9(2)(a) [redacted]

From: Hugh Cowan
Sent: Monday, 8 November 2010 5:41 p.m.
To: david.kelly@dbh.govt.nz
Cc: Out of scope [redacted] George Hooper
Subject: Transfer of EAG stewardship to DBH
Attachments: DBH-10-11-08.pdf; TOR - Phase 1.pdf; TOR - Phase 2.pdf

Dear David,

As discussed previously, EQC is keen to see practical engineering guidelines for reinstatement of housing in Canterbury, developed and applied consistently. The intended outcome is the improved future performance of residential housing under earthquake loading and empirical evidence of a systematic approach to seismic risk management in New Zealand. The economic significance of the latter point will grow as consideration turns to the future underwriting of earthquake (liquefaction) risks, both here and abroad.

The attached TOR (Phase 1) describes work sponsored by EQC during October, and the letter requests the transfer of stewardship for the advisory group to DBH, so that the Group's work can be formally constituted as guidance material and disseminated under the auspices of the Department. The TOR – Phase 2 is an initial draft of possible next steps for your consideration.

Naturally, EQC will continue its close collaboration with the Department on this important topic and I look forward to assisting you to achieve a positive outcome for all.

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI - 9(2)(a) [redacted]

8 November 2010

David Kelly
Deputy Chief Executive
Department of Building and Housing
P O Box 10-729
WELLINGTON

Dear David

Technical Advice for Repairing and Reconstructing Houses Damaged in the Canterbury Earthquake
I am writing to initiate with you the migration of an EQC-sponsored engineering advisory group to the Department's stewardship, to guide certain aspects of the engineering requirements for residential recovery in Canterbury. As we have previously discussed, technical complexities associated with the repairs and reconstruction of houses damaged by the 4 September earthquake are apparent. In addition to the variability in the response of the land, a range of structural effects on dwellings has occurred due to liquefaction and ground shaking.

In late September, EQC established an engineering advisory group to consider the technical issues and processes associated with the recovery for residential dwellings, with the group engaged along similar lines to our collaboration on the statutory review of earthquake prone building policy. The group comprises representatives from BRANZ and selected industry leaders from the Structural Engineering Society, in addition to key people from EQC and its geotechnical engineering consultant Tonkin & Taylor, plus Mike Stannard from the Department. Collectively they represent a significant body of knowledge and experience in the disciplines of earthquake, structural and geotechnical engineering, and building remedial work.

The engineering advisory group has quickly developed a consistent and convergent technical philosophy and approach. A sixty page draft document has been produced, and a clear view established as to the steps involved in producing a final draft version by mid-November. The organisations and individuals briefed to date (the three local councils, AMI Insurance, Fletcher Construction, local structural and geotechnical engineers) reportedly are very positive about the potential of a future guidance document.

EQC has co-ordinated and funded this feasibility phase of work during October as part of our role to facilitate the transfer of information from the research domain towards operational application. However, you will recall at the early stages of the group's deliberations, we agreed in principle that any guidance material should be issued by the Department.

To progress this we now need to formalise the arrangements under which the Department will co-ordinate the work of the group as it migrates to the production phase. I have taken the liberty of asking the group to prepare the attached draft Terms of Reference for the production phase of this project (refer attachment) and look forward to discussing this at your earliest convenience.

Yours sincerely

Hugh Cowan
Research Manager

Earthquake Commission
Level 20, Majestic Centre, 100 Willis Street, Wellington 6011, New Zealand
Corporate Mail: PO Box 790, Wellington 6140 Claims Mail: PO Box 311, Wellington 6140
Telephone: (04) 978-6400 Fax: (04) 978-6431
www.eqc.govt.nz

Engineering Advisory Group on House Repairs and Reconstruction Following the Canterbury Earthquake

Terms of Reference
Phase 1: Feasibility and Indicative Content

31 October 2010

Background

Following the Darfield, Canterbury Earthquake of 4 September 2010, the Earthquake Commission (EQC) established an Engineering Advisory Group to consider the range of technical issues the recovery of residential dwellings, and to establish the feasibility and indicative content of a Guidance Document to be produced by the Department of Building and Housing (Phase 2).

