
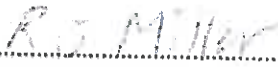



DESKTOP GEOTECHNICAL REVIEW

340 Cranford Street, Saint Albans

		20 Troup Drive, Tower Junction PO Box 9339 Christchurch 8149 New Zealand 03 379 4014
Prepared by:	 Raquel Miller Engineering Geologist	BSc
Reviewed and approved for release by:	 Marton Sinclair Director Civil and Geotechnical Engineer	BE, BSc, FNZIS, MIPENZ, CPEng, IntPE(NZ), RPSurv
Date:	15 April 2016	
Reference:	323438_15105084719_GEOTECH_mds.docx	
Status:	FINAL	
Distribution:	1 PDF 1 Original	GM & M Case Eliot Sinclair

Limitations: This report has been prepared according to the instructions from GM & M Case for the particular objectives described in this report. The information contained in this report should not be used by anyone else or for any other purposes.

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1. INTRODUCTION

Eliot Sinclair were engaged by GM & M Case to undertake an investigation and prepare a Desktop Review of available Geotechnical Data and supplemented this with 3 shallow hand auger test holes in the vicinity of the existing house to assist in possible rezoning of the land.

2. SCOPE OF WORK

The scope of work for this Geotechnical Interpretive Report was to:

- Review available data from the Canterbury Geotechnical database¹ (CGD), Environment Canterbury's geographic information system² (GIS) and the Institute of Geological and Nuclear Sciences' (GNS) Active Faults database³;
- Review the existing report by Connell Wagner (Aurecon) by Dr Jan Kupec, dated 18 February 2007;
- Review the existing report by Tonkin & Taylor, dated April 2013;
- Prepare this Desktop review to summarise the general geotechnical conditions encountered across the site and to recommend suitable methods for future development of the land for residential development in accordance with the requirements of the Ministry of Business, Innovation and Employment's (MBIE) December 2012 guidelines⁴ or any other suitable methods.

3. DISCLAIMER

Comments made in this Geotechnical Interpretive Report are based on information shown on the CGD¹, Environment Canterbury's GIS², GNS' Active Faults database³, Eliot Sinclair's recent shallow testing, our inspection of the general area and the MBIE's guidelines⁴.

Whilst every care was taken during interpretation of the subsurface conditions, there may be subsoil strata and features that were not detected. Additionally, on-going seismicity in the general area may lead to deterioration or additional ground settlement that could not have been anticipated at time of writing of this report. The exposure of such conditions, occurrence of additional strong seismicity, or any future updates of the guidelines may require a review or additional investigations. Should this occur then Eliot Sinclair should be advised in order to confirm the recommendations of this report.

This report has been prepared for the benefit of GM & M Case and Christchurch City Council in accordance with the Scope of Work.

¹ Canterbury Earthquake Recovery Authority. (2012). *Canterbury geotechnical database*. Retrieved in April 2015 from <http://canterburygeotechnicaldatabase.org/teckort/t.com/>

² Environment Canterbury. (2013). *Geographic information system*. Retrieved in April 2015 from <http://canterburymaui.govt.nz/AdvancedViewer/>

³ Institute of Geological & Nuclear Sciences. (2004). *Active faults database*. Retrieved in April 2015 from <http://maps.gns.govt.nz/website/af/viewer.htm>

⁴ Ministry of Business, Innovation & Employment. (2012). *Repairing and rebuilding houses affected by the Canterbury earthquakes (version 3)*. Wellington, New Zealand.

No liability is accepted by Eliot Sinclair or any employee of Eliot Sinclair with respect to the use of this report by any other party, for any other purpose other than outlined in the Scope of Work.

4. SITE DESCRIPTION

The site is located 340 Cranford Street, Saint Albans, Christchurch and is legally described as Lot 1 Deposited Plan 471475. The site is located approximately 3.6km north of the Christchurch central city. The site is bounded by Cranford Street to the southwest, residential lots to the east to southeast and farmland. Refer to Figure 1.

This site has been classified by CERA as 'Green Zone and urban non-residential', indicating the site is located within an unmapped area and future land damage from liquefaction is unknown in future significant earthquakes.

