point Mr Hare was actually junior to Mr Grant Wilkinson and was working with him, and the Commission will hear from both Mr Hare and from Mr Wilkinson. He then did a full design, documentation, soils investigation and drawings and he did that at the Alan Reay Consultants Limited offices and that's referred to in that reference in paragraph 98 – I can't remember whether we're bringing it up, but in any event that records, here it is here, the summary of investigation, you'll see the second paragraph, "In addition we were able to view the full design documentation, soils investigation and complete set of drawings at the office of Alan M Reay Consulting Engineer on 26 January 1990. The original design engineer was unavailable for comment having since left the company but Mr Geoff Banks was available for comment on aspects of the design." It also refers to speaking to Mr Bryan Bluck about any concerns during the permitting and construction process, and then an inspection that they did physically of the building and they say that, "Levels 1 and 4 were unavailable for inspection but the remaining floors were taken as representative."

JUSTICE COOPER:

Now this is the document generated by Mr Hare, is that right?

MR MILLS:

Yes it is.

JUSTICE COOPER:

Is it possible to see the first page of that?

MR MILLS:

Yes I imagine it will be. There's the covering note that went with it, "Please see over the draft copy of our report for your information and comment," that as you'll see is directed to Schulz Knight.

JUSTICE COOPER:

Yes.

MR MILLS:

And then the page after that is the one that you want to see I think which is the formal front to the document. It is I think in that green folder, but nonetheless you'll get it I think. There it is there. And you'll see it's prepared for the Canterbury Regional Council by Holmes Consulting Group in association with Buddle Findlay Limited and Schulz Knight Consultants Ltd.

JUSTICE COOPER:

Can I just see the next page too please? And the next one, sorry? I am just…

MR MILLS:

Well you'll see they say it was completed during 1987 but I think it was probably early '98.

JUSTICE COOPER:

I am just trying to fathom the mystery of this date reference that you mention in your paragraph 97?

MR MILLS:

Oh, yes, yes.

JUSTICE COOPER:

I wonder if we could see the next page of this too? And the next? And the next? Yes well the whole thing is a January, it was generated in January 1990 so –

MR MILLS:

That's right, yeah. So it does look that for reasons that who knows what they are, but the date probably is, it certainly doesn't fit with any of the other narratives Your Honour, Sir.

JUSTICE COOPER:

All right, yes?

MR MILLS:

Now I come then actually to the page you were just looking at, paragraph 99, on 31 January 1990 that draft report comes in and we were just looking at section 3, perhaps we could go to that again so that you could just have a chance to look at that. It recorded a significant problem with the floor diaphragm/north shear core connection at lines D and D/E. We saw that in the handwritten note, that that was an issue identified early on, and then of course it says there, in section 3 and it's section 3.3 there is, "a vital area of non-compliance with current design codes, seen in the documents, is in the tying of the floors to some of the shear walls". So that was picked up by the documents, I think is an important point. That wasn't based on a physical inspection, that was based on looking at the documents that were reviewed at the offices of Alan Reay Consultants Ltd which would've been the structural engineering documents.

JUSTICE COOPER:

Well he had inspected the building but not in –

MR MILLS:

He had –

JUSTICE COOPER:

– but not in an invasive way.

MR MILLS:

No, and he refers specifically to the documents, that it's seen in the documents.

JUSTICE COOPER:

I see.

MR MILLS:

Then if we could go on to section 6.3 of that report, which is the next reference. You'll see there under the heading, "Structural Design Aspects," and the sub-reference, "Lateral Load Resistance," he says, "Resistance to lateral loads is via reinforced concrete shear walls," which we've talked about earlier. "The shear walls themselves appear to have been generally well designed to the requirements of the correct design loading and materials codes. The building was apparently analysed using a three dimensional computer analysis programme checked by a static hand analysis". And then he says, "An area of concern however has been discovered in the connections of the structural floor diaphragm of the shear walls. While this is not a concern on the coupled shear wall to the south of the building, connections to the walls at the north face of the building are tenuous due to penetrations for services, lift shafts and the stairs, as detailed on the drawings." Again it's the drawings. "The result of this would be that in the event of an earthquake the building would effectively separate from the shear walls well before the shear walls themselves reach their full design strength."

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Now as I understand it, and the structural engineers of course know this much better than I do, that, effectively, what that last paragraph is saying is that the shear walls are designed to take the energy forces from the earthquake, behave in that ductile manner that I mentioned earlier, absorb that energy for the building as a whole and disperse it and the concern that's being expressed is they won't perform that function because there'll be a separation of the load paths into that shear core before they perform their full task. That's my understanding at least of what's being said. I'm sure your two fellow Commissioners will correct the errors.

Now that then is followed, and I deal with this in paragraph 100, that's followed by some sketches for remedial work and, again, it's quite hard to read, I'm not sure whether we were bringing this up or not but it's in your files, and then on the 1st of February a memorandum is prepared that sets out more specifically the suggested remedial works and I think you should look at that. So just in passing, that's from Grant Wilkinson and it's to Warren and Mahoney who seem to be the go-between, between Holmes and the Canterbury Regional Council, they're estimating a cost for doing this of 14,000 plus GST. It turned out to be much less expensive than that but that's the figure that they were estimating at the time and if we can go I think to the next page I think might be – which is point 18, I think that might be worth a brief look, and the point I just draw your attention to there, because it has some ongoing significance is that the remedial works that Holmes was suggesting on 1 February I think it was is the steel angle and there were to be two per level at five levels. So they're recommending these steel angles, or drag bars as they've been referred to in this hearing, at each of the five levels. Now as the Commissioners are aware that isn't what ultimately happened. It went in on three levels. But that was their view at that point.

Then I come to paragraph 101 of my opening and this is a reference to the communication to KPMG as the receiver of this issue that Holmes Consulting Group had identified and, again, we have the letter that I will let the Commissioners just have a look at but the nub of it is that on the 1st of

February 1990 KPMG was advised of the content of the Holmes Consulting Group report and you can see that in the first paragraph where they refer to a meeting with Dr Reay and with Geoff Banks and they're recording their "…understanding of the steps to be taken to the alleged non-compliance with current design codes as recorded in the structural report prepared by Holmes Consulting Group Limited dated January 1990". So it seems pretty clear from that that they had seen a report or at least been made aware of the fact that there was a report and it's the one that the Commissioners have just been looking at.

Now the, the note here, if we go to the last page of that letter we see that it's signed off by Mr P W Young who was the receiver within KPMG and the letter does refer to work that's underway. You'll see that KPMG say they've advised Mr Stock, the solicitor for the Canterbury Regional Council, that the remedial work is to be carried out forthwith and there was real concern, you can see this in the letter, that they'd had such difficulty finding a buyer for the building that they were now very concerned that if there was any hiccup over this remedial work, if we could just go back a page please, then the sale might fall over because Canterbury Regional Council's got an option at this point and so the pressure is on to get this done and you'll see here also an estimate of the cost. It's now 5000, significantly less, obviously, than what Holmes thought it was going to be and let's go back to the full letter. You'll see in paragraph 2, and this follows through into a number of documents and correspondence and notes that come after this, that KPMG is being "…advised that investigations are continuing as to whether or not steel ties were placed between the structural floor and some shear walls as a metal detector has indicated the presence of some steel". Can we go back to the full letter please. And then they say in paragraph 4, "In view of the relatively modest cost for the remedial work you are advised it is more cost effective to assume that the steel is not in place as the cost of further investigating the matter would in all probability exceed this amount. You're also advised that there is reasonable agreement with Holmes Consulting Group as to the level of remedial work required and that once carried out there is no suggestion that the building is not at proper standard." Now, again, I just draw the Commissioners' attention to the issue

of reasonable level of agreement because there is, it seems, some dispute between Holmes and Alan Reay Consultants Limited about the role that Holmes played in the detail of what was ultimately done with the insertion of the drag bars and you will hear about that from the Holmes perspective from both John Hare and Mr Grant Wilkinson.

Now at this point any rate, I just mention in passing, that the question of who was going to pay for this was left open but all that Mr Young as the receiver was really concerned about was that things get moving. Now, again, I won't bother you with these documents, I don't think they matter sufficiently but they're in the file, but that then is followed by Alan Reay Consultants Limited advising its broker of a possible insurance claim, and there's correspondence with Alexander Stenhouse and also with Indemnity & General, and I don't think we need to go to that, unless you want to.

Now it does seem that around about this point the Canterbury Regional Council decided not to proceed. That at least is the evidence that you will hear I think from Mr Hare. Now the possible relevance of that is picked up in my paragraph 104 and this refers to a letter of the 2nd of February 1990 from Mr Banks to Mr Wilkinson which set out the proposed remedial work, and there it is there, and it refers to telephone discussion between Mr Banks and Mr Wilkinson that morning, confirmed that the scope of the possible non-compliance referred to is on gridlines D and DE and relevantly from levels 2 to 6 inclusive and then the proposed remedial work if required would consist of a total of two ties per floor which is what Holmes had themselves proposed. They give a figure about the kilonewton tie load that would be carried and then Mr Banks asks Mr Wilkinson to contact Alan Reay Consultants Limited if your understanding of the situation is not as outlined above and you'll see there the sketch plan which came from Mr Banks about what was proposed and the two places are arrowed where the drag bars were to be inserted and where they subsequently were inserted, although not at all of those levels.

Now this is what gives rise to this issue between Holmes and Mr Banks and Alan Reay Consultants Limited about the level of involvement by Holmes in

this. There is no record of any response from Mr Wilkinson but as I note at paragraph 105 this has led to a rather contentious issue between the two parties over who was responsible for the design that was ultimately followed and you'll hear from those various parties on this and we'll just have to see how that turns out in the evidence.

1240

Now paragraph 106 I pick up this fact that contrary to what was in that letter from Mr Banks and contrary to what Holmes had proposed that the decision was made to install the drag bars only on levels 4, 5 and 6 and the consultants' report for the Department of Building and Housing identifies the possibility that the absence of drag bars on levels 2 and 3 may have been relevant to the collapse scenario and it's a view which is shared by some other expert witnesses and at least as I understand it I believe that that will also be at least commented on by Professor Mander who is being called by Alan Reay Consultants Limited.

Picking up then the chronology again, paragraph 107, so the sale to Canterbury Regional Council collapses, the building just continues to sit empty and that brings to an end any immediate steps to remedy the weakness which had been identified in the diaphragm north core connections. It's just left. About a year later, late 1990 is the date we have, this company called Madras Equities Limited becomes interested in the building and on 21 December 1990 it actually purchases the building and it's remained unoccupied up to that point.

The Royal Commission will hear evidence from Madras Equities Limited that at the time of the purchase it was not made aware of the deficiency in the building, and I mention because I know that one of the issues that has come up from time to time is this issue about when critical structural weaknesses are identified with buildings, what happens to that, does it get communicated to anyone, any of the regulators in particular and here it was not, and wasn't communicated to Madras Equities and for reasons that will become clear in a moment, nor was it communicated to the Christchurch City Council. And of course the Canterbury Regional Council's got this information as well but they

don't communicate it with the Christchurch City Council either so that knowledge just gets parked.

Following the purchase, and this paragraph 109 of the opening, an unconditional agreement to lease the building is entered into with the ANZ Banking Group and it's referred to in that 21 December document that I just made reference to and it seems clear although the witnesses for Alan Reay Consultants Limited may want to comment on this, but it does seem clear that Alan Reay Consultants Limited subsequently became aware of the sale and became concerned about its position and it's referred to in a Geoff Banks file note which is just coming up and you'll see it's to Peter Smith from what as I understand it is the Consulting Engineers Association which appears to help to manage claims for and against structural engineers who are members of the society and it notes that they're aware of a sale of the building, this is a Geoff Banks note. "What are our obligations if any to notify anyone re the status of the review to date? Preliminary advice from insurance point of view is no further action. Peter Smith to consider and advise".

And then you'll see that there appears to have been contact coming back from Peter Smith and Mr Banks has made the note, "contact Austin Forbes," who of course is a Christchurch barrister, or "Sam Maling at Lane Neave for opinion. Consulting Engineers Association Society to pay". So that is what happens, advice gets taken, we haven't seen that advice, it has not been made available to us but it does seem clear from the narrative that that advice is taken and that whatever the detail of that advice was the decision was then made by Alan Reay Consultants Limited to notify KPMG and that takes us back to that letter from KPMG which we looked at a moment ago and it's running fairly close because the tenancy for the ANZ Bank was to commence on 1 November.

Now there's a letter in here of – if we just go to the second of the documents referred to in paragraph 111. It might be the one we looked at before – no it's not. So this letter is dated 30 September. It's from Pedofsky Ibbotson Cooney who are acting for the owners of Madras Equities Limited, the shareholders.

This refers to a letter of 11 September 1991 which no one has been able to locate. It's a mystery. None of the various parties who one would have thought would have been in the chain for this have been able to locate it but it – the content of that is indicated I assume from the second paragraph. It says, "as indicated to you we are currently naturally concerned on behalf of the owners that there may be an engineering design fault omission in the structure which could impact on insufficient loadings to meet the normal earthquake requirements". So my assumption any rate is that that that's sort of the flavour of the 11 September letter to which this is then responding. Reference to it being drawn to the attention of KPMG and various background matters, reference to have been relatively simple to carry out and so on.

We'll just go to the second page of that in case there's anything else there that I just need the Commissioners to note. You'll see that the question of cost liability for this work is left for final determination, that's the second paragraph on that page you're looking at and ultimately the evidence appears to be that Madras Equities carried the cost of doing this repair work. The narrative continuously through to the end refers to the repair works been carried out by Alan Reay Consultants Limited being done on a without prejudice basis in respect to the ultimate responsibility for the cost of it and ultimately it rests with Madras Equities.

I refer in paragraph 113 of the opening to the cost of the work. It comes in at $4633.50 plus GST and as I observe much less than Holmes had thought it would be but of course it didn't cover so many floors although that wouldn't make up the difference but in any event that's the figure. I don't need to dwell on the next paragraph or two, but then at paragraph 115 just to let the Commission know what's coming, foreshadow that the Commission will hear evidence from Mr Andrew Dickson who's an independent expert retained by counsel assisting who will give evidence on the strength of the drag bars that were installed and the conclusions he has reached show that the strengths were significantly lower than those used in the Department of Building and Housing consultants' report in the computer analyses then ran of which the Commissioners will be aware when they were looking at the collapse

scenarios and of course, if that is correct that may well have a bearing on the likelihood of the floor diaphragm and the north shear core disconnecting, which is an issue of some debate, that if the strength of the drag bars was lower than it was thought to be, then one expects that that has a bearing on that issue.

1250

Now I come back then to this question of did the Council know about this weakness in the building that had been identified by Holmes and at paragraph 116 I note that a building permit was never obtained for the drag bar remedial work and the position that the Christchurch City Council has advised us of, as counsel assisting and which I assume will be repeated in evidence, is that a building permit was required. On the other hand the position that I understand Alan Reay Consultants Limited will take was that it was not and that at the time the Council would have allowed the work to be treated as part of the original building permit. Mr Hare is also expected to say that he believes a permit was required but in any event none was ever sought and none was ever given.