Objectives of the Advisory Group

(i) To establish the engineering requirements and regulatory linkages necessary to expedite the house repair and reconstruction process following the agreement on land remediation issues.

(ii) To identify the engineering requirements for various repair and reconstruction options and techniques.

(iii) To establish the elements and Terms of Reference of an ongoing Engineering Advisory Group to be established by the Department of Building and Housing to produce a Guidance Document

Particular Areas of Work

The areas of work being addressed by the Engineering Advisory Group in the scoping phase (Phase 1) include:

1. Establishing appropriate structural and geotechnical engineering approaches to repair and reconstruction;
2. Consulting with Christchurch City, Waimakiriri District and Selwyn District Councils on the regulatory issues and processes to be followed;
3. Consultation on the technical objectives and processes to the engineering profession, the wider construction sector, and other affected agencies;
4. Consideration of suitable engineering resources in support of the recovery operations.

Structure and Composition of the Engineering Advisory Group

The Engineering Advisory Group is to comprise a small group of leading engineers and remediation specialists including representatives from the following organisations:

- EQC
- Department of Building and Housing
- BRANZ (incl. representing the NZS3604 Committee)
- Structural Engineering Society (SESOC)
- Tonkin and Taylor

The Engineering Advisory Group reports during Phase 1 to Dr Hugh Cowan, Research Manager, EQC.

Arrangements for Group Members

Those members representing government agencies (EQC, DBH) are providing their input directly. Other members are to be engaged on a commercial basis by EQC.

Engineering Advisory Group on House Repairs and Reconstruction Following the Canterbury Earthquake

Terms of Reference (Draft 1)

Phase 2: Production of Guidance Document

1 November 2010

Background

Following the Darfield, Canterbury Earthquake of 4 September 2010, an Engineering Advisory Group was established to consider the range of technical issues involved in the recovery of residential dwellings.

After the feasibility and content scoping stage facilitated by EQC during October, the production of a Guidance Document is to be co-ordinated by the Department of Building and Housing.

Objectives of the Advisory Group

(i) To document the engineering requirements and regulatory linkages necessary to expedite the house repair and reconstruction process following the agreement on land remediation issues.

(ii) To provide guidance to EQC, commercial insurers, the Canterbury Earthquake Recovery Commission and Christchurch City, Selwyn District and Waimakiriri District councils on the engineering requirements and regulatory issues and processes.

(iii) To convey the engineering requirements for various repair and reconstruction options and techniques to the insurance, design and construction sectors.

Particular Areas of Work

The areas of work to be addressed by the Engineering Advisory Group include:

1. Documenting appropriate structural and geotechnical engineering approaches to repair and reconstruction;
2. Obtaining consensus across the insurance sector on the technical objectives and recommended approaches;
3. Obtaining agreement with Christchurch City, Waimakiriri District and Selwyn District Councils on the regulatory issues and processes to be followed;
4. Communication of the technical objectives and processes to the engineering profession, affected agencies and to the wider construction sector;

Principal Output of the Advisory Group

The principal output of the Engineering Advisory Group is a Guidance Document addressing the following aspects:

1. A summary of relevant insurance principles and requirements, and regulatory issues and requirements

2. Future performance expectations for foundations and floor systems for both repaired and reconstructed dwellings
3. Principal options and methods for major re-levelling work for houses to be repaired
4. Recommended foundation and flooring systems for houses being completely rebuilt
5. Proposed arrangements for structural and geotechnical engineering input prior to and during construction work

This guidance document is to be produced as soon as practicable, including appropriate peer review processes, and taking account of required consultation. The target date for a final draft document for the Department is mid-November.