The topography across the site is generally flat, but has a gentle slope down from the main dwelling, towards the northwest and northeast of the site located within the red outline. The dwelling and residential area is located on a historical river terrace.

A small watercourse, the Dudley Creek Diversion, is located approximately 110m north of the dwelling on the site, which runs in a northeast to southwest direction.

At 340 Cranford Street, there is an existing single story timber framed dwelling on the site with concrete brick veneer cladding and a heavyweight tiled roof over a concrete slab foundation system.

The owner advises that the main house and farm buildings on the site only suffered minor damage. Earthquake damage caused a vertical separation of approximately 10mm between the original foundation system and the new foundations for the house extension.

Largely cosmetic repairs to the existing dwelling on the site have been completed.

The site contains multiple detached sheds used for farming use.

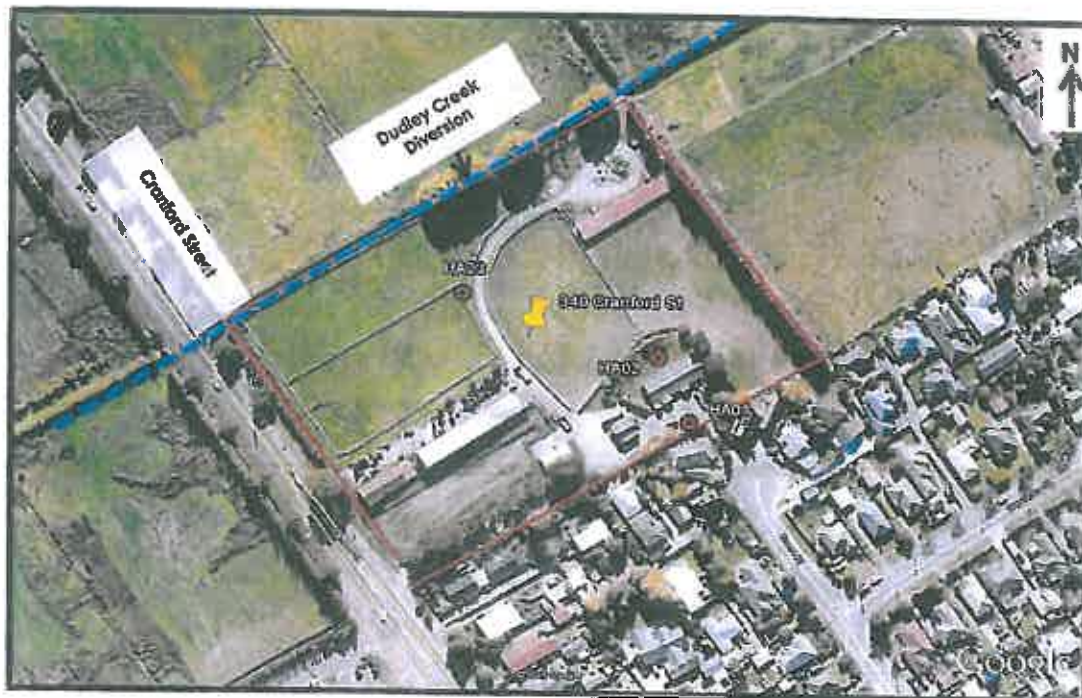


Figure 1: Site location (red outline) and shallow testing location plan.

4.1. Canterbury geotechnical database

The Canterbury Earthquake Recovery Authority (CERA) coordinates the CGD¹, which contains a large range of photographic, topographic, geological, geotechnical, land classification, survey records and field observations that relate to the Canterbury earthquake sequence.

4.1.1. Land Category

The CGD confirmed that the land immediately to the south and south east of the Case land is TC2. The Case land is not zoned and is presently mapped as rural land.

4.1.2. Geological mapping

The geological map⁵, indicates that the site geology comprises of "dominantly alluvial sand and silt overbank deposits" and "peat swamps now drained" of the Springston Formation.

Refer to Figure 2.

⁵ Brown, L.J.; Weeber, J. H. 1992: Geology of the Christchurch urban area. Scale 1:25 000 Institute of Geological & Nuclear Sciences geological map 1. 1 sheet + 104 p. Institute of Geological Nuclear Sciences Limited, Lower Hutt, New Zealand.