JUSTICE COOPER:

Is there to be a witness called saying that a permit wasn't required?

MR MILLS:

Well Mr Reay, Dr Reay will give that evidence but the Council's position and Mr Hare's position, as I understand it, is that a permit was required but his position, as I understand Dr Reay's position it is that it was covered by the original permit and you didn't need to have another one. That was the view of the Council and in particular the view of Mr Bluck at that time.

Now of course the result of this is that anyone looking at the structural drawings for the building wouldn't know that drag bars had been installed and so you would look at it and see it in its original form as permitted which led to the concerns that Holmes Consulting Group had expressed and I say in paragraph 118 that the fact that this was the case is confirmed by a subsequent event in 1997 when Opus was considering taking up a tenancy in

the building and one of its senior engineers was effectively doing a due diligence for his firm, this is Mr Murray Mitchell, and he carried out a desk top survey of the structural drawings for the building and quickly identified the same structural concern that Holmes Consulting Group had identified in 1990 and the relevance of this is in part because it comes up in the context of the assessments that were being carried out and the fact that the drawings were not looked at during the assessment processes but what Mr Mitchell will say and Mr Hare will say as well is that they both picked up this concern very quickly when they looked at the structural drawings and it was as a result of that Opus decided not to take up a tenancy in the building.

Now as I say at paragraph 119 it is not entirely clear whether there will be any serious dispute over whether the floor diaphragm north core connection complied with the requirements of the code in 1986. It's of interest though that one of the many, many information requests that counsel assisting have issued over time, using the statutory powers of the Commission, one went to Mr Geoff Banks and he confirmed in his answer that in his view it certainly did not comply with the requirements of the code that applied in 1990 when he was involved in looking at this issue. As far as I'm aware there were no relevant changes between 1986 and 1990 to this aspect of the code and so he appears to take the position no, that it didn't comply in this regard but the Commission will hear from him and that'll be able to be clarified.

It does seem that Mr Harding is going to take a different position. I think he is going to say that it was compliant but generally I think it's fair to say the evidence the Royal Commission will hear is critical of this connection to what was intended to be the principal seismic resisting element in the building.

JUSTICE COOPER:

Does that include Dr Mander?

MR MILLS:

On whether it complies or not?

JUSTICE COOPER:

That the, you say the evidence generally will be critical of this connection.

MR MILLS:

Yes, well yes there is, there's some interesting discussion. I'll come to his evidence a bit more in a moment but yes there's some interesting discussion in Professor Mander's evidence, or more accurately in his submission that's attached to his evidence in which he talks about an alternative collapse scenario where the issue of the connections and the lack of the drag bars on levels 2 and 3 does feature in his thinking.

I come now to his issue of change of use which I mentioned right at the outset of the opening. Again, this is an issue that will need to be explored and I just observe that the Commissioners will be aware that the fact that a building has fallen behind what would be required if it was being built anew, under new codes, doesn't require any change to the building unless it triggers the issue of being earthquake prone. Subject to that buildings can be falling behind current standards but be left as they are but that, of course, can change if there's a change of use in terms of the occupation of the building and there are a couple of issues around that that I've just noted here. The first is at paragraph 124 and this is the reference to Going Places which I mentioned earlier. There's a tenant that had been there but was not there on the 22nd of February and the permit application for that refers to a language school fit-out and it does seem that, and this is in front of you now, that the Council was at least aware that this, the fact that a language school was going in there, could trigger, or did trigger a change of use and gave the Council powers to take certain steps as a consequence of that but you'll see in that column you've got there, point 9, change of use, yes, that's easier, change of use, engineering report, age, condition, strength, reasonable modern, 1986. I'm trying to think what that first word is, after that it's shear wall building – what do you think it is – frame, okay, the consensus here is it says frame, frame/shear wall building ok. So that seems to have been the basis on which the Council concluded that even though there was a change of use that it didn't require any additional changes to the building, any strengthening of the building.

Now that's an issue that Dr Reay is expected to give some evidence on and my understanding is that the Commission will hear from him that in his view, at any rate, it increased the design lateral load co-efficient for the building and it did result in a substantial change to the seismic and gravity loads and I've referred to that at paragraph 125 of my opening. So there may be some issues around that but in any event that's the decision that Council made.

The Council also says in correspondence that we've had with them that it was never notified that Kings Education was going in, which again, just as with Going Places, would have involved, potentially, a change of use – whether it did was never considered. Council was never notified.

Similarly, as I say at paragraph 127, the Council was never notified that The Clinic was going in there in January 2011 and I'm expecting that we'll hear legal submissions from the Council on whether that would have amounted to a change of use on which there might be some divergent views.

Now I just note briefly the Council was also asked whether it had identified the CTV building as potentially earthquake prone because that's one of the questions the Commission is asked under its terms of reference and the answer was it was not and that's consistent with what the DBH consultants concluded was that it was 40 to 55% of the new building standard and so it was not classified, or classifiable as earthquake prone.

Let me come next then, I'll try to move through this a bit more quickly, to the post-February assessments.

JUSTICE COOPER:

September.

MR MILLS:

What did I say?

JUSTICE COOPER:

February.

MR MILLS:

I'm sorry, wearing out. So after 4 September, so we have, not unusually for what happened around Christchurch, two rapid assessments, a level 1 and a level 2 and you'll be hearing from the three Council officers who did the level 2 assessment, nothing particularly about that that's unusual. Ends up with a green sticker but I do note at the end of paragraph 129 that the building manager who I should make clear was Mr John Drew at this point, they say he was advised to obtain a more detailed engineering assessment urgently.

1300

Now Mr Drew's role in this arises as I note at paragraph 130, because he was an interested purchaser of a shareholding in Madras Equities. Mr Lionel Hunter wanted to sell his shareholding, Mr Drew was interested in buying it and so while that sale process was in the process of going through he took on the role of building manager. The sale never went through because the earthquake came first, there were various delays about getting the sale through but that's how he comes into the frame as the building manager and I've given the details of that in paragraph 130. I don't need to dwell in them.

Mr Drew following the recommendation that was given with the level 2 assessment arranges a more detailed assessment. I've touched on that at paragraph 131 and that was carried out by Mr David Coatsworth of CPG Consulting Engineers and I imagine the Commissioners are familiar with this. I've set out the recommendation that Mr Coatsworth made after an initial discussion with Mr Drew, it's set out in paragraph 131 and you'll see what he proposes there and he says, and it's also recorded in this document that's just come up on the screen, what he says is, "I suggest that we should be allowed to carry out a thorough inspection of the building. This would include viewing the exterior and the grounds, the windows, from the roof and from whatever other vantage points are available. It will also include inspecting all visible internal surfaces. I would propose that we lift ceiling tiles in appropriate places to inspect under floor surface, beams and beam-column joints where

possible. For the purpose of this review I would not suggest removing internal wall linings unless there were some obvious reason to want to do this. …structural and architectural drawings of the building would be very helpful," and I do note that because in fact they were never made available so even though they're described as being very helpful they were not reviewed. "If these can be made available they will help the understanding of the structural systems within the building."

Mr Coatsworth reports to John Drew on the 6th of October and the report concludes and I've set it out in paragraph 132, "the likely remedial work on a best endeavours visual and non invasive basis from a brief walk through of the building on Wednesday 29 September," and then he sets out what he saw and that's set out in paragraph 133. I won't go through all of it but I do note in the second to last paragraph there on page 29 of the opening, "we have not sighted any structural drawings for the building. I understand that the Building Manager was unable to obtain drawings and Council records are currently unavailable following earthquake damage to their archived system, but in the absence of that concluding there are no obvious structural failures. In that respect we believe that the building's performed reasonable well."

Now I do foreshadow that this issue of how the building performed in September is emerging I think as a very live issue in this hearing. There is a view emerging that in fact the building suffered significant damage in the September earthquake and partly in response to that as I understand it the expert panel that the Commission directed be set up to look at this non-linear time history analysis is running a further analysis which will include the assumption that there was damage to the building in September whereas at present the time history analysis that was run by the Department of Building and Housing consultants assumed that the building was untouched and ran the analysis in two stages, one for September, start again, one for February and the correctness of doing that I'm hoping we will hear evidence from a further time history analysis that will give more insight into that, but certainly there is a view in several quarters that in September the building sustained what was essentially a design level earthquake that goes back to the spectral

analysis that I took the Commission to and that there will be evidence from some witnesses that the floor diaphragm and the north core may have disconnected in September and that might explain or go some way to explaining the evidence that you will hear from the witnesses about this increased liveliness or bounciness or movement in the building that a number of people say they experienced post September.

Now of course one has to take into account the much greater sensitivity everyone had to earthquakes in Christchurch after September but certainly there is consistent evidence that the Commission will hear that that building changed after September.

I come then to paragraph 135. Another issue which a number of the witnesses will refer to was demolition that was going on, on the western side of the CTV building prior to the February earthquake. I think there are actually two demolitions that took place and there might be a little bit of confusion in some of the evidence that I'll have to try to clarify but the one that most of the evidence relates to is one that was going on right before the February earthquake and in relation to which I think the Commissioners will recall that there are photographs of people working on that western wall right at the time when the February earthquake struck and evidence will be heard from the two workmen who were on that wall but what a number of the occupants of the building say is that the effect of the demolition on the building was frightening and that the building shook and they weren't sure whether they were earthquakes or aftershocks and they were conferring with each other as to which they were, so the issue of the demolition on the neighbouring property attracts some attention at least from witnesses.

We counsel assisting made enquiries of the Council about the demolition consent and the Council will give evidence about that. There was a demolition permit. The Council I think will say that the demolition methodology complied with the permit and the Department of Building and Housing report which I note at paragraph 137 has concluded that despite all the alarm that

the demolition caused that it was unlikely to have played any role in the collapse of the building in February.

Paragraph 138 really picks up the point I was just making about the possible disconnection of the floor diaphragms and the north core in September and I don't need to repeat that.

JUSTICE COOPER:

Can I just throw a question out for, maybe for Mr Laing primarily. As I understand it under the current system once one has construction of a building such as this has been completed, there's a requirement to provide 'as-built' plans. Was that – I'm interested to know whether that was a feature of the by-law regime that was applicable when this building was constructed.

MR LAING:

No Your Honour, it's as my friend has described there was the provision for a design certificate, the intent of the design had been complied with, but there was no requirement for 'as-built' drawings as such.

COMMISSION ADJOURNS: 1.09 PM

COMMISSION RESUMES: 2.20 PM

MR MILLS:

I am at the Boxing Day event on page 30 of the submission paragraph 139. Following the Boxing Day event there was a further Level 1 rapid assessment. A green sticker was placed on the Building and a USAR report recorded that no engineering assessment was required [BUI.MAD249.0167.1 and BUI.MAD249.0166.2] and an overall building damage assessment of 0-1% further damage from Boxing Day and there are the two, you just had them picked up fairly quickly but two people did it the same day and there are there two reports.

Despite this there continued to be serious concern from some of the Building occupants and the Royal Commission will hear evidence of this kind from a number of the witnesses. In particular Mary-Anne Jackson, the receptionist for CTV, appears to have been so convinced that the building was at risk if there was a further earthquake that she was known by her colleagues at CTV to run from the building each time there was a big aftershock, a practice which, in fact, served her very well because she did manage to flee from the building as it collapsed behind her.

I turn next to slightly more detail, overview detail, about the Department of Building and Housing's investigation. The consultants' report for the department consisted of examination of remnants of the collapsed building, a review of photographs, interviews with surviving occupants, eyewitnesses and those involved in the design of the building. They also reviewed the design drawings and the structural analysis, including computer analysis to assess demand on, and capacity of, critical parts of the building.

However, and it does seem a bit unfortunate, but it is history now, because the site materials were removed before a detailed forensic examination could be carried out it seems likely that useful information about the collapse causes and sequence may have been lost. Certainly this is what the Commission will

hear from some of the experts, including Professor Robin Shepherd who is being called by Alan Reay Consultants Limited and has expertise in forensic examination of collapsed sites and such like.

Paragraph 143 I note that in addition to appointing Dr Hyland and Mr Ashley Smith to prepare the consultant's report, the structure of the inquiry process for the Department included the appointment of an Expert Panel which had the task of overseeing the work of the consultants and reviewing and approving their report. The Chair was Sherwyn Williams, who is a lawyer, construction law expert. The Deputy Chair was Professor Nigel Priestley, an expert on the earthquake design of structures as the Commission well knows. Other members were Dr Hyland, Mr Rob Jury of BECA, Professor Stefano Pampanin from the University of Canterbury Engineering School and Adam Thornton from Dunning Thornton, a structural engineering firm which I think is principally based in Wellington. In addition, the expert panel consisted of Dr Helen Anderson, Marshall Cook, Peter Fehl, Peter Millar and George Skimming, and they represented a range of skills and expertise – seismology, architecture, construction, geotechnical practice and the role of territorial authorities in building procurement. So that's the expert panel that was, effectively, a peer review over the consultants.

Now I've mentioned this before but probably worth mentioning again, the consultants' report concluded that the most likely initiator of the collapse was the failure of columns at Line F. I think that will come up on the figure that, yes, so that's taken from, I think from the expert panel report but the Commission will recall the plan that I showed earlier on which identified Line F as being on the eastern side of the building beginning with Line 1, 2, 3, 4, 5 as it went to the north. So it is that Line F which was identified by the consultants' report as likely to be where the collapse events initiated, remembering that the consultants' report thought that collapse initiated with the panels, sorry with the columns, so the columns on Line F, and this was thought to be – and you can see it in this one that's just come up – as a result of this deflection which we can see there. Start off with the building vertical, it deflects first one way then another in the centre one and, as a result of the deflection, it loses its

capacity to carry the load and down it all comes very rapidly. So that was the theory that was set out there.

Now I think it's fair to say that there was general agreement in the expert panel, as well as amongst the consultants about the role of the columns as a collapse initiating event. Where there was disagreement was in relation to which columns and, as I've just said, the view that was, I think, pretty firmly reached by Dr Hyland and Mr Ashley Smith, was that it was that exterior line of the building on that eastern side. The other thing that was unanimous there, and I've mentioned this at paragraph 145, and this is true of the consultants as well as the expert panel, was that the columns were inadequately confined, so the concrete, as a result, was not able to survive the demands placed on them as the building moved east-west, west-east, north-south and backwards and forwards and one of the issues that they've referred to was there was a very substantial amount of concrete outside the confinement which broke off and what was left within the confined concrete was very slender, very little, unable to sustain this. Now for just a wider audience that's listening to this, I know the Commissioners are aware of this, but earlier on when I took the Commission to the model, the computer model that we've had done and we zoomed in on a column and then we went inside that column and that showed the reinforcement we're talking about, particularly that spiral reinforcement that was shown spiralling up through the column and there is a fair bit of criticism of that by a number of the experts and certainly by the consultants and the expert panel as inadequately confining the concrete within that spiral steel.