The Engineering Advisory Group may be called upon for other involvement and outputs throughout the recovery process.

Structure and Composition of the Engineering Advisory Group

The Engineering Advisory Group is to comprise a small group of leading engineers and remediation specialists including representatives from the following organisations:

- EQC
- Department of Building and Housing
- BRANZ (incl. representing the NZS3604 Committee)
- Structural Engineering Society (SESOC)
- Tonkin and Taylor

The Engineering Advisory Group is to have access to and the ability to task other practitioners, researchers and agency representatives whose inputs would be of value to them.

The Engineering Advisory Group is to be set up as a committee appointed by the Department's Chief Executive, and reports to Dave Kelly, Deputy Chief Executive.

Arrangements for Group Members

Those members representing government agencies (EQC, DBH) are providing their input directly. Other members are to be engaged on a commercial basis by the Department of Building and Housing.

9(2)(a) [redacted]

From: Hugh Cowan
Sent: Thursday, 28 October 2010 2:09 p.m.
To: George Hooper
Subject: RE: FW: EAG Timeline (hugh)

Thanks for the update George, and for your help around this. I would like to think that this issue partly arises from a misunderstanding of the role that EQC must play in order to get certain things done, for itself and for the wider community. Wish you a safe trip. Hugh
--- original message ---
From: "George Hooper" <ghooper.eqc@clear.net.nz>
Subject: FW: EAG Timeline (hugh)
Date: 27th October 2010
Time: 5:26:43 pm

Hugh,

9(2)(h) [redacted]

We can discuss when you get back

Bets regards

George

Recovery Liaison

NZ Earthquake Commission

Phone: 9(2)(a)

Email: <mailto:ghooper.eqc@clear.net.nz> ghooper.eqc@clear.net.nz

---

From: George Hooper [mailto:ghooper.eqc@clear.net.nz]
Sent: Thursday, 28 October 2010 12:10 p.m.
To: Out of scope
Cc: 'Hugh Cowan'
Subject: FW: EAG Timeline

9(2)(a)

9(2)(h)

Sincerely

George Hooper

Recovery Liaison

9(2)(a)

From: George Hooper <ghooper.eqc@clear.net.nz>
Sent: Tuesday, 26 October 2010 6:01 p.m.
To: Phillip Jacques
Subject: FW: EQC Engineering Advisory Group - Potential Liability of Members

Phillip,

This question from 9(2)(a) there is an issue around liability that needs to be sorted can we please discuss; I think it essential that we get a letter of comfort from EQC, that covers of the issues of any liability for cost in protecting themselves. We should perhaps discuss by phone.

Out of scope

Go well

George

Recovery Liaison
NZ Earthquake Commission
Phone: 9(2)(a)
Email: ghooper.eqc@clear.net.nz

Out of scope

From: Out of scope
Sent: Sunday, 10 October 2010 21:37
To: 'Hugh Cowan'

Cc: Hooper George (ghooper.eqc@clear.net.nz)
Subject: EQC Engineering Advisory Group - Potential Liability of Members

9(2)(ba)(i)

[redacted]

9(2)(ba)(i)

9(2)(a)

From: George Hooper <ghooper.eqc@clear.net.nz>
Sent: Friday, 15 October 2010 4:52 p.m.
To: Out of scope
Cc: Hugh Cowan
Subject: RE: Engineering Advisory Group - Notes From Yesterday's Meeting #2
Attachments: Damage slides.pdf

Guys,

The attached PDF from 9(2)(a) are I believe the slides you wanted circulated.