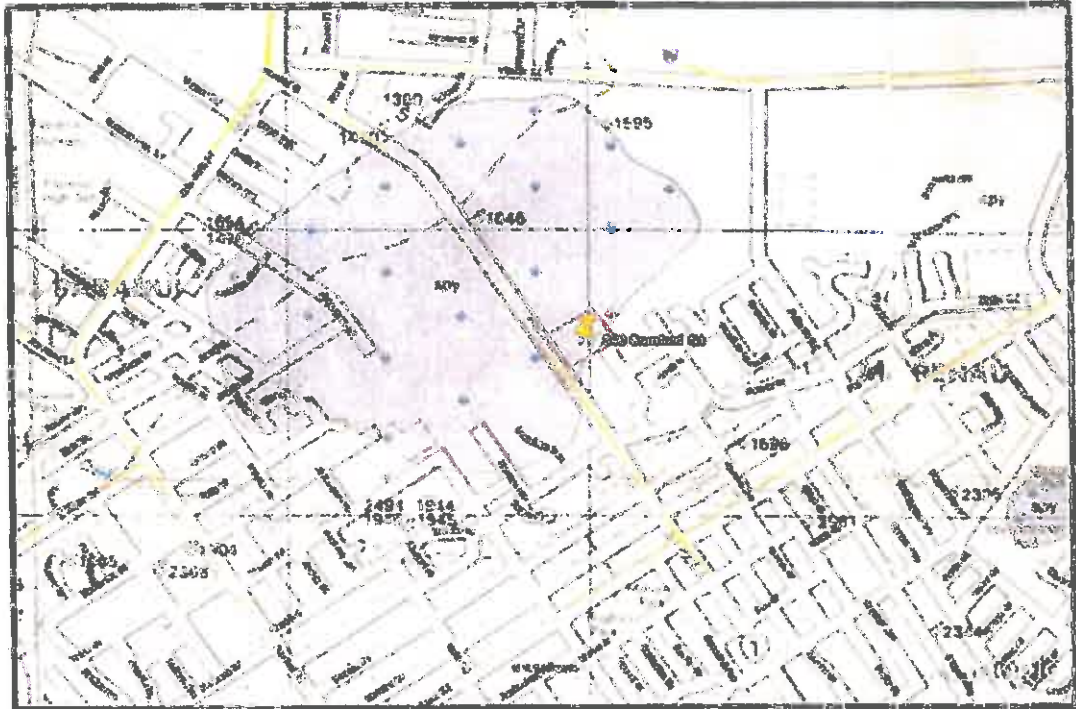


Figure 2: Geological map of Christchurch (source: CGD, April 2015)

5. Peak ground acceleration (PGA)

For residential land the MBIE's guidelines⁴ specifies the peak horizontal ground acceleration ($PGA_{M7.5}$) to be adopted for liquefaction assessment in a serviceability limit state (SLS) event as $PGA_{M7.5}=0.13g$ and in an ultimate limit state (ULS) event as $PGA_{M7.5}=0.35g$.

The conditional median PGAs in each of the September 2010, February, June and December 2011 events are likely to have exceeded an SLS event and the February 2011 earthquake may have approached ULS conditions.

Refer to Table 1.

Table 1: Comparison of conditional median peak horizontal ground accelerations at the site (source: CGD¹, April 2015)

PGA (horizontal)	SLS (1/25, M7.5)	ULS (1/500 , M7.5)	04 Sep 2010 (M7.1)	22 Feb 2011 (M6.3)	13 Jun 2011 (M6.0)	23 Dec 2011 (M5.9)
Design PGA _{M7.5}	0.13g	0.35g				
Conditional Median PGA			0.204g	0.286g	0.162g	0.198g
Magnitude Scaling Factor (MSF)			1.11	1.41	1.48	1.52
Equivalent to PGA _{M7.5}			0.18g	0.20g	0.11g	0.13g

6. REIVIEW OF EXISTING REPORTS

6.1. Connell Wagner Limited (Aurecon), dated 24 February 2009

This report was written by Dr Jan Kupec and was used to provide evidence for the site observations, geological and geotechnical setting of the site, engineering constraints and opportunities to site development and resource management issues and geotechnical hazards within the Cranford Basin.