Now as I say in paragraph 145, and I'm just trying to summarise the key points that the consultants and the expert panel have come to, once one column gave way then, of course, the others followed almost certainly in rapid succession because the load that was being carried by one column then has immediately been transferred to another column and it can't carry it and so you get this rapid collapse sequence. The other feature of the February earthquake which is thought to have exacerbated this, and this is referred to also by some of the experts being called by Alan Reay Consultants, is the very strong vertical forces. So that uplift put even more pressure on the columns

as the building forced itself upwards and that put even more pressure on these already stressed columns and it's thought that that increase in the gravity loads that they were carrying as the push up occurred that that reduced even further their ability to do what they were supposed to do which was to be capable of deflecting north and south and east and west as the ground moved without collapsing.

So much for areas of agreement within the consultants and the expert panel. I note at paragraph 146 that there has been, there have been several areas of quite strong disagreement, I think it's fair to say, between the consultants, to some extent between the consultants themselves, and certainly with the expert panel and that disagreement is set out pretty clearly in a very large number of emails that record exchanges during the course of the preparation of the report on the CTV building.

1430

The Department was asked to disclose to the Commission the processes that had been gone through and the discussions that had been gone through A very large number of emails were made available to counsel assisting which we reviewed and we then made then available as we thought was proper to the lawyers acting for Alan Reay Consultants Limited and a number of those emails at the request of Buddle Findlay have now been included in the hearing documents. So one assumes that more will be heard about those. But there's no disguising the fact that there was some real debate went on about the issues the Department, consultants and experts were looking at.

Now at paragraph 147 I move from the columns to other areas of disagreement. There is a, there is disagreement over whether really the columns were where it all began. The Commission is aware that Mr William Holmes, the external peer reviewer from San Francisco who's been engaged, he is, I think, going to express some slightly different views on this, as to where the real problems lay. On the issue of the columns there's disagreement about which columns. As I said before DBH consultants favour line F, probably on line 2, so if we think about those intersecting lines, line F running down the eastern side, line 2 the first one in from the southern face of

the building, the first one in from the coupled shear core, that seems to be the favoured position and probably at level 3, not at the top, but probably at level 3.

A contrary view that the Commission will hear for one from Professor Nigel Priestley is that it was more likely that it was an interior column rather than an exterior one and the suggestion there, I think, will be column D2 at level 3. So, again, same level I think but D2 and the reason for that was, there's several reasons for that which will emerge when Professor Priestley gives his evidence but, certainly, the one I've mentioned here is that the interior columns were carrying more weight than the line F columns. So as I've put it there they were more heavily loaded than the exterior columns and that was likely to have reduced their ability to deflect as they were being called on to accommodate these sideways movements and backwards and forwards movements.

The other factor that I think will be pointed to as a reason for thinking it more likely it's the interior columns is simply the eye witness accounts of how the building came down and the, while there won't be complete consistency on this there's certainly an indication from some of the witnesses that you'll hear from tomorrow that it was as though the building had been pulled inwards, collapsed inwards almost, and then came straight down and that is, it will be said, is more consistent with interior columns giving way than exterior ones, but you'll hear some quite distinct views on that.

The other building elements that attracted considerable debate as collapse reasons, I suppose, in the DBH investigation I've set out at paragraph 148 and the first of them involves the question of the spandrels. I haven't said much about that so far but, I know the Commissioners are aware of what this refers to, but if we think back to that first photograph that was up at the CTV building it's the panels, the decorative panels that we saw all around the outside of that building, or virtually all around, the so-called spandrels, and they ran down the front of each floor and then wrapped over the top as well, effectively to create a ledge which came out and then dropped down. Here it is here. So those

grey elements there are the spandrels and it will be observed that the columns, the exterior columns, go up between the spandrels, an issue which has attracted quite a lot of debate about the implications of that.

Now the first point that I make here on paragraph 148(a) relates to this and this is the issue of whether because the columns were confined by the spandrels which effectively shortened the length that was available to move did that have an effect as a cause of the collapse and certainly there is a view, which you will hear from the DBH consultants' report, that it did, that it prevented the columns from having the full length they would otherwise have had to deflect and was a significant factor in the collapse scenario. Related to that is an issue about how the spandrels were actually constructed. The spandrels as designed were intended to leave a space around the columns to give it room to move. There will be some evidence that will be based on the belief that the spandrels didn't leave that amount of space. Again, we're sort of talking seismic gaps here and that they were so close to the columns that that meant they didn't have even the space that was intended to move in. So the Commission will hear evidence about that and hear divergent views on the role the spandrels played.

Then the consultants' report, as I say at 148B, raised this issue about the diaphragm connection to the north core, whether that might have been where it initiated. One of the things that will be said against that which is, I think, the view of Dr Hyland is that the photographs post collapse show the floors, at least some of them, still hanging onto that north core, as Your Honour may recall in some of those photographs and that the way they collapsed indicates they didn't come first, that other things came first but, again, you'll hear divergent views about that.

Then the third one that is referred to, and again we'll get some attention from a number of other witnesses, is whether those beam column connections that we looked at relatively briefly when the model came up, whether they might have simply pulled apart and that they might have been the critical initiator of the collapse event.

Then, of course, the one that's been mentioned before that we saw when we looked at the building in plan, the irregular, or as the structural engineers refer to it, the eccentric shape of the building and that issue about where the centre of torsion was as opposed to the centre of mass that we looked at in that diagram, the effect that that might have had in putting pressure on particularly the connections to the north core but also on other elements as well.

Then this issue about the western wall which I've mentioned before and which we looked at when we did the drive around on the computer model, this question of the western wall, as I mentioned previously, is a vexed issue. I think it's fair to say that the DBH consultants, particularly Dr Hyland, have formed a pretty firm view that contrary to the design intent that that was not separated from the rest of the building by some kind of gap and some kind of flexible sealant that would have gone in but was concreted right in, hard up against the columns and on that basis had a significant effect on the way the building responded which it does not appear that was what was intended but I think that's the view that Dr Hyland came to, that it was concreted in, or mortared in and it did effect the way the building responded and he will attach, I think, some significance to that, or the report that he's done does, as a feature in the building collapse.

Now you will hear some witnesses on this but I think it is possible that in the end the evidence will prove to be conflicting and possibly inconclusive but nonetheless you will hear evidence from various people on whether or not there was a seismic gap between those panels and the columns or whether there wasn't.

1440

For the expert panel the Royal Commission is going to hear from Mr Rob Jury from BECA, not from Professor Priestley the deputy chair. As I say at paragraph 150, because it did become clear to counsel assisting that Professor Priestly does hold a different view from the consultants on several points and even from the expert panel report in some respects, that the Royal Commission wanted to hear from him independently of representation

on the expert panel. So he will give evidence, but not in his capacity as a member of the expert panel or as a the deputy chair of it, but in his own right as a leading international expert in structural engineering.

I've set out at paragraph 151 a summary of the areas where the consultants' report concluded that the building was not code compliant. I'm not sure whether that's going to come up. You have the reference there, but as I've already foreshadowed the first one was the columns where the view was that they were required to be designed and detailed for ductility. That's come up, that's from the consultants' report. The second one is the columns didn't meet the requirements for shear reinforcement. Third, the beam column joints were required to be detailed for ductility, and fourth that the north shear core floor diaphragm connection was not compliant, or as I've said, at least this appears to be the conclusion, it's not always entirely clear but no doubt that will be clarified when they give evidence.

The Royal Commission is also going to hear separately from Mr Ashley Smith on the question of code compliance. What has become apparent I think is that the section on code compliance in the consultants' report was principally the authorship of Dr Hyland, not Ashley Smith, and he has some views of his own that he wanted the Royal Commission to hear, and so you will hear separately from him on his views.

JUSTICE COOPER:

So does he think the building complied in some of these respects? Is that the difference?

MR MILLS:

No, I think he takes a more emphatic view on non-compliance.

JUSTICE COOPER:

Does that mean that he thinks it did not comply in other respects as well, or just that he is more clear about these matters?

MR MILLS:

He takes a view on ductility requirements, I think, which is stronger than this expressed in the consultants' report with the consequences that flow through from that.

And then I've just mentioned that Professor Mander is expected to say the building was code compliant, although in fairness to him I think that he may turn out to have a more nuanced view than that but we'll see what he has to say.

I turn then just briefly, again just by way of overview, to the computer modelling that has been utilised by the DBH consultants. I know the Commissioners are well aware of this, but it lets me cover it off. One of the other areas that has, very apparently has caused some differences of view between the expert panel and at least the earlier stages of the DBH consultants' report was over the use of computerised modelling systems to try to identify the collapse cause and sequence and there've been two types of computer modelling that have featured in this and both have been mentioned. The first is the ETABS or ERSA analysis and earlier version of which as I mentioned was done by Mr Harding when he was doing the building design. The ERSA, as I think you'll be well aware, is an acronym for Elastic Response Spectra Analysis. I think the critically important point there being "Elastic". And the other is, I refer to in paragraph 155, is the Non-Linear Time History Analysis.

Now the consultants' report relied heavily on the ERSA analysis which as I understand it, and again your colleagues will correct any errors I've got here, but as I understand it it's principally used for building design not for analysing collapse sequences and scenarios. But, there is a lot of weight put on the ERSA analysis in that consultants' report and this did lead to the expert panel insisting that a Non-Linear Time History Analysis be run as well. As I understand it the Non-Linear Time History Analysis is much more directed to determining a collapse scenario because it records much more accurately the response of the building to a range of different ground shaking from different

directions over time. It takes little snapshots of time and watches what happens as time progresses, as the building responds to the ground shaking.

That becomes clear I think looking at the consultants' and the expert panel report but it will be covered off in the evidence.

Now as is perfectly obvious to everyone I think that anything of this kind is very dependent on the quality of the inputs. I mention this at paragraph 156. The well known garbage in/garbage out proposition is capable of applying here as it does to other computer usages, and it's very complex. That certainly has become clear to we lawyers as we've had to try to understand this. Potentially you're modelling every part of the building, making assumptions about their strength, putting that in as input data and if you get those wrong, if you get the ground shaking wrong, if you get the strength of members wrong, if you get the strength of the concrete wrong, then all of that has the potential of course to create or give results that may not be accurate.

As I observe in paragraph 156, my understanding is that some of those inputs you can probably assess objectively. Others are the result of experienced judgement by highly qualified structural engineers.

Because of this, and I'm at paragraph 157, because the Commission learned that it was intended that other Non-Linear Time History Analysis be run by other parties and the concern that the Commission might be confronted then with a range of divergent views with no common element to them, the Royal Commission issued a directions order which required the various experts who are being called to give evidence on the results of Time History Analysis to confer with the aim of providing the Royal Commission with a single report that sets out areas of agreement and disagreement, and as the Commission knows, that work is being facilitated at the direction of the Royal Commission by Professor Athol Carr. The work is still not completed. We're not sure when the results will come in but at some point that is the expected outcome from it.

I just observe in paragraph 158 that that procedure of the Courts directing that expert witnesses confer is common in the Courts in New Zealand.

1450

Just going down then I think to paragraph 161, the, even though that focuses on the Time History Analysis the relevance of the ERSA analysis is still a matter that requires consideration and here to because of the potential for disagreement about the inputs the same process has been followed there at the direction of the Royal Commission as is being followed with the Time History Analysis and the relevant experts are discussing amongst themselves which inputs that were used for the earlier time-history analysis and the earlier ERSA analysis carried out for the Department, which of those should change and which new ones should come in for the purposes of re-running these analyses and as I mentioned earlier as I understand it one of the ones that will change is that it will take into account the prospect that the building suffered damage in September and it will be run in a linear fashion from there making certain assumptions about the level of damage. What's going on beyond that I don't know but as I understand it that is something that the various experts on that panel have agreed to do.

Now the question of concrete and by this I mean concrete strength. Here too we have a highly vexed issue. The consultants' report done for the Department reached the view that the concrete, or significant amounts of the concrete in the CTV building did not comply with the required levels of concrete strength and the conclusion was reached that that under-strength concrete played a not insignificant role in the collapse sequence. That view which clearly had an impact on the DBH consultants' report will be strongly contested in this hearing on two grounds as I understand the way this is developing. First, it will be on the basis that the protocols that were followed for the concrete testing did not follow the required protocols for doing that. Whether that's right or wrong remains to be seen but as I understand it that's the first criticism of the concrete analysis that was done in the Department's work. It didn't follow the proper testing protocols and the Commission will hear from some international experts who have been called by Alan Reay Consultants Limited, not solely international, but some international

experts who will deal with that issue. Second, it's been challenged on the basis that the actual concrete strength that the Department consultants arrived at, the conclusions it was under-strength and the figures that they arrived at for level of under-strength, gave results which when they were fed into the non-linear time history analysis give results which simply can't be relied on. It's not safe to rely on assumptions reached on that basis. Well perhaps because I've just been reminded of what's in the next paragraph, that the ERSA analysis which relied on that can't be relied on safely.

Now it's important to understand that in carrying out the non-linear time history analysis, which a firm called Compusoft did under contract to the DBH consultants, that they didn't use the conclusions that had been reached on under-strength concrete for the consultants' report. They didn't do that. They did the non-linear time history analysis on the basis that the concrete was of the specified strength plus 2.5 megapascals to allow for the expected strength gain over time. So whatever the issue might be with the concrete conclusions that have been relied on in the consultants' report the time-history analysis did not adopt them.

Nonetheless the Commission will hear evidence from several of the experts being called by Alan Reay Consultants Limited, particularly by Professor Mander, that even this level of strength that Compusoft ascribed to the concrete is too low and that there does need to be another time-history analysis run which attributes significantly higher strength to the concrete than Compusoft ascribed to it. So we don't have the problem with Compusoft, if there is one, that applies to the consultants' report but it will be said that it's still too low in what Compusoft did, should have been higher and we get a different consequence as a result.

Now all of that will be matters that the Commission will have to weigh and listen to the evidence. I'm just trying to give you a road map to where the issues are likely to lie in relation to this.

Now the Christchurch City Council, we've made some efforts to try to get the original concrete testing records that would have been given at the time. We know that the way the concrete is delivered to site that there would have been regular testing of the concrete strength from the various batches that came in. We have drawn a complete blank on that. Christchurch City Council says it's got no record of the concrete testing that was conducted during the construction of the building. Mr Jones, the foreman from Williams Construction, when he gives evidence he will say that each day he would receive a docket from the concrete supplier as concrete was delivered and Mr Harding is expected to say that he, too, would check the documents from the concrete supplier. No suggestion from anyone that they were alarmed about the quality of the concrete.