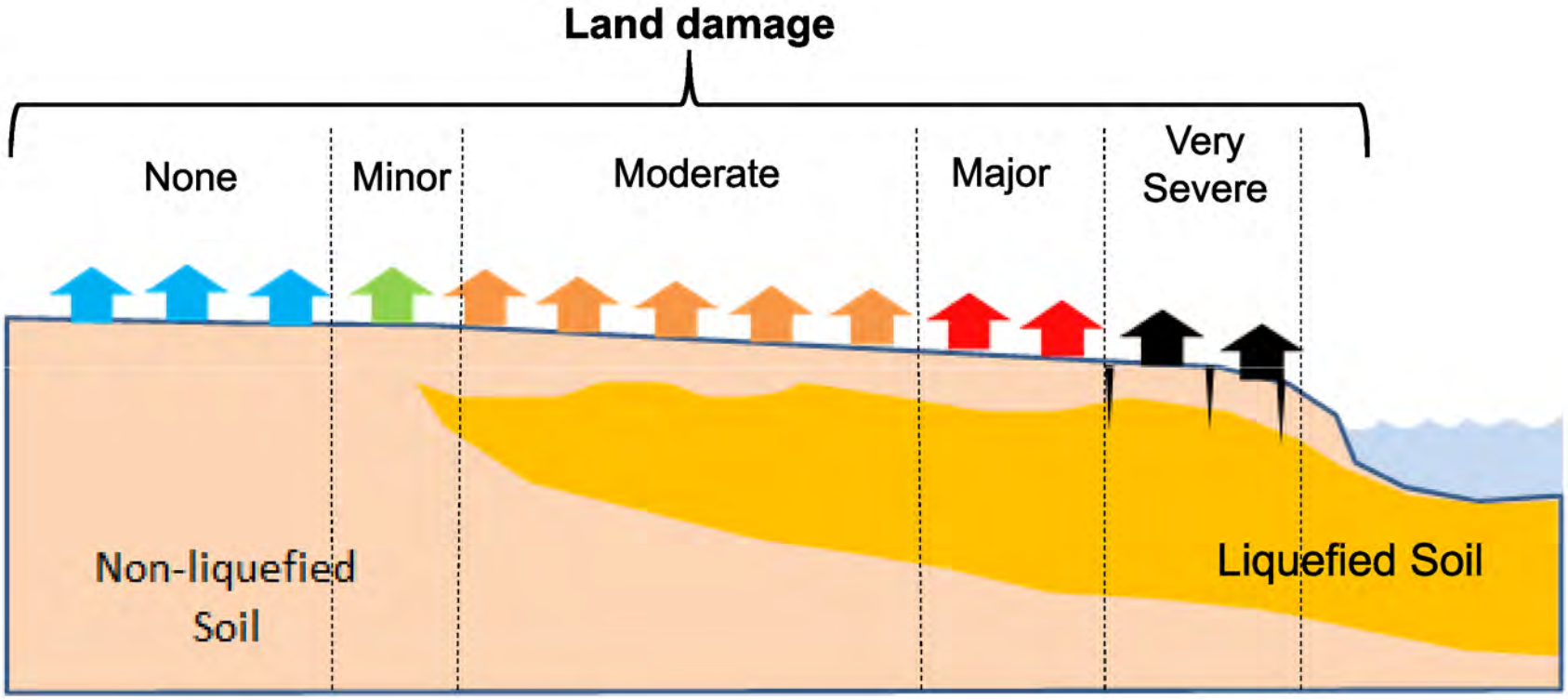
Can I please remind you that these need to remain under embargo and should not be used for public presentation until at least the T&T report is public.

George

Recovery Liaison
NZ Earthquake Commission
Phone: 9(2)(a)
Email: ghooper.eqc@clear.net.nz

Local Land Damage Mapping

Tonkin & Taylor



Very Severe Land Damage

Tonkin & Taylor

- Extensive lateral spreading >1m
- Surface rupture. Large open cracks >100mm
- Extensive liquefaction (ejected sand)
- Significant horizontal and vertical displacement >500mm
- Heavy structural damage to buildings
- Dislocation of roads/ services
- Dwellings most likely to be uninhabitable and beyond economic repair