The areas covered in this report are largely the agriculture area at the on the western and eastern side of Cranford Street. Within these areas, there are several drains and ditches, including the Dudley Creek Diversion (Refer to Figure 1).

The reported observations made during Dr Kupec's site visit explain that the dwellings located on the site appear to have shown no signs of distress due to the geological and geotechnical conditions of the site. Areas of soft ground were observed underfoot over majority of the area, with some area's appearing softer than others, where peat was observed at the surface.

It is noted that the existing buildings, generally the newer buildings, were founded on deep driven piles to a depth of approximately 6m to 8m. Some of the buildings and roading observed had not performed well due to consolidation of the soft materials and surcharge loading.

Dr Kupec explains that the peat layers encountered across the Cranford Basin (including agricultural areas and residential areas) appear to vary in depth from the surface and thickness of the peat layer. Generally the peat to organic silt was observed within the top 5m of the soil profile, underlain by interbedded silty sand to sandy silt, and sandy gravel at a greater depth.

The peat appeared to be of a greater thickness in the areas of the man-made drains and Cranford Street intersect. This layer reduces towards the boundaries of the basin.

The peat appeared to be at a greater depth towards the southern end of the Cranford Basin (where the Case site is located), based on the deep investigation results.

Four mitigation methods were discussed in the report, which include removal and replacement, preloading and consolidation, load transfer platforms and ground improvement. It was noted that not all methods would be feasible due to the extent of the compressible nature of the soils. Where the compressible soils were thinner, load transfer platforms and preloading and consolidation of the material were likely to be feasible options.

Note that this report was completed prior to the Canterbury earthquake sequences in 2010 and 2011.

6.2. Tonkin & Taylor Limited, dated April 2013

This report was written to assess the likely earthworks and foundation requirements within the Cranford Basin for the proposed sub-division and development of the site at 340 and 341 Cranford Street.

Both sites are located at the southern end of the basin, with 341 Cranford Street located to the west of the street and 340 Cranford Street located to the east of the street.

Tonkin & Taylor completed deep investigation as part of their geotechnical investigation, the results from this concluded that there is a compressible soft peat layer present, underlain with a interbedded silty sand and sandy silt, sand and gravels at a greater depth. The geology across the site is variable and the thickness of the peat appears to range in thickness.

A liquefaction analysis was completed and the results show that liquefaction can occur within the natural fine grained material observed at the site. The results indicated that the risk is low due to the thickness of the non-liquefiable crust that overlays the potentially liquefiable materials. Lateral spreading was judged to be low given the sites current condition.

It was noted that the site is likely to undergo static settlement due to the nature of the natural soils and settlement from liquefaction is less likely to occur.

Mitigation methods included ground improvement in the area of drains to decrease the risk of lateral spreading occurring and remediation of the stormwater channels. Other methods discussed in the report involve excavating and replacing the organic soil with competent engineered fill material and preloading the site for a period of time causing static settlement to occur within the soft compressible natural materials.

Due to the nature of the peat and the varying thickness of it, not all of these methods are feasible and would involve further geotechnical design.

7. SITE INVESTIGATION

7.1. Shallow testing

Three shallow hand-auger boreholes were undertaken across the site in April 2015 to confirm the nature of the shallow subsoil materials and the records are included as Appendix A.

One shallow hand auger (HA01) refused due to the borehole collapsing at a depth of approximately 2.6m (bgl) and another refused at a depth of 4.0m (bgl) (HA03) due to the water table creating a suction effect on the hand auger causing deeper testing to become

difficult, and another met the target of 4.0m (bgl) (HA03). Refer to Figure 1 for test locations.

All three hand augers encountered topsoil (fill), interbedded silt, sandy silt and silty sand, peat (of varying thickness due to topography across the site) and sand material. HA01 and HA02 appear to be at the upper level of what may be a historical river terrace, given that the interbedded silt, sandy silt and silty sand was present above the peat layer (which is generally thinner in these two hand augers test holes) and HA03 appears to be within a swamp area, where peat was encountered at the ground level.

The observations made, show evidence of thicker peat layers within the lower elevation levels at northwest area (HA03 location) of the site and becoming thinner towards the southeast area (HA02 to HA01) of the site. The area where the main dwelling is located is at a higher elevation similar to the existing residential areas to the south.