Now as I say at paragraph 166 in accordance with the Royal Commission's practice of seeking independent peer review of experts' reports the Royal Commission commissioned a report from Mr James MacKechnie on this question of concrete testing and whether the protocols that should have been followed had been followed by the Department's analysis. The report that he has given, and we'll hear from him, did identify a number of shortcomings in the testing process. So he will give some support to the criticisms of the witnesses being called by interested parties, or affected parties. We also heard from the Cement and Concrete Association of New Zealand, raising a number of similar concerns, and at our request we'll have a representative of that Association come along to give evidence.

So it's fair to say that there is a fair degree of criticism in the witnesses about the protocols but one can expect that on the other side it will be defended by Opus who did the original testing for DBH consultants and also by Dr Hyland and Mr Ashley Smith as well perhaps but, certainly, from Dr Hyland.

Finally on the concrete I just make mention of the fact that Alan Reay Consultants Limited is calling evidence from (inaudible 14:55:58) Haavik who is expected to produce the results of separate testing which has

been carried out which leads to the conclusion that the strength of the columns was above that specified in the original specifications.

I turn then to nearly the final topic which is the –

JUSTICE COOPER:

Just before you go, and I may not have followed this, you may have told me, in the process that's going on with the expert panel to run further NLTHA tests is one of that, does part of that involve using an increased concrete strength?

MR MILLS:

Well I don't know the answer to that. I know it's being debated within the panel. It's certainly an issue that I gather has been raised.

JUSTICE COOPER:

Do you wish to confer with your colleagues?

WITNESS CONFERS WITH COLLEAGUES

MR MILLS:

It is? I'm being told it is. I'm not sure what the figures are. I don't know whether either of my – but, yes, some increased strength.

JUSTICE COOPER:

Thank you.

MR MILLS:

I turn now to this issue about further collapse evidence beyond that which comes out of the DBH report and so on and I note there that in addition to the various witnesses I've referred to that Dr Alan Reay is expected to give evidence in which he sets out some possible collapse scenarios which he says were not adequately considered as part of the DBH investigation and Alan Reay Consultants Limited is also calling Professor John Mander and he will set out an alternative collapse scenario. Of course it's entirely possible as

the hearing progresses that other collapse scenarios may emerge which we'll have to, potentially, make further enquiries about.

1500

That's the nature of I think a Royal Commission of Enquiry. Issues can emerge during the hearing itself. Now paragraph 169 is the point I've made previously about accounting for September. I won't repeat that and I've already noted that as I understand it, the expert panel is doing just that. Paragraph 171 just picks up again this point about the very high vertical accelerations which a number of the witnesses will point to and then at 172 I just comment a little further on Professor Mander's alternative collapse scenario. It's a very carefully developed alternative collapse scenario, I think the Commission will find it interesting. It's described as a submission and is attached to Professor Mander's statement of evidence.

JUSTICE COOPER:

What's that about?

MR MILLS:

Well I'll give you a brief overview of it –

JUSTICE COOPER:

Well, is he a witness or is he (overtalking 15:01:09).

MR MILLS:

Well he is a witness and I will clarify with him when he is called or my friends will, the nature of the submission I have assumed that it's part of his evidence. It's attached to his evidence, it's referred to as a submission, so we'll tidy that up I expect.

JUSTICE COOPER:

What's the story Mr Rennie?

MR RENNIE:

(inaudible 15:01:32) because it is a specific scenario Sir, he's presented it in effect as an exhibit rather than discussing it in the text of his brief.

JUSTICE COOPER:

Right, but there's no suggestion that it's not evidence in the normal sense?

MR RENNIE:

None, quite the contrary Sir. It's been put forward in that way as it's a single coherent statement which he will support in his evidence because we perceived it to be the clearest way to put forward the analysis which he has done.

JUSTICE COOPER:

I don't follow why the word submission has been used, that's all.

MR RENNIE:

Well I can only say Sir that the Professor liked that word and we left it there.

JUSTICE COOPER:

Right.

MR RENNIE:

I didn't intend to be facetious to you Sir or -

JUSTICE COOPER:

No, I didn't see it in that way, but perhaps some other word perhaps.

MR RENNIE:

Well it happens to be his perception of the way to categorise it Sir.

MR MILLS:

Just to briefly foreshadow I think some of the points that the Commission will hear on that. It's critical as you would expect of the DBH consultants' report but interestingly on my reading of his submission at any rate, he places much

emphasis on the performance of the beam column joints and their lack of joint shear reinforcement and also the potential role of the floor slab north core connection. He does appear to agree with other experts who refer to or are expected to refer to a lack of robustness and redundancy but the views he reaches around that are different and it's interesting that in his analysis of the columns he I think in common with Professor Priestley considers that the interior columns were more vulnerable than the exterior columns which the DBH consultants identified as the indicator columns and again for the same reason that they were more heavily loaded, particularly with the vertical accelerations putting additional gravity force on them and I think that like others the third floor is likely to be seen by Professor Mander as the most critical floor with respect to both the strength and drift capacity of the columns.

Now to the final issue which is the question of ground conditions. I think I can pass over this pretty quickly. There was a site inspection report obtained by Alan Reay Consulting Engineer in June 1986. That report concluded that either a shallow foundation or piled foundation would be suitable. After the collapse of the building Tonkin and Taylor prepared a report for the purposes of the Department's investigation and that concluded that those foundations were typical for that size of building and were appropriate as long as liquefaction was not an issue, and the view is that liquefaction was not an issue in relation to the building collapse. There's no one who suggests, that I'm aware of, that liquefaction played a role here.

So that concludes the substantive part of the opening. I've then just touched briefly on the structure of the hearing. I think Your Honour has already mentioned that the number of witnesses, there are at least 77 and I think it looks like it's growing. A number of expert witnesses, some are from other countries, principally the US. Some are being called by counsel assisting, some as a result of receiving summons, others have been called by their own counsel and the DBH witnesses as Your Honour is aware are being called by Crown Law and a number of witnesses of course are being called by Alan Reay Consultants Limited. There is a schedule which if anyone's interested

they'll find it on the Commission website setting out the hearing structure and it's currently scheduled to run for about eight weeks.

The way that the hearing has been structured and to give coherence to it, means that we're running it by topic which does mean that some witnesses will come more than once, so rather than having a witness come once and give evidence it goes across a range of topics where calling them more than once if they're dealing with more than one topic as it will make it more coherent. So we're beginning with evidence from the eye witnesses to the collapse and from the building occupants about the state of the building following the September earthquake and then witnesses who will give evidence about the state of the building after February, evidence on assessments, expert evidence about the collapse and then evidence as we roll through about the design, the permitting and so on and so forth and the construction.

Now before I call the first witness unless there's any issues I can help with other than what I've covered, there's just one matter I've been told needs to be corrected and it relates to the reference to the Coatsworth report which is in paragraph 132 of the opening and it appears that there's a little gremlin has got in here. The report that it's quoted from briefly, in paragraph 132 which is referred to as a report from Mr Coatsworth to John Drew, is actually from a report from the quantity surveyor whose evidence is to be read, not from Mr Coatsworth but nothing of any significance turns on it, but that does need to be corrected.

MR MILLS CALLS

NILGUN ELIZABETH KULPE (SWORN)

Q. Your full name is Nilgun Elizabeth Kulpe?

A. That's correct.

1510

Q. You've been a New Zealand resident since 1985?

A. Yes.

Q. You live on the Banks Peninsula and you were working as a counsellor at Relationship Services at the time of the February earthquake. Now you prepared a written brief of evidence didn't you?

A. Yes I have.

Q. And you've signed it?

A. Yes.

Q. And you have a copy of it in front of you?

A. Right here.

Q. All right well I wonder if you could just pick up with your brief of evidence in paragraph 2 just after the reference to the Relationship Services and just read it through. I will take you as you go through to the plan that's attached to it but you just start reading, I'll ask you as we go along if I need to.

A. Is it, do you want me to after, after, before –

Q. After the reference to working as a counsellor at Relationship Services.

A. Okay, all right. Relationship Services occupied the 5th level (Level 6) of the CTV Building. I was on the 5th floor along the western side of the building when the 22nd February earthquake hit.

Q. If you just pause we should have the plan that's done which should enable us immediately to have it up there and identify where she was.

A. I apologise for my voice. I just recovered from a nasty cold.

JUSTICE COOPER:

Q. Your voice is fine and we can all hear you and we haven't always been in that position in other hearings so that's fine.

A. Okay let me know if you can't hear.

EXAMINATION CONTINUES: MR MILLS

Q. Now you've got that on the screen in front of you.

A. Yes.

Q. I wonder if you could just, when you say that you were on the 5th floor along the western side of the building can you just identify.

A. I was in Room 3, the number 3, in that room yes.

Q. All right thank you.

A. So, shall I go on with the report.

Q. Yes please.

A. Before September 2011, before the 4th of September –

Q. 2010.

A. 2010 sorry, so I noticed the building would vibrate whenever they were doing aerobics classes at Les Mills, which was a fitness centre next to the CTV Building. I sat near the external wall on the western side of the building and I could see them from my window, I could look over to Les Mills. Clients would ask me if it was an earthquake, the shaking, and I would tell them it was just people doing aerobics and for them to take a look to be reassured. The movement did not startle me until the 4th September earthquake. I guess because I was more sensitive to movement after that.

They began to demolish Les Mills building in 2010 before 4th of September earthquake. My understanding was that they wanted to upgrade the Les Mills building and it had nothing to do with the earthquakes, it was not as a consequence of the earthquake. I did not notice any movement in the building when the demolition was carried out but it was very very noisy, but there was no shaking or vibrations at that time. When the aerobics classes started up again, and I'm thinking I'm referring to when the new building was built, in the new building, it's missing there a little bit, the movement was back. It was noticeable again. It was like a light vibration and I always knew when the classes were on. So after the 4th of September 2010, after the earthquake I was surprised that the building was re-opened on the Tuesday, meaning I rang in on Monday. I thought surely we would be closed for a while. I rang the administration desk at my work in Relationship Services at

work on Monday and was told that we were open and that we had the green sticker. I cannot remember who I spoke to. I wondered how fast a building of that size could be assessed and deemed to be okay. A number of areas of damage had appeared on the 5th floor, this is level 6 again. Attached is a floor plan of the building I have prepared (marked "A"). The positions of the rooms and internal walls have not been drawn to scale and their placement is approximate only. The issues of concern that I refer to in my evidence are marked on this plan.

Q. Can I just ask you to pause briefly. I just need to clarify with you how this plan was actually put together and this is going to arise with everyone who's giving evidence. I take it that you've said that you prepared it, just tell me if I'm correct in the way in which this was done, I don't think it matters that I lead your evidence on this. Am I correct that what happened when your evidence was being briefed by counsel staff from the Commission is that you did a sketch, marked these things out – say yes as we go along please.

A. Oh yes, yes.

Q. And then that hand sketch was then taken by the Commission staff and put into the form we've currently got.

A. Correct, yes, yes.

Q. But what we've got here is an accurate reflection of where you began.

A. Yes, yes it is, and a much better one than mine.

Q. That's why I asked.

A. Much better but it is correct, yes.

Q. Thank you if you just pick it up again at paragraph 8.

A. Okay, so I noticed a small crack in the foyer by the lifts. I have marked this as "1" on the plan. It was right coming out of the lift to my left. It ran vertically on a slight diagonal. From memory I would say it was approximately 1.5 metres in length. It's a real estimate, it's not maybe the correct length. It ran above the window and underneath the window as well. I felt really scared being in the CTV building after September 4th. I felt like the building was sick and that it wasn't safe. In aftershocks I would always go to the nearest doorframe. I would do that even if I was seeing clients, which was a bit embarrassing if they were

trauma clients who I supposed to be helping to calm. I always said jokingly that at least they could see that I can handle it less than them, than they, or I can, you know, I'm just doing a worse job than they do. The building on the west, so okay demolition on adjoining site, can I go (inaudible 15.17.18)

Q. Yes please, yes.

A. So the building on the western side of the CTV building was demolished after the 4th September earthquake. I think this was the Injury Solutions building. There was machinery work about all the time. The CTV building moved a lot as a result of the demolition and it was very difficult to do trauma counselling when the building was moving as much as it was. So to illustrate that it was really, I think, impossible in a way because the building was shaking and the people who came up from the ground to be with us on level 6 were all very traumatised people so… I was very alarmed about the demolition because I believed the eastern wall of the Injury Solutions building was joined to the western wall of the CTV building. When they pulled on the adjoining wall it felt like the CTV building was pulled as well. It made the whole of the CTV building shudder and I was sitting right there on that side so each time there was a pull the whole building felt like it was moving with myself in it.

Q. When you say you were sitting there this is a reference to your –

A. The western wall.

Q. – to your room, my room, western wall.

A. Yeah, yeah.

Q. So you felt you were moving towards the east and then back to the west.

A. Yes. Following the removal of the adjoining wall the movement in the building felt worse. In aftershocks the building seemed to sway a lot more and it just felt weaker. In the bigger aftershocks file cabinets would fly across the room and bookcases would fall down. These were later bolted to the wall. I had a sense that the swaying was a north-west to south-east movement, so the building was swaying on a diagonal. I remember this because I would always stand under the same doorframe and can remember the sensation of moving in that direction. We knew

when the demolition workers were on tea breaks because there was no shaking. It made me think that our building was suffering a lot of stress and that it was not safe. My nerves were strained and I noticed a high degree of irritability even outside of my job.

1520

A. It was a very stressful time. So after Boxing Day 2010, after the Boxing Day earthquake I noticed that one of the pillars or columns was cracked. This was outside the lifts. I have marked this as "2" on the plan. I can't be sure if it was a result of the Boxing Day earthquake, but I didn't notice it before then. I noticed it about two or three weeks before the 22nd February earthquake. I remember telling my husband about it when he picked me up one day. I pointed it out to him and told him that it was new. I remember that there were cracks in the foyer area and that that got worse over time. I remember wondering whether they were just surface cracks or something more. I pointed the cracks out to my husband. He told me not to worry because they appeared to be just superficial to him. I remember hoping that somebody was doing something about all the damage I had seen.

Two or three days before the 22nd February earthquake holes were drilled along the outside window ledge of the 5th floor, now that has ment – been mentioned at all yet, and that was on the outer, on the top level, holes were drilled in. I believed they were drilling holes to insert hooks for safety harnesses to hold painters who were going to paint the whole outside skirting green, the colour of the clinic. When the drilling was going on the whole building vibrated yet again. The building just seemed to be under constant stress. We were told the building had been checked by an engineer after Boxing Day and it was safe to occupy. This was told to us in a staff meeting by management but I can't be sure when exactly. I never saw any engineers going through the building at all. I had heard lots of comments that the building was the best building to be in and was the safest in Christchurch. I believe this message was originally passed to staff from someone in Relationship Services management. I am not sure who told them. This

was a real rumour that was going around and I can't really recall where it started. We were told the movement we were experiencing was what you would expect because the building was built on rollers, like Te Papa, and was meant to move in earthquakes. Apparently it was purpose built to deal with earthquakes and I repeated that many times to reassure clients. We were told not to worry, but I was worried. At staff meetings some of us would ask if we could temporarily relocate to another building because we felt unsafe. Management eventually agreed to move location at the end of the lease, which was a year away. I understand that they were responding not only to the discomfort felt in the building but because we were growing and needed bigger rooms. I did not personally ask to see any reports on the building after either the 4 September or Boxing Day earthquakes.