BLACK ZONE

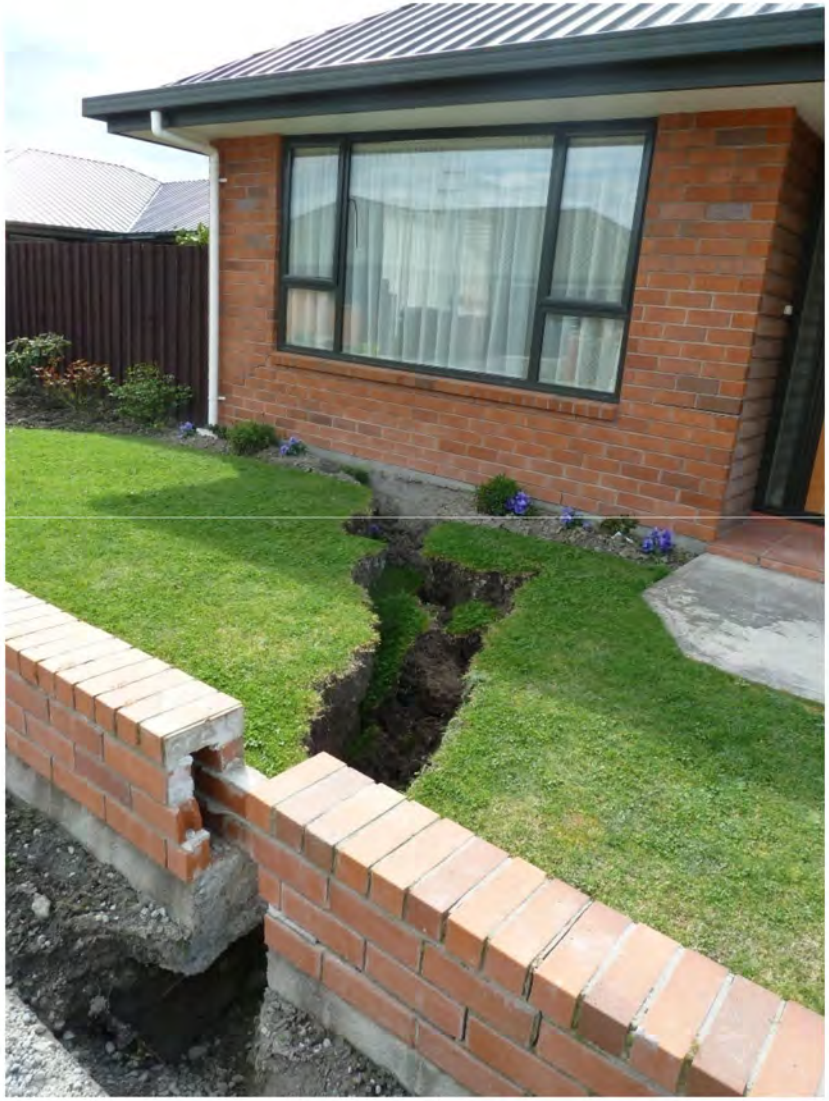
Very Severe Land Damage

Tonkin & Taylor

BLACK ZONE

Very Severe Land Damage

Tonkin & Taylor



BLACK ZONE

Very Severe Land Damage

Tonkin & Taylor

BLACK ZONE

Major Land Damage

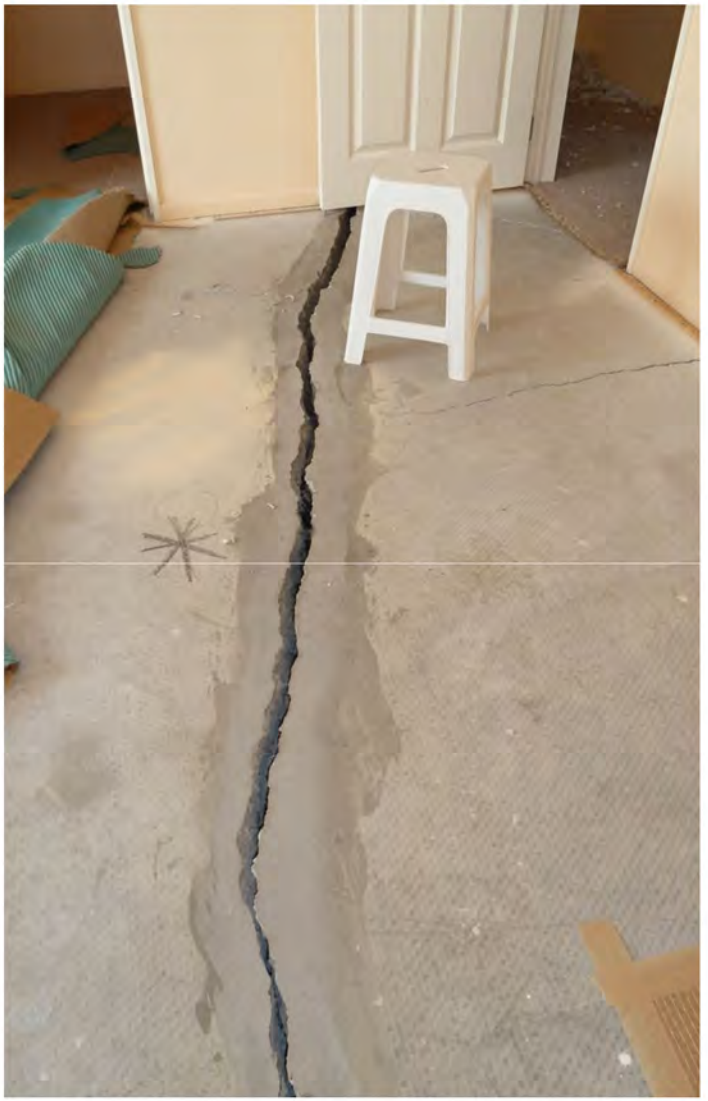
Tonkin & Taylor

- Extensive liquefaction (ejected sand)
- Large cracks from ground oscillations
- Horizontal and vertical displacement >50mm
- Structural damage to buildings
- Major differential settlement >1/100
- Damage to roads and failure of services
- Dwellings generally uninhabitable and beyond economic repair

RED ZONE

Major Land Damage

Tonkin & Taylor



RED ZONE

Major Land Damage

Tonkin & Taylor

RED ZONE

Major Land Damage

Tonkin & Taylor

RED ZONE

Moderate Land Damage

Tonkin & Taylor

- Visible signs of liquefaction (ejected sand)
- Small cracks from ground oscillations <50mm
- No vertical displacement of cracks
- Some structural damage to buildings
- Moderate differential settlement <1/100
- Moderate damage to roads/ services
- The majority of houses are likely to be habitable in medium term with reduced serviceability but are variable with respect to the cost to repair them

ORANGE ZONE

Moderate Land Damage

Tonkin & Taylor

ORANGE ZONE

Moderate Land Damage

Tonkin & Taylor

ORANGE ZONE

Moderate Land Damage

Tonkin & Taylor

ORANGE ZONE

Minor Land Damage

Tonkin & Taylor

- Shaking induced damage – cyclic deformation
- Minor ground cracking (tension) and buckling (compression)
- No liquefaction visible at the surface
- No permanent horizontal or vertical displacements
- Occasional minor structural damage and varying degrees of cosmetic damage
- Minor street, pavement and landscaping repairs required

GREEN ZONE

Minor Land Damage

Tonkin & Taylor

GREEN ZONE

No Land Damage but Possible Building Damage

Tonkin & Taylor

- No apparent land damage
- No signs of liquefaction at the surface
- Potential building damage due to earthquake shaking, but not visible from the road frontage
  - Potential chimney damage
  - Potential internal and external wall damage

BLUE ZONE

No Land Damage but Possible Building Damage

Tonkin & Taylor

BLUE ZONE