Groundwater was encountered at a depth of approximately 1.2m (HA01), 1.7m (HA03) and to 1.8m (bgl) (HA02) during the shallow site investigation. Note that there is a difference in elevation between all of the shallow hand auger boreholes.

8. MITIGATION METHODS

The soils that were observed across the site appear to range from soft silt / sandy silts to compressible peat material. The layers of these upper materials vary in thickness across the site.

The risk of liquefaction at this site appears to be relatively low given the nature of the soils observed. Settlement occurring from liquefaction is of low risk and it is more likely to occur from static settlement due to the compressible peats.

An economically feasible solution in these soils, is preloading and consolidation of the natural soils. This is a common practice and would be suitable for the site conditions encountered. The soils would be loaded using bulk fill material, which then creates consolidation of the compressible or soft materials. Once consolidated the bulk fill is then removed. This method decreases the risk of significant static settlement in the future. The design detail for this would need to be completed by an engineer.

Another feasible solution is the creation of a load transfer platform that will create a reinforced platform that will reduce the risk of damage to the infrastructure and buildings if static settlement occurs. Geotextile cloth is placed on the base, with an appropriate geogrid on top, then the compacted hardfill. The type of geogrid and hardfill thickness will need to be specifically designed by an engineer.

These two mitigation methods have also been recommended in the Connell Wagner report, dated February 2009, and the Tonkin and Taylor report, dated April 2013.

9. CONCLUSION

Based on the observations made during the shallow field investigation, review of existing reports and background knowledge we consider that with appropriate detailed investigation, design and construction techniques the land is suitable for residential use.

The house located on the site has performed relatively well and is surrounded by residential houses to the south, southeast of the site, which also appeared to have performed relatively well during the recent Canterbury earthquake sequences although the area is unlikely to have been fully tested by a ULS level earthquake.

The site shows evidence of compressible peats but with varying thickness, which tend to be thinning as towards to residential area (south to southeast of the site). It is not known whether the peat layer extends southeast of the land, under the existing residential area. However, this is likely to be at sufficient depth to provide a non-liquefiable crust capable of carrying the loading from residential development given the TC2 performance of the residential land.

Given the topography across the site and the geological history, it is likely that the residential area is located on an historical river terrace that has undergone consolidation due to a thicker layer of interbedded silts and sands deposited on top of the peat layer.

The general environment within the area poses challenges from an engineering aspect but with the use of specifically designed mitigation methods, we believe that development is feasible within the Case land at 340 Cranford Street.