So we're coming to the day, 22nd February 2011. On the morning of 22nd February I could not use my normal counselling room because of the noise, and this is number 3, because of the noise and vibration of machinery flattening the ground next door. A client had made a comment about the noise so we changed rooms. I have marked my room as 3 on the plan. It was making our whole building vibrate but the movement was particularly bad on the western side of the building and that is why we moved. I have marked the counselling room we moved to as 4 on the plan. So that was much more in the middle of the, um, of the floor plan, the building, much more in the middle. At 12 o'clock I had cultural supervision with nine other counsellors from Relationship Services. We were in a meeting room in the south-west corner of the building. I have marked this meeting room as 5 on the plan. In the room with me were Andy Winchester, Betty Inglewood, Anne Malcolm, Liz Cammock, Angela Osborne, Pip Randy, Quinn Tan, David Millar, Louise Tankesley, our supervisor, and her eight month old baby. We did not have any clients at that time, at least in the room, I didn't know about the waiting area. Usually meetings were held in a group room in the middle of our premises but on 22nd of February someone suggested that we have our meeting in the room on the corner, which had recently

been vacated by our manager. If we had been in the room in the middle of the floor I don't think we would have survived. Pablo Godoy, our clinical leader, was in his office and Liz Ford was in the kitchen. Nina Bishop and Christine Hunt were at reception. There were two clients in the waiting area, one with two young children. I knew that afterwards. I recall that I was very hungry and could hardly focus which can happen from time to time. I was thinking about going to get something to eat from my bag in the next room, the counsellors' room across the corridor. Fortunately I did not leave the room I was in because a second later the earthquake hit. I felt a vertical jolt. It almost propelled me off my seat upwards. There was a clear path between myself and the door so I immediately ran to the door so I could stand under its frame. I was there within a second. It was just a flimsy doorframe with an aluminium frame. Angela joined me straightaway, so the two of us were under the doorframe. The others were still sitting down. As I reached the doorframe there was another really sharp jolt underneath, from underneath. The floor lifted underneath me, and the next thing the ceiling caved in and everything began to collapse. I'm not too sure whether it was the whole ceiling caving in but at least the inside of the ceiling came down, at least, you know, the Pink Batts came down. I'm not sure whether the whole roof collapsed at that time but something came down from top, on top of me.

Q. So it's coming down from inside the ceiling cavity?

A. From inside yeah, yeah, yeah, space.

Q. The cavity space?

A. Yeah. Yeah.

Q. Area 29?

A. Yeah it happened so fast. The movement was up and down initially and then it felt like it was sideways. So it was like a very sharp jolting up and down and then if felt it was swaying a little bit. It was very, very noisy and the jolts were very hard. The insulation from this, the insulation from the ceiling came down. I was under the frame so nothing landed directly on my head. I could feel us going down, but it wasn't a freefall. It wasn't a real jump down. I could feel that we were on a slope and felt

a downward movement at the same time. The slope was to the south, and the building seemed to be twisting anticlockwise, and it really was from that, from that point.

Q. Yes, so when you look at that –

A. Yeah.

Q. – if we take that lower right-hand corner to the north –

A. Yeah.

Q. – that was in effect spinning or moving to the left –

A. Yeah.

Q. – anticlockwise?

A. It was just like this.

Q. Yes.

A. Yeah. It is hard to say how long the shaking went on for. It didn't feel as long as the September one, earthquake, just sharper and more violent. It certainly went on for some time, but I can't be sure for how long. I was facing east and didn't see what was happening behind me in the room. It happened in stages, it collapsed, and collapsed, and collapse, that's the pancake effect that has been mentioned before. Then there was a bit of a jolt and we stopped. It felt like being in an elevator when you reach the ground floor. It suddenly stopped and that is when I looked around and saw a lot of dust and people getting up from the ground.

1530

There was a mess everywhere. At this point I was still standing holding onto the doorframe which to me is a miracle that I was still standing holding on. The first thing I noticed was that something sharp had gone into my right knee and there was blood coming out of my knee. The way out of the door was blocked and my first thought was, "Oh, how are we getting out of here?" I could see that the outside walls had collapsed inwards. The internal walls were the only ones still remaining, so I saw that and it was actually in that corner as well.

Q. Which corner are you (overtalking 15:30:50)?

A. So we are looking at corner western wall facing southern wall where room 5 is.

Q. Yes.

A. And it was like a collapse like that, it was not towards the inside.

Q. And are you identifying that both the western and the southern walls had collapsed in?

A. Felt like that, yeah.

Q. Yes.

A. (inaudible 15:31:10) it was also because two of my colleagues were buried underneath it, I didn't see them.

Q. Yes.

A. They were sitting on that side of the wall and really that's why I concluded that because they were sitting on the outside wall, I mean I looked around, they were underneath. There was a filing cabinet in the room which I had been – which had been bolted to the wall, I have marked this as 6 on the plan. I think that was what cut my knee during the earthquake, it must have fallen in a south-east direction. I believe that the building collapsed in the south-east corner, that is just the way I perceived it then because of the way the floor was tilting and the way I still look at it now. The next thing I recall is being able to see blue sky through an opening of the wall. Rescuers came and opened up the hole wider and I was able to escape. I was so surprised to see that we were actually just a metre off the ground. You know because my initial sensation was I thought when we stop that we were just on level, just one level down. It didn't feel like all the way down and then when I finally leaped out, or looked out I was completely gobsmacked that we were – I had travelled all the way down so that was a big moment really, yeah. The first aftershock I felt was outside the building. I was – it was very strong and I saw the IRD building moving significantly. The aftershock continued, I went to Latimer Square. I did not smell or see any smoke, I believe the fire started later. I didn't realise the building was on fire until I was at Latimer Square and could see the smoke billowing. I believe the fire broke out after my escape.

CROSS-EXAMINATION: MR LAING, MR RENNIE, MR WALLACE, MR RENNIE – NIL

COMMISSIONER FENWICK

Q. You commented that the south-east corner collapsed, you felt that first?

A. Yeah, I think – well it's all a feeling thing, you know, it's like you know when you're in there, so it felt like it was moving this way so it felt like something gave way in that corner.

Q. Now earlier on –

A. But you still tilted and then moved, yeah.

Q. – earlier on before you got into the earthquakes you said the building shook to the south-east.

A. Mmm.

Q. Like to the north-west, south-east in that direction, that was while they were demolishing the building next door?

A. Yeah, yeah.

Q. And in the earthquake, the February earthquake, you commented the same direction of movement you felt, south-east, north-west or have I got that incorrect?

A. Ah, yeah it's hard to say.

Q. That's fine.

A. Yeah, yeah. My sense was that it was moving in many directions you know when it was collapsing but it had a strong – in the earlier aftershocks before the big one on the 22nd, it certainly had a sense from the – that it was coming from the north, north-south kind of direction. I don't know whether that makes sense to you at all.

COMMISSIONER CARTER:

Q. No, I think that query, that last point was interest to us to know how the building was twisting, if it was, you commented twisting. So you would feel the movement?

A. Yeah.

Q. In the direction that part of the building you were in was moving and I think that, did I understand you correctly it's more of a diagonal direction?

A. Yeah that's good, yeah.

QUESTIONS FROM JUSTICE COOPER - NIL

WITNESS EXCUSED

COMMISSION ADJOURNS: 3.36 PM

COMMISSION RESUMES: 3.52 PM

MR MILLS CALLS

ELIZABETH MARY CAMMOCK

JUSTICE COOPER:

This witness has expressed a wish not to be photographed or filmed or live-streamed and so relevant cameras need to be de-activated as appropriate and I so order. Thank you.

ELIZABETH MARY CAMMOCK (SWORN)

EXAMINATION: MR MILLS

Q. Your full name is Elizabeth Mary Cammock?

A. Yes.

Q. You reside in Spreydon, Christchurch.

A. Yes.

Q. And you're a counsellor?

A. I am.

Q. And you're currently employed with Relationships Aotearoa?

A. I am.

Q. Which was previously known as Relationship Services?

A. Yes.

Q. And you've been with Relationship Services since 2008?

A. Yes.

Q. Now you prepared a brief of evidence and I understand you've got that in front of you.

A. Yes I have.

Q. Could I ask you please then to just start reading it from paragraph 2.

A. I am currently employed?

Q. Yes please.

A. I am currently employed with Relationships Aotearoa, previously known as Relationship Services. I joined Relationship Services in 2008. Relationship Services occupied the 5th floor (Level 6) of the CTV

building (the building). I was on the 5th floor along the western side of the building when the 22 February earthquake hit.

Q. Now once again we'll just get up the floor plan that you refer to so that you can be identifying this as you go along. You've got that on the screen in front of you?

A. I have.

Q. And so the location that you were in when the earthquake hit is –

A. I was in room 3.

Q. Thank you.

A. Okay.

Q. Just carry on thanks. You're at paragraph 4.

A. Thank you. I believe that the building initially had a yellow sticker after the September earthquake, but I think this was only temporary until we had been inspected. We were then given a green sticker. I took this to mean that the building had been adequately checked.

Q. Now can I just ask you about this yellow sticker because no-one else has mentioned –

A. I know. I'm hearing that.

Q. What led you to think that there had been a yellow sticker?

A. You know I think it might have just been an assumption. I don't know. I just kind of assumed because I guess, because our house was yellow stickered, I just, until it was then kind of checked over. So I just assumed that the yellow sticker was there until the building had been properly checked.

Q. All right. So there's nothing specific –

A. No.

Q. Right. Thank you for clearing that up. You're at paragraph 5 I think.

A. Thank you. A number of areas of damage had appeared on the 5th floor. Attached is a floor plan of the building I have prepared (marked "A"). I do need to say about this floor plan that there was a little bit of difference between Nilgun and I around the floor plan but I went along with this. I would have had the lifts further towards this, Madras Street.

Q. All right. Well I don't want you to go along with anything that isn't what you'd really like to say.

A. Oh, no I just wanted to make that, yeah, I don't know if that makes any difference to anybody. I did talk about it with the lawyers and I signed it to say but I, to say I was okay with it.

Q. All right. Well if as you go through your evidence you think there are points that you come to where it does –

A. Yes.

Q. – make a difference in your thinking then you just tell us.

A. Okay.

Q. And we'll deal with that.

A. Okay.

Q. And just while you're on that. Presumably you were here when I asked the previous witness about the way in which the plan was put together?

A. Yes.

Q. And you would confirm that's the –

A. Yes.

Q. – same for you?

A. Yes. Yes I would, yes.

Q. All right. Thank you.

A. So the positions of the rooms and internal walls have not been drawn to scale and their placement is approximate only. The issues of concern that I refer to in my evidence are marked on this plan. Two cracks had appeared on either side of the elevators. I have marked these cracks as "1" on the plan. I can't be sure when these cracks first appeared because the elevator was not something I used often, but I know they were more pronounced following the Boxing Day earthquake. We talked about the damage by the elevators at staff meetings. Moira Underdown, the Upper South Area Manager, assured us that the building had been inspected and it was safe. I saw people downstairs fixing the entrance way after the September earthquake. I'm not sure if this had anything to do with the earthquake but I know that they had to return and redo some of the tiles after the Boxing Day earthquake. This was the only damage I was aware of after 4th of September. I expected

some answers regarding the cracks that had appeared but there didn't appear to be any real follow up. I didn't see anybody come around and inspect the building. I didn't see any inspection reports on the safety of the building either. I –

Q. Is there a problem?

A. No. It's okay. I just get upset. It happens.

Q. Just take your time.

A. I didn't get a letter as a member of staff or as a tenant of the building with the findings that were made on the safety on the building. Demolition began to the west of the CTV building around 4 September, but I don't think it was connected to the earthquake. I think the buildings next to us had some connection to Les Mills and they wanted to convert the land into a carpark. I think this because that is basically what it was by the time of the 22 February earthquake. I remember after the 4th of September earthquake the CTV building would vibrate as a result of the demolition. I don't remember this before the earthquake. Every time part of the building was brought down, and that's the building next door, the building would vibrate. It felt like the building was hollow. As the demolition moved closer to us the building would shake more and more. It seemed like it was happening right next door. We had clients who were there for counselling, some traumatised from the earthquakes, and we would take them to the window and show them what was happening to keep them calm. As part of the demolition a wall on the western side of the CTV building was brought down. When the wall came down it felt like it had been ripped away from our building. When it was brought down there was quite a big jolt, which felt like another earthquake. It was huge. It made everybody on our floor stop in their tracks. I remember thinking it had to be attached to make that sort of impact on our building but I never saw whether it was or not. I think that this occurred just before Christmas because I remember thinking that when I come back to work after the break there would be no more demolition, but of course there was.

1600

After Christmas work was still being carried out on the demolition site. There were big machines moving around. I was able to differentiate between movement from the demolition and from aftershocks. Aftershocks tended to roll, whereas the demolition felt more like vibrations.

When I returned to work after the Christmas break I saw that we had a Green Sticker on our door. I again I took this to mean that the Building had been inspected and that it was safe for us to be in there. There were cracks that had appeared up the stair well in the north core. I have marked the area of cracking as "2" on the plan. I biked into work and used to carry my bike up the stairs. I only noticed cracking around the 4th and 5th floors. I remember feeling really uncomfortable walking up the stairs and feeling unsafe. The lights were not working and these were never replaced. Plaster and small bits of debris had come off the walls too and no one cleaned this up. I remember wondering why nothing had been done and asking myself if I was the only one who used the stairs. I don't recall saying anything to anyone about the damage I saw.

I remember the cracks by the elevator were more pronounced after the Christmas break. I can't remember how wide they were but you could see them very easily, even from a distance of approximately ten metres away. I remember they ran from floor to ceiling and were very distinctive. It looked like someone had slightly pulled the wall apart. I wondered how the building could be safe with these cracks in both corners. There were clear differences in the building and people were worried. We talked about the elevator cracks amongst the staff; it was a common theme of discussion. I remember standing in front of the elevators one day and asking one of my colleagues how the building could be safe with all the cracks running down the corners.

I don't know whether there was an inspection following the Boxing Day earthquake. I didn't receive any information regarding the damage around the floor or any checks that had been carried out.

I was sitting with a group of people on the 5th floor for cultural supervision session when the earthquake hit. I have marked my position as "3" on the plan. I had my back up against the wall on the eastern side when there was a sudden lurch to the east. I felt like I was being tipped over backwards and I could see my colleagues and things in the room sliding towards me. From this movement I knew it was serious. The building didn't move a whole lot after the lurch. I saw Angela and Nilgun bolt immediately for the door frame and with hindsight I don't think they would have been able to make it if the building was moving at that time. So that's that, I think that's the fraction of a second I'm talking about there. There was like a fraction of a second after the lurch where it just felt nothing, just, yeah. After that first strong lurch it was like there was a fraction of a second of stillness. After the pause I sat there and gripped my chair as the building began shaking uncontrollably. I remember seeing glass explode in the window along the southern wall, twisted metal, exploding glass; I just remember craziness. I could see Nilgun standing under the doorframe and I remember thinking good luck girl. I later found out that she remained standing through the whole collapse. Amazing. I didn't experience any sensation of falling, although this may have been because I remained seated. I don't have a strong recollection of what happened but it felt like the building was down in about 15-20 seconds. It all happened so fast. The next thing I know I have been thrown from my chair and am pinned to the floor by the collapsed ceiling. I remember David Millar asking me if I was okay. He lifted the collapsed ceiling off me and the first thing I did was check my head for injuries. I could see out onto Cashel Street so knew the southern wall was gone. People were looking at us with shocked faces and I remember wondering how they got up there and were so close. I still hadn't registered that the building had collapsed. I guess my brain had switched off. The rescuers were able to get to us by scrambling over the rubble on the Cashel Street side of the building. I felt like I was only about three metres off the ground. I can't remember how I got down the rubble to safety. Everything felt surreal.

CROSS-EXAMINATION: MR LAING – NIL

CROSS-EXAMINATION: MR RENNIE

Q. Ms Cammock I'd just like to ask you about a couple of things that you will have heard Ms Kulpe say when she gave her evidence.

A. Yes.

Q. She was talking about the time after the 4 September earthquake and after the wall demolition but before the Boxing Day earthquake and she talked about filing cabinets flying across the room. Was that something you experienced?

A. No, but I work two days a week.

Q. Yes.

A. So, therefore, I may not have been there.

Q. Toppling bookcases was the other one.

A. No I don't, I wasn't there then.

Q. Or a sense that the building seemed to have a sort of north-west south-east element to its behaviour?

A. No I was sitting in a different side, my office, I'd sit differently so I wasn't against that wall.

Q. So you wouldn't disagree with her but that wasn't your personal experience.

A. No.

CROSS-EXAMINATION: MR WALLACE AND MR SHAMY – NIL

COMMISSIONER FENWICK:

Q. With regard to the last question, where were you normally seated in the building?

A. Um, I was spread between two rooms on the, if you're looking at the plan, Room 3 is the corner, which was the manager's room, the next room was the clinical leader's room, the next room to that would have been Room 4, so I was in that room and then I was also in the room next to it and Room 4 had a window that looked out over to –

Q. Now when you went up those windows you were travelling north were you?

A. I was travelling west.

Q. West.

A. Mhm. So it, yeah.

JUSTICE COOPER:

Q. You see on this diagram north is marked.

A. Yes. I wasn't going north, sorry the offices are going north?

Q. Yes.

A. Yes, yes.

Q. I think that was the sense of the question.

A. Yes, yes, the offices are going north but my window was faced west.

COMMISSIONER FENWICK:

Q. So you were on the west side.

A. Yes, mhm.

Q. Now the issue of the cracks that you observed before Boxing Day and after, were they vertical or were they inclined.

A. The cracks in the corners by the elevator shafts were floor to ceiling.

Q. And they were vertical.

A. Yep they were just going, um, yeah and they would have –

Q. Were they both at the end of the elevator or was one –

A. They were right in the corners, so the elevators actually did not go all the way into the corners. So there was a window and then a bit of wall space, elevator, elevator, a bit of wall space, corner and then another wall coming out along here. So it was in those two corners that the cracking was floor to ceiling.

Q. Right but they were both close to the front face of the elevator?

A. Yes, yes, 'cos the elevator was set back so that the elevator doors were flush with that wall where the cracking was.

Q. And you said you could see those from a distance of 10 metres.

A. Approximately, approximately that distance 'cos they were quite, they were quite deep cracks. They weren't superficial they were deep cracks, yeah, deep cracks.

Q. In terms of my third of a pencil, a quarter of a pencil or is that too wide, to get an idea?

A. Um, maybe a third to a quarter of a pencil, yes, yeah. I mean you could certainly see that –

Q. Quite wide if you can see them from 10 metres.

A. Approximately 10 metres, I can't be really clear about that, approximately yeah.

JUSTICE COOPER:

Q. You talked about the depth of the cracks but I think you're talking about the width are you?

A. Yes, yes.

Q. The distance across.

A. Yeah, half, yeah, I could, yeah, yes, yes that's true, sorry depth would, yes, mhm.

COMMISSIONER CARTER:

Q. You mentioned that you realised the southern wall had gone, the southern wall was partly those spandrels up to sill height of the windows I presume, would that be right?

A. Yes, that had come, yes.

Q. So above that there would have been glazing normally would there?

A. There was a wall, the wall and glass, yes, and that had exploded out, in and out.

Q. So the spandrel had fallen off and you were just exposed to the outside of the building?

A. Yes, yes.

WITNESS EXCUSED

1610

MR MILLS CALLS

KENDYLL JOY MITCHELL (SWORN)

Q. Your full name is Kendyll Joy Mitchell?

A. Correct.

Q. And you live in Timaru?

A. Yes.

Q. And you prepared a brief of evidence?

A. Yes I have.

Q. And you've signed it and you have that in front of you now?

A. Correct.

Q. Now just before we get going again I wonder if we could just once more get the plan up that's been referred to in her evidence.

A. Yes, this is not accurate this is what I believe how it was.

Q. All right, well we'll come to the question of its accuracy as we go along.

A. Cool.

Q. And if there's any changes you want to make to any aspect of your evidence you just tell us as you go along.

A. Okay.

Q. If you could then just start reading from paragraph 2 of your evidence please?

A. I was on the top level, Level 6, of the CTV building with my children whjen the earthquake hit on 22nd of February 2011. I have been asked to give evidence about what happened. I am a full-time mother. Before the February earthquake I lived in Spreydon with my partner, Hayden Lamont and my two children, my son Jett who was then aged three and my daughter Dita then aged 10 months. We lived in Christchurch for five and a half years. Jet was having counselling to address trauma he had suffered as a result of the 4 September 2010 earthquake and aftershock. He had not been coping, he was petrified of his bedroom and would not sleep in his own bed. Before 22nd of February I used to go the CTV building regularly about two years before February 2011 and I cannot recall having any concerns about the building then. 22nd of February 2011 was my second visit to the building since the September

earthquake. Jett's first counselling session had been two weeks earlier. During that session the counsellor, Betty Inglewood told Jett that if he felt the room vibrating it was the digger on the empty section next door. During that visit I felt the building rock as the digger worked, but I wasn't too worried about it. The digger was only moving across the section, it wasn't actually digging. There was also vibration at one point and Betty said it would have been a truck going past. Hayden was with me at the time and he didn't like it. After we had left the appointment Hayden said the building should not be rocking like that just because a digger was moving next door.

On 22 February 2011 at about 12.45 pm I arrived in the waiting room of Relationship Services, on the fifth floor of the Building (Level 6). I had the children with me and was early for my one o'clock appointment for Jett. Just before the earthquake, I was sitting in the waiting room. I sat facing south with my back to the northern wall. I have drawn a plan of my location in the waiting area on Level 6.

Q. If you just pause there, first of all to just locate you on that plan and then secondly if you've got any questions which you indicated you might have about the accuracy of it we can deal with those now.

A. That curved wall which I think to be curved was actually a lot closer to the reception desk, a lot closer to the door.

Q. Yes.

A. Yeah, and I think everything else is pretty much as I can remember it.

Q. And your location it's marked is that –

A. Yeah.

Q. - is that still accurate?

A. Correct.

Q. All right, now you were here I think when you heard me ask of the other witnesses how this was done?

A. Same.

Q. Same for you, thank you.

A. Yeah. The floor plan also shows the counselling rooms were along the west wall to my right. The reception desk was on my immediate right.

An internal wall was about 4 metres in front of me. I think this internal wall was curved. Jett was to my right and Dita was in front of me strapped in her stroller. There was another girl waiting in the waiting room also and there were two receptionists. The counsellors were in a meeting room about 10 to 15 metres away from us. When the earthquake started I grabbed Jett and tucked him under my arm because I knew he would be petrified. I grabbed the front of Dita's stroller. I quickly realised this was a big earthquake. After about 10 seconds of shaking the building started to collapse. It was very, very fast. What remains most vivid in my mind is seeing the internal wall that was in front of me crumble and disintegrate, separating from the ceiling as it did so. I could see light through a gap between the ceiling of Level 6 and the curved internal wall I was facing. That was when I realised the building was going down. I remember feeling like I was being sucked downwards because the floor was going down, fast. It was like the building stayed in place and we were sucked down in a vacuum. The ceiling came down also, but the ceiling didn't cave in on me. It was definitely the first earthquake (not an aftershock) that caused the building to collapse. I was knocked out on the way down but don't remember hitting anything. My ankle was pinned by a piece of concrete so I couldn't move. Jett can remember all of the fall as he landed on his bottom he tells me. Jett tells me I was asleep in the building and that he had to look after Dita while I was asleep. I think I was unconscious for about ten minutes, working on the time of a photo that was taken of me when I was rescued. When I came to, both children were looking at me. We were trapped in a sort of cubbyhole, about a metre by a metre. A steel beam was over our heads and it caused everything to A-frame around us. There was concrete, glass, pink batts, window frames and beams around us. I had trouble moving the rubble from me and the children. The children actually weren't pinned, it was just myself, they didn't have any rubble. I managed to wriggle and pull my foot to free it. Dita had landed at my feet in her stroller. She was embedded in the rubble right up to her back. I removed the concrete and glass from the stroller and got Dita out. I put the children on my knee. I also tried to

move the stuff over the top of us but it was just too heavy. I had to stay in a crouched position because there was not enough room to stand. I was in so much pain. My leg was cut and bleeding and my blood was over me and the children. I could see the sky through the rubble and the stairwell. I could also see thick black smoke starting to rise from the rubble. I thought, "Oh my God, we have survived and now this". I could hear muffled cries for help. The girl who was next to us in the waiting room was to my east and us and about three metres across and one metre down. I could see her through a gap in the rubble. She was severely pinned and could only move one forearm. She was trapped facedown. I asked her if she could reach her cellphone as I was unable to get mine but she couldn't**.** We were completely helpless. I heard people crying out for help. I heard footsteps on the corrugated iron above me. I called out for help and said I had two children and a man lifted the corrugated iron sheets away and was able to lift out the children and then me. The man who rescued us is called Evan. He was on his lunch break from working on the church on Madras Street. I handed Dita out first. Jett got quite upset because he thought he was not getting out. Evan put Dita under his arm and pulled Jett out by the hood of his jacket. He then carried the children to a line of people. I climbed out myself and then was carried to the line of people who passed me down the chain. Everyone got quite upset when they pulled out the children. Photographs were taken of us being rescued. Some of the photographs are annexed hereto and marked with the letter "B". I am eternally grateful to the people who assisted in mine and my children's rescue. A "Thank you" does not seem enough.

Q. Thank you for doing that. I know it was not easy. Now there might be some questions of you so if you wouldn't mind.

CROSS-EXAMINATION: ALL COUNSEL – NIL

QUESTIONS FROM COMMISSIONERS FENWICK AND CARTER – NIL

WITNESS EXCUSED

MR MILLS CALLS

PHILLIPPA ROBYN LEE

JUSTICE COOPER:

This witness has expressed a wish not to be photographed or filmed or live-streamed and so relevant cameras need to be de-activated as appropriate and I so order. Thank you.

PHILLIPPA ROBYN LEE (SWORN)

EXAMINATION: MR MILLS

Q. Your full name is Phillippa Robyn Lee?

A. Yes.

Q. You're a receptionist and you live in Christchurch?

A. Yes.

Q. You've lived in Christchurch since 1995?

A. Yes.

Q. And you began work as a receptionist at The Clinic in May 2010?

A. Yes I did.

Q. You've prepared a brief of evidence?

A. I have.

Q. And you've got that in front of you?

A. I do.

Q. When you're ready if you could just start reading that through from paragraph 3 of your written statement?

A. The Clinic was a medical centre situated on level 5 of the CTV Building. Although The Clinic's location was referred to as being on the level 4 of the building, when including the ground floor as level 1, it was in fact level 5. I refer to The Clinic as level 5 in this Statement. I have drawn a floor plan of level 5, annexed hereto and marked with reference is a copy of that plan.

Q. Now again you've probably heard me ask this of others, the same for you I take it?

A. Yes it is. The reception area is situated on the northeast corner, about five metres from The Clinic entrance. The Clinic relocated to level 5 of

the building around the 5th or 6th of January 2011 after its earlier premises at 192 Gloucester Street had been red-stickered. This was due to the risk of falling masonry from the neighbouring building after the Boxing Day 2010 earthquake. The Clinic re-opened to the public around the 10th of January 2011. The general feeling of the staff was the building was an unusual location for a medical centre. There was also a lot of comment made by staff and patients that the building was not suited to a medical centre. For example, The Clinic did not have any sinks in consultation rooms or in the nurses' station. A make-do wash station was set up with a water cooler style tap on it. I understand The Clinic was awaiting consent approval for clinics and plumbing could be installed permanently.

I had only been in the building a couple of times prior to the September 2010 earthquake. This was back in approximately 2007 or 2008 when I went to the gym that was on the top floor, level 6. I did not notice anything unusual about the building at that time. My first visit after that was around the 28th of December 2010, when The Clinic staff were invited to look through level 5 of the building before moving. At that time, everyone commented and giggled about the green sticker on the building entrance because of the red sticker at the Gloucester Street premises. I do not recall much comment about the condition of the building at that time. I remember representatives of Pegasus Trust Limited coming in to view The Clinic shortly after our move. I also understood from an article I had read in the newspaper that a representative from Pegasus had gone through and inspected level 5 of the building. I do not know if this was for structural safety or for a medical audit. However, when discussing the accounts for The Clinic with Faye Kennedy the clinic manager, Pegasus had billed The Clinic for an engineers' inspection.

Q. Can I just ask you to pause there?

A. Yes.

Q. I think you know what I'm about to show you. It won't be necessary to show this to other counsel because it's not contentious, I'm just clarifying something but I'll give the Commissioners copies.

WITNESS REFERRED TO DOCUMENT – TAX INVOICE FROM PEGASUS HEALTH

Q. I just want to clear up with you, or clarify with you this tentative conclusion, I suppose, you reached that Pegasus might have been doing an engineering inspection. Now you'll see you've got in front of you a tax invoice from Pegasus Health?