Appendix A SITE INVESTIGATION RECORDS

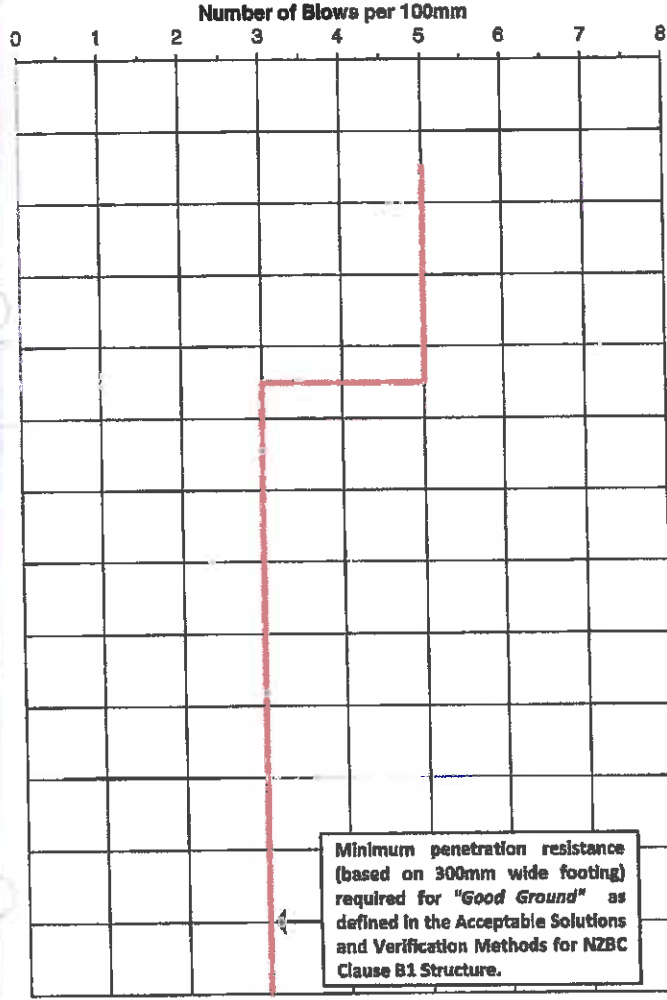
SITE INVESTIGATION RECORD

Client **GM & M Case Ltd**

Site **340 Cranford Street, Malrehaus**

Technical Category
NA - Urban Nonresidential

SCALA PENETROMETER TESTS



Minimum penetration resistance (based on 300mm wide footing) required for "Good Ground" as defined in the Acceptable Solutions and Verification Methods for NZBC Clause B1 Structure.

DEPTH

[m]
G.L.
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
3.0
3.2
3.4

BORE LOGS

Hand Auger	Machine Auger	Test Pit
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(Borehole @ 1)

Brown silty TOPSOIL Fill, some stones

Dark grey sandy SILT, moist, iron staining

Grey sandy SILT, moist to wet, iron staining

Grey silty SAND, moist to wet, iron staining

Grey SAND, wet, iron staining

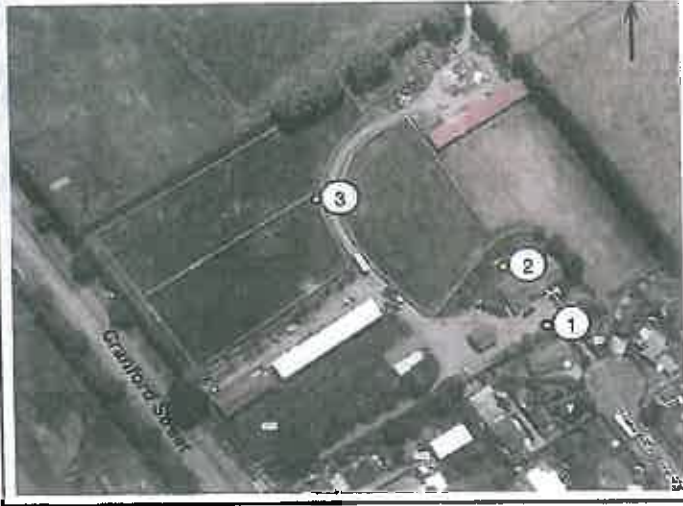
Water Table @ 1.2m

Grey silty SAND, wet to saturated

Bluish grey SAND, minor silt, saturated

STOP - Hole collapsing in saturated SAND

SITE PLAN (Not to Scale)



COMMENTS

LOGGED BY: QJF CHECKED BY: JTA

Eliot Sinclair
surveyors | engineers | planners

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Job Number
323438

Date Tested
10-Apr-2015

Page **2 of 3**

D.P. **471475**

Lot **1**

Technical Category
N/A - Urban Non-residential

SITE INVESTIGATION RECORD

Client **GM & M Case Ltd**

Site **340 Cranford Street, Mairehau**

BORE LOG @ 2

DEPTH [m]	Hand Auger	Machine Auger	Test Pit	DEPTH [m]	Hand Auger	Machine Auger	Test Pit
GL	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6.4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6.6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6.8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Dark brown silty TOPSOIL Fill, moist

Grey sandy SILT, moist, iron staining

Grey silty SAND, moist, iron staining

Grey sandy SILT, moist to wet, iron staining

Grey SILT, some sand, wet

Bluish grey silty SAND, wet

Bluish grey silty SAND, saturated

Bluish grey SILT, some sand, saturated

Brown PEAT

Water Table @ 1.0m

Brown PEAT, minor silt lenses

Grey SILT, soft, saturated

STOP - High water pressure - hard to retrieve auger

SITE PLAN (Not to Scale)



North ↑

COMMENTS

LOGGED BY:

QJF

CHECKED BY:

JTA

Eliot Sinclair

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Job Number
323438
 Date Tested
10-Apr-2015
 Page **3 of 3**

SITE INVESTIGATION RECORD