A. Yes.

Q. And it refers to an earthquake inspection, see that?

A. Yes I do.

Q. And it's dated the 17th of December 2010?

A. It is.

Q. And you'll see that the reference to The Clinic is at 192 Gloucester Street?

A. Yes it is.

Q. Now am I correct that that's the previous location of The Clinic?

A. Yes and I am aware they went through at that time as well.

Q. Yes, so do you think this is the, when you say that you were told by Faye Kennedy that Pegasus had billed The Clinic for an engineers' inspection, do you think that's what she might've been referring to?

A. I assume it must've been, yes.

Q. Thank you I just wanted to tidy that up as need be. Now you're at paragraph 8.

A. The building exterior was mostly glass. I did not see any cracking in the exterior concrete. There was internal cracking along the west wall on level 5. Some of these cracks were quite large, approximately one metre in length. The cracks started from the bottom and went diagonally, went up diagonally. These were visible from at least three metres away. I did not relate the expansion of the cracking to a particular aftershock. Faye had put white tape on some of the cracks, but the cracks had grown past the tape by about two inches.

Q. Can I just ask you to pause there and ask you two questions about that?

A. Sure.

Q. You've got in front of you the plan of level 5?

A. Mhm.

Q. Are you able to identify on that where this internal cracking along the west wall was that you referred to?

A. Um, on top of the west wall there's some writing?

Q. Yes?

A. It's in that middle room there, yeah.

Q. Right in that area there?

A. Yes, through there.

Q. Thank you, and then the reference to white tape being put on the cracks but the cracks had grown, do you, are you able to say over what period of time that expansion or growth had taken place?

A. She put the tapes on the week that we moved, so that was the 5th and 6th of January and I assume from that point through till the 22nd of February they had grown.

Q. Thank you, you're at paragraph 10.

A. I did not notice the floor moved when people walked past. Initially the reception desk was not fixed to the floor so it used to wobble when it was touched or leaned on. Many patients thought it was from an earthquake but it was later secured and did not move after that. The building really shook during an aftershock. A lot of the staff did not like being in the building because of this. The neighbouring building to the west was being demolished and the banging would make, would really make the building shake. Staff noticed this and mentioned it feeling like an earthquake. As our old premises at Gloucester Street also moved with large trucks and buses passing it was not unusual for us to feel movement. However, the demolition felt quite violent and we were surprised at how much the building moved. The shaking could be heard and felt all day. The Clinic staff were also surprised with how much it would be felt on the opposite side of the building and that high up.

Q. Just again I will try and clarify what you're referring to here, when you say, "On the opposite side of the building," which side are you referring to by reference to that plan?

A. Well as you can see the reception and Dr Maysoon Abaas' room, that's where The Clinic staff were. We didn't really have or use the facilities on the other side of the building. And the other side of the building was where the demolition was occurring.

Q. So when you say, "The movement on the opposite side," you're talking about the western side again?

A. Western side, yes.

Q. Thank you, you're at paragraph 11?

A. The reception desks were on a three-weekly rotation. On the week beginning the 21st of February 2011, my desk was on the right-hand side directly behind the reception counter and is marked with number 1 on the plan. Dian Falconer was on the northeast corner and her desk is marked with the number 2 on the plan. Marion Hilber's desk was against the north wall to the right of the reception desk. It is marked with number 3 on the plan. The wall to the south of the reception area is the wall between reception and the consultation room for Dr Maysoon Abaas. This wall is marked with number 4 on the plan. Photographs of the reception area is annexed hereto and marked with the reference. The bottom photograph is taken from the level 5 entrance doors and shows the reception area in the northeast corner. The top photograph is of Dian sitting at what was Marion's desk on the 22nd of February 2011. My desk is the desk and empty chair in the foreground. The grey coloured desk at the top right corner of the photo is where Dian was sitting that week.

I was sitting at my desk on the 22nd of February 2011 when the earthquake struck. Dian was sitting at her desk behind me. Marion was not at her desk. She had gone to lunch and was sitting in the staffroom. The shake was very violent. The computers fell off the desks onto the floor. I remember a pause in the shaking. I had time to stand and I started to walk towards Dian. Dian also stood up and began to walk towards me. When I was looking towards Dian I could see that all the windows were still intact. Before Dian and I reached each other there was a large cracking sound. I thought it was the start of an aftershock

but I now know it was the building starting to collapse. I have marked my approximate location on the plan with number "5". I started falling to the south towards Maysoon's consultation room. My desk was also falling south towards me. I remember everything coming towards me and that my desk and chairs were falling down with the building. While I was stuck in the rubble I could only move my left arm. I felt around me to find out what I was trapped in. I was in a very tight space and could only feel what was in my bubble. I remember feeling the threads of the carpet flooring in front of me and I could also feel the concrete floor slab had broken. There was a crack in the concrete that was large enough for me to fit my hand through. My left foot was caught in my desk drawer and I could feel all of my stationery around me. When I was rescued my foot was forced out by the Fire Service. My right hand was also pinned between my desktop and what I believe was the wall marked "4" on the plan. I still have the mark of the desk wood on the palm of my hand and I can remember this wall coming away as I was being rescued. I was rescued from the building rubble at 16:45 that afternoon.

Q. Thank you. Do you want to take a moment? Once again it's possible there might be some other counsel who want to ask questions or the Commissioners may.

CROSS-EXAMINATION: MR LAING, MR WALLACE AND MR SHAMY – NIL

QUESTIONS FROM COMMISSIONER FENWICK – NIL

QUESTIONS FROM COMMISSIONER CARTER:

Q. Just in that last memory you had of the large crack in the floor, big enough to put your hand through –

A. Yes.

Q. – have you got any ability to remember just how that crack might have been orientated?

A. The crack was in front of me horizontally. So it was right at my chest. I was in what I refer to as a down-facing dog position so the floor of the concrete was quite close to my face and it was right in front and I could slip my whole hand through it.

Q. Would it have been running, given that Madras Street is on the east, would it have been running east-west that crack?

A. It would have been running, yeah, Madras, yeah, east-west, yes.

QUESTIONS FROM JUSTICE COOPER - NIL

WITNESS EXCUSED

MR MILLS CALLS

RONALD WILLIAM GODKIN

JUSTICE COOPER:

The same orders apply for this witness. He is not to be photographed, filmed or live-streamed and relevant cameras must be de-activated or diverted as appropriate.

RONALD WILLIAM GODKIN (SWORN)

EXAMINATION: MR MILLS

Q. Your full name is Ronald William Godkin?

A. That's right.

Q. You were on the third floor, which others would describe as level 4, of the CTV building when it collapsed?

A. Yes, that's correct.

Q. You were a tutor in health care at Kings Education?

A. Yes.

Q. Now you've prepared a written brief of evidence which you've signed and have in front of you?

A. Yes.

Q. Could you just start reading it at that last sentence in paragraph 1 please.

I started with Kings Education part time in May 2008 and became full time on 3 May 2010. Prior to that I was employed by Richmond NZ, which is the largest mental health provider in New Zealand, involved in transitioning people from mental health facilities into the community. Kings Education had the whole 3rd floor, which you've called level 4. I was the Health and Safety Officer for the floor because no-one else wanted the job. We had 71 students and nine staff who died when the building collapsed.

Pre-September 4. Prior to the September earthquake I thought the building was fine and you'll see in the map in front of you where I was and I'll try and show where I was at different things. I had none of the

concerns I understand others have mentioned about the building feeling flimsy even before the 4th of September. I could feel the floor movement with pedestrian traffic and the people as they ran past. Here we go. This was my room here and as people came down here they'd go to the common room, kitchen or through this way to the lift and that sort of thing and it was quite common for people to be running down this area, walking quite fast and I'd feel –

JUSTICE COOPER:

Q. Your room is the room marked ACE is it?

A. That the ACE programme and that was where I was working to prepare people for, to work as nurse aides in the retirement industry.

Q. Okay, thank you.

EXAMINATION CONTINUES: MR MILLS

A. I could feel movement as I said before. This was the vibration of people walking around the corridor and since preparing this I've got to know a real estate agent who worked for ANZ who was in the building at the time and he, and I passed over his name to the Commission. Following the September earthquake there were a number of cracks that appeared on the 3rd floor. Attached is a floor plan you can see.

Q. Again, just to keep the record straight. You've heard me ask that question of other witnesses about the plan.

A. Yes.

Q. I take it the answer from you is the same?

A. Yes, that's right and I will endeavour to, perhaps it's not to scale as I'll point out with different things – I've prepared (marked "A"). Where's A?

Q. Well that's the general floor plan.

A. Yep, that's right, okay. The positions of the rooms and internal walls have been drawn to scale and their placement is approximate only. The cracks – sorry?

Q. I was just going to say, I think it says, "have not been drawn to scale."

A. Sorry, have not been drawn to scale. The cracks and other issues of concern that I refer to in my evidence are marked on this plan. So these things here are all things that I will be referring to. There was a

horizontal plaster crack under the window on the western side here. I have marked the approximate position. This is "1" on the plan, okay? That one there.

Q. Yes.

A. It was only visible as a crack in the plaster only, okay, and that was under the window. It was quite a large window and it was going from half way underneath the window, the width of the window down to the floor.

Q. Right, thank you.

A. On the eastern side of the student common room there was a big glass wall, this one here, and that had a very large crack that developed about the middle. So all this wall along here was glass. It had a doorway into the student common room there and a doorway in here and that's where it is there.

Q. And that crack is horizontal or vertical?

A. It was, it was vertical.

Q. Thank you.

A. It had gone from the top to bottom. I got black tape to tape it because I didn't want it to break in another aftershock. There was also a big crack which ran from ceiling to the floor in an internal partition wall between the tutors' room and the audio visual room. Now this is the audio visual room here and the crack was in this part here. Okay. I have marked the approximate position of this as "3" on the plan and we would go into that room fairly regularly after each earth shake or aftershock and see if there was any further movement of the width of the crack and that crack developed possibly around about the September earthquake but it was plaster only and it was about the width of my finger. In other words, it was about 50 millimetres. Finally, there was a hump in the floor which I've referred to in more detail in my evidence and this was the hump here, number 4. I now realise that each of these areas of damage run together effectively in a straight line going from here through here, okay, so this reception area was back a little bit to put it, put it into (inaudible 16.40.11).

1640

Q. Can I just clarify with the hump that was running east-west was it?

A. It was running east-west. Now if we could go to, um, I'll show you approximately where it is on figure 173, if we can go to that particular figure, it's pre-class beam location plan and I'll be pointing to levels 2 and 6, so if we can go to that particular one.

Q. We'll do our best so the reference you've got is?

A. Reference to figure 173 and it's titled Precast Beam Location Plan and it shows down one side the position of the pillars and beams.

Q. You'll just have to bear with us a moment because that won't be our reference that's probably from one of the DBH consultant reports I suspect.

JUSTICE COOPER:

Q. Can you remember where you found that figure?

A. Yes it was on the diagram that came up this morning, your worship.

Q. Was it.

A. Yes, and I took that off because I thought I could use it this afternoon.

EXAMINATION CONTINUES: MR MILLS

Q. Its actually in the file, it's the one marked QIMAV.490189316 and it's just the sketch floor plan that showed the north-south –

JUSTICE COOPER:

Too fast for me Mr Mills I'm sorry.

EXAMINATION CONTINUES: MR MILLS

Q. Here it is.

A. That's it, oh here we go. Now what I was going to point out is that between column E and F this was the approximate position of the hump. We had offices along here, okay, and the hump was in, would be in line with this position here, D and E, on this plan.

Q. So this is the beam on line 3 running east-west.

A. Yes and it was so pronounceable that people who were sitting in our reception desk they were forever losing their pencils because they'd put it on the desk like this and it would roll onto the floor. It was quite a

definite hump and I'll talk about that later on. I did actually bring that to people's attention.

Q. All right thank you you're at paragraph 7.

A. If we can go back to the floor plan again please. I don't need that one any more. I am aware of two engineering inspections of the 3rd floor. The first was soon after the 4 September earthquake and the second was in late September. On both occasions John Drew went around the floor with the engineer who was carrying out the inspection. I may have been introduced to the engineer but I cannot recall the name of the engineer. The first Inspection. I was on leave at the time the first building inspection occurred. However, after I returned Brian Taylor, who was the Managing Director of Kings Education, took me around the floor and showed me the damage that had been identified. Sorry I digress can I just have my face blanked out please.

JUSTICE COOPER:

Q. I've made an order. You are not being filmed. The camera is playing on Mr Mills.

A. Okay thank you.

Q. Mr Godkin I have made an order and you will not be photographed or filmed or live-streamed.

A. Thank you.

EXAMINATION CONTINUES: MR MILLS

A. Going back, still on paragraph 8. Brian Taylor told me the staff and students of Kings Education had not been allowed to go back into the building until the inspection had occurred. Brian had gone around the floor with John Drew, the Building Manager and the engineer, when the inspection had taken place. The damage that Brian drew to my attention included a crack under the window on the western wall, marked 1 in the plan – this one here – and a crack in the tutors' room – this one here, just over a bit there – because there was some concern being expressed by the staff that some of the cracks were increasing. Brian asked me to do regular inspections in the future and I agreed to

do this. It started off we would have a regular health and safety meeting with Elsa DeFrew who was our education director and we also had a staff meeting on Wednesday morning and if there was any concerns they'd either go to Elsa or they'd bring it up at our staff meeting on a Wednesday morning. I brought the issue of the floor movement to the attention of the Building Manager, John Drew. I understand he asked the building engineer about it when he did his first inspection. The engineer told him that floor movement from pedestrian traffic was common with a concrete floor constructed building, and this message was passed to me. The second inspection – I was present for the second inspection that took place in late September. It took about half to three quarters of an hour. I walked around the floor with John Drew and the engineer and pointed out the various cracks and the hump in the floor in the reception area. They also checked sewerage and water and said they would do some other things as well. I cannot recall what they were. I then had a class I needed to go to and I asked John Drew and the engineer how much longer they thought they would be. The engineer said that they had a few more things to look at and then he wanted to re-check what he and John Drew had gone over with me. The engineer thought they would be about another three quarters of an hour to an hour. I later saw the engineer and John Drew going past my classroom, 'cos my classroom was here and I could see the people walking down here because the glass and here was up to about, it was frosted up to about half but you could still see people walking past, their heads going past.

JUSTICE COOPER:

Q. Just show me again where the classroom was please.

A. The classroom was the ACE programme here.

Q. Oh I see.

A. And this wall down here of my class was glass and it was frosted glass about halfway up so people couldn't look in but you could see their heads going past.

EXAMINATION CONTINUES: MR MILLS

Q. You were I think at paragraph 10, where you were just dealing with how long they were there for. I think you're probably into paragraph 11.

A. Engineers thought they would be about another three quarters of an hour to an hour. I later saw the engineer and John Drew going past the classroom but I cannot confirm the time they left, because they were there when I first arrived at school at half past eight and I saw them walking past round about quarter past nine but I don't know whether they were finished or not at that stage. The hump – this part here – I have referred to ran east to west across the foyer of the building at the point marked 4 on the plan. It first appeared following the September earthquake but as we experienced more earthquakes the hump appeared to get bigger and become more and more noticeable. It was a matter of particular concern to me and to other staff. The effect of this hump was sufficient to cause a pencil to roll across the receptionist's desk, which did not happen before the September earthquake. As far as I am aware the vinyl floor coverings in the foyer were not lifted during either of the two inspections in order to examine the hump, although I pointed it out to John Drew and the engineer on their second inspection and expressed the concern both my colleagues and I had about it. The engineer said that all concrete buildings hump between the supporting beams that hold the floors up when the concrete dries over the support. The engineer told me the building was doing what it was meant to do following an earthquake and it was not a problem and that was the message I got back that Brian Taylor had given us after the first September earthquake.

Boxing Day. After Boxing Day there was more damage. This was on the western wall adjacent to where the Les Mills building was being demolished. It occurred about two to three weeks before the 22nd of February earthquake and during the course of the demolition. Both of these damages were at ground level and could be seen from the ground floor car park. Underneath this area here at ground level was where people could drive their cars under, which you've mentioned before.

They're marked 5 and 6. This one was a free-standing concrete wall which came out from the edge of the building and this part here was, again, a concrete block building which went between supporting beams, vertical pillars rather. They're marked 5 and 6 on the attached plan. The damage noted as 5 involved a concrete non supporting wall at the end of the car park – that one there – and had completely collapsed eastwards, so it collapsed this way. The wall marked 6 was between two supporting pillars here and it had dropped and separated from the floor above by about 20 millimetres or so, but did not collapse. Neither of these walls were load bearing. After this occurred I checked the whole of the western wall but saw no other movement or cracking so going through the carpark you could see if that wall was okay, you could also notice where some not so careful drivers had hit the pillars and the pillars seemed to be okay to survive the car hitting them.

Q. Can I just ask you on this question of checking the western wall?

A. Yeah.

Q. I take it you're checking it from the eastern side of the wall, not the outer side?

A. Yeah, I checked from the inside of the carpark.

Q. Yes.

A. Because staff had concern not just because of that wall but all of this wall along here.

Q. Yes so it's all from the inside –

A. Yes.

Q. – in effect of the wall. Thank you.

A. They said none of those walls were load bearing and I checked that wall. Request a further inspection – I wanted a further inspection of the building after Boxing Day. This was because staff were concerned that the hump in the floor, this hump here, had become worse after the Boxing Day earthquake and I acted on that concern by asking Brian Taylor to arrange this. Brian said he would, however Brian was killed in the collapse of the building and I do not know whether he arranged for this to be done, but Brian was the kind of person who, if he said he would do something, would do it. You could set your watch by it.

Water leaks post Boxing Day. In about early to mid January, and then again just before the 22nd of February earthquake, there were serious water leaks into the third floor. I spoke to John Drew about this and I was advised that it was the result of work on the fourth floor with the heat pumps. The first leak was in the course of a fit-out that was being done on the western side of the fourth floor to prepare for new tenants, so the leak was in this area here, okay, in this area here and he said it was – for this people to work in this area here. The second leak was in the same place as the first, again in this area here, but there was more water coming out.

Q. Probably just need you to identify in a way that can go into the record, descriptively rather than just by pointing the cursor where you're describing these things.

A. Okay, the water leak came out of this wall here.

Q. Which is the records storage room wall.

A. It was in that wall there, now this wall was not load bearing and it seemed to have – it came out of the skirting boards and there was more water flowing out with the second leak and it showed up the hollows in the floor so we had to section off that part of the corridor because of –

Q. That's the corridor between the record storage room and the audio visual room?

A. That's right, yes.

Q. Thank you.

A. There was also problems in the male toilets, the male toilet was here and the male toilets were said to have been involved with blocked sewer lines. I am not sure what was causing this. The location of the male toilet is marked on the plan just in there. The male urinal also blocked and a tradesperson was called to unblock this and you should have seen the surprise of people coming into the male toilet where they saw a female tradesperson working there. They got a fright. The visit by the tradesperson was organised and arranged by the building manager, John Drew.

Next topic is demolition on the adjoining site. The demolition of the Les Mills building began about mid October. The Les Mills building was about three to four floors in height. The gap between it and the western wall of the CTV building, this was the western wall here and Les Mills was over here, the western wall was about 150 millimetres. The demolition was largely done by a wrecking ball. We all know what a wrecking ball is. Every time the ball swung and hit the Les Mills building the CTV building shook to such an extent that staff, myself included, frequently asked each other during our breaks whether it was an earthquake or demolition and we would often go to the Geonet website to confirm this. I also learnt afterwards that staff couldn't stand up to those shakes all the time so as soon as the classes were finished at the end of the day they couldn't get out of there fast enough. The areas of cracked glass developed along the southern wall, so this is the southern wall here and if you could go to the original picture of showing the building prior to the quake and I'll show you what we were looking at.

Q. Right, see if we can do that.

A. So we had major ongoing damage with the glass along here. Anything that was not reinforced glass ended up by getting cracks quite regularly and this, this glass here was forever being checked and Brian asked me to go out and check it within 24 hours of an aftershock. No damage along that side and the wall of my room had a very large non-reinforced glass in it and I was always concerned that if there was a major shock that that glass would fall inwards and cause major damage.

JUSTICE COOPER:

Q. Right, well let's just note the photograph being addressed is number 0082.13 in our system?

A. Yes.

EXAMINATION CONTINUES: MR MILLS

A. Okay so if we can go back to the floor plan again please. Okay, back to the floor plan so most of the major damage of glass was along this wall here, the ACE room had a very large window which went for the whole,

virtually the whole of the room, very large non-reinforced glass. The glass would rattle but didn't crack in all the time that we were there. Areas of (inaudible 16:57:41) glass (inaudible 16:57:43) seven, down in this area, the majority occurred in the windows nearer to the eastern end. Some of this was post, and it was mainly down in this area because glass in that area and glass along here was all reinforced glass. The glass was repaired by Cranfield Glass so you can check out how many times they came in. Following Boxing Day I did not observe any additional glass damage. My observation was that because there was another newer Les Mills building further to the west of the building being demolished, which had a glass wall facing into the demolition, every effort was being made to focus the demolition towards the CTV building, so I'm talking about Les Mills building had a very large floor, ground to floor and further up window which faced east for natural light and it's also so that people could see in, so all of the damage was pushed down here because this was also a right of way, business right of way from one street to the next street. Once the building was down the rubbles were pushed towards the CTV building in order to keep the access way as I said clear, and just ran the length of the Les Mill building. I was concerned about the shudders that the CTV building was suffering from the demolition work and with the stability of the CTV building. This influenced my request to Brian Taylor for a further engineering report after Boxing Day.

Now we come onto the February 22nd earthquake. At the time of the 22nd February earthquake I was standing in the lift foyer with David Horsley, who was a tutor from Toyama School in Japan. I was standing in the position marked 8(a) just there and David Horsley was marked here and he got to the lift before me and he pushed for the lift button. I was standing behind him probably about two metres from the lift doors because I had actually gone from seeing him there, I'd gone to the – my ACE room to pick up glasses and then I met him there. As I stood there I had a chocolate bar in my hand, and I'm always going to eat chocolate bars after this, my hand was extended in front of me, holding the

chocolate bar. Suddenly a large piece of concrete, about the size of a rugby ball, came down out of the ceiling or the floor above and broke the top off my chocolate bar and it dropped it to the floor. I think that the concrete that dropped was part of the floor or the roof from the 4th floor or the roof from the 3rd floor, so it was our roof.

Q. So you're saying it's, it was your roof, yes, okay?

A. I thought the chocolate bar could be picked up and would still be edible so I stepped forward to recover it. So I actually made a step forwards. At that point another slab of concrete fell behind where I'd been standing. This second slab appeared to be part of the floor above and about the size of an adult body. The sensation I experienced in the building was like a vibration of a clothes dryer, or a dishwasher. I can demonstrate it with my hands, it was like this, this was the southern end of the wall, of the floor and it was going up and down but I'll get to that, so think about that.

Q. So can I again get this in the record, you're indicating an upward, an up and down movement?

A. Yes, but before that, even before, um, the lump of concrete came out of the wall we had a, um, bookcase along this wall here and it had souvenirs.

Q. So which wall are you indicating?

A. This was right outside the lift area.

Q. This is the area that's marked 10?

A. Yeah I see I mentioned this in my original draft but it has been taken out and as the earthquake hit we had souvenirs on this bookcase. Now remember I was here, probably about two metres out from this wall here, and these souvenirs came out far enough that I could actually catch them if I wanted to. And I thought, no this is too dangerous to stop and grab them. So back to paragraph 22.

Q. So again just let's get some clarity around this. So those souvenirs were falling towards the east?

A. They were falling towards the east, they were actually flying out and I was thinking, "How cute, there are dragons flying out, should I try and catch them?" I thought, no. As I, and then because it was still

movement I put my hand out to touch this part of the, of the side of the lift and the lift seemed to go in by about 45 degrees towards me, okay? So that knocked me off balance so I was here, reached out to touch between the two lifts upright, that part there, the lift moved out by about that much, knocked me off balance and then I was on the floor here and see this part marked 10, I thought that was the supporting beam from the floor above 'cos it was quite a large block. It was big enough for me to move round and put my back up against and had my hand over my head like that, so that provided me protection.

Q. Again just so we're sure of this, you say when the lift moved or you felt it was moving it was moving to the south?

A. Yeah, this was the, this was the lift surround the centre part between the two lifts where the lift control was. So I put my hand out like that to steady myself and that's when the lift moved in by what I estimate was about 45 degrees.

Q. And it's moving towards the south?

A. It was moving towards the south. I dropped to the floor here, this was the supporting, what I call the supporting beam, it was in front of me which I snuggled up to. So I was on all flours, crawled over to that part and as I was crawling over I looked to the south. This is the south here and I looked this way 'cos I was actually able to look down this corridor here and –

JUSTICE COOPER:

Q. Just for the record, that's on the, roughly on the line 4911 in terms of the makings on this diagram?

A. Four nine 11 yeah. So as I dropped to the floor and looked south I can recall someone with their hands outstretched above their head disappearing from view as the floor they were on, I've talked about here, um, it just sort of dropped. I could not see this room here because of the, um, the classroom, admin and also this side. I couldn't see this building here so I can't, I can't –

Q. You are talking about the room marked "Classroom" at the southern, south-eastern corner of the building?

A. Yeah, that's right. I could see the fire escape 'cos I was looking straight down there, and at that stage the fire escape was still standing when I started looking down, okay? Now where am I up to?

Q. Probably at 25 aren't you pretty much?

A. I'm pretty much at 25 yes. So at this stage at 25, paragraph 25 as I lay next to supporting beam another lump of concrete slid down my arm, so slid down here, so I got a cut there, cut there and gravel, like a gravel rash down my, my arm. I got a cut on my forehead and cut on my back and at some stage I had another lump of concrete bounce off my back, the small of my back.

Q. So you are indicating your right arm?

A. The right arm Sir yes.

Q. Yes thank you, paragraph 26?

A. Okay, I think these were all from the floor above. I recall looking up towards the ceiling and seeing sky up above me. I then crawled across the foyer with David Horsley, to the eastern side of the building. I saw the south and eastern sides of the building, this part along here I've marked on 12, were gone, however there was an area of the foyer near the lift still standing. I think the only other survivor from the 3rd floor to walk away immediately out of the building was our office manager, Margaret Aydon. She was in the office manager's room there.

Q. Which is there?

A. That's the office manger's –

Q. It's noted as 12?

A. Noted as 12 yes. The other survivors from the 3rd floor were helped free by Search and Rescue possibly the next day. Together David Horsley and I were able to crawl to the eastern side of the building and we were able to find our way down from the rubble. Two policemen came up to the top of what was the 2nd floor and helped us both down. Two photographs which are also in here were supplied to the Royal Commission by the police which show me being helped down. You can't see it very clearly but this one with the great big TV transmisison disk, right underneath there is myself and David Horsely being helped down, okay, not very clearly but I'm there. I understand that these were

taken by David Horsley after he's made his way down the rubble to Madras Street. I am the man wearing the maroon shirt but you can't, there we go, that's me there, and that's one of the policemen. I am not sure of the identity of the other pictured males. I was out of the building and in Latimer Square by the time of the second earthquake. I think it was the second quake that caused the fire in the building. I did not smell any smoke when I was in the building at all.

CROSS-EXAMINATION: MR LAING - NIL

CROSS-EXAMINATION: MR RENNIE – NIL

CROSS-EXAMINATION: MR WALLACE

Q. Mr Godkin if I could just refer you to your paragraph 8 of the written statement you've just read from?

A. Yes.

Q. You mentioned there that you were on leave at the time the first building inspection occurred –

A. Yes.

Q. – so that's some time shortly after the 4th of September. Could you tell us, do you recall when did you return from leave?

A. I recall, I, the 4th of September was the Saturday, by the following Thursday Brian told me that they had had, um, the first check and the school was back in operation from the Thursday after the earthquake, so that had had the first check about Tuesday, so there was Saturday, Sunday, Monday, Tuesday, that was when they had the first check and the school was open for business again on that Thursday of that week and I was back in Kings Education on the Monday after the earthquake, after the first check had been done.

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Q. So that would likely be Monday the 13th of September.

A. Yes.

A. And so when you say at the bottom of that paragraph that there was some concern being expressed by the staff that some of the cracks

were increasing 'so Brian asked you to do regular inspections in the future'.

A. Yes.

Q. Are you expressing there that staff had said from the time that they immediately went back into the building until you, returning on leave just the following week, that things were already changing.

A. No. The staff were not allowed to go back into the building until they'd had the first engineers' check which was done about some time between Monday and Wednesday, I'm picking about Tuesday, because they were able to go back in on the Thursday and Brian told me that they were back, business as usual, on the Thursday and we were not allowed to go back into the building until the engineers' check had been done on that Thursday.

Q. Yes but I'm asking you about when you say that staff were, you were told by Brian that staff were noticing the cracks were increasing over time.

A. Well they thought they were increasing but, um, to be –

Q. Do you recall when Brian told you that?

A. Yes after the first, maybe it was the second, no I can't recall for sure.

Q. You can't recall when he told you?

A. No.

CROSS-EXAMINATION: MR SHAMY – NIL

QUESTIONS FROM THE COMMISSIONER FENWICK:

Q. Just one point I'd just like to make quite sure I've got it right. The hump in the floor, the crack in the audio visual room wall and the crack in the students' common room wall they were all in line?

A. They appeared to. When I saw them on the plan that the Commission staff had drawn with me they all seemed to line up.

Q. All in line, virtually line 3 then, right thank you.

QUESTIONS FROM THE COMMISSIONER CARTER – NIL

QUESTIONS FROM THE JUSTICE COOPER – NIL

WITNESS EXCUSED

COMMISSION ADJOURNS: 5.12 PM

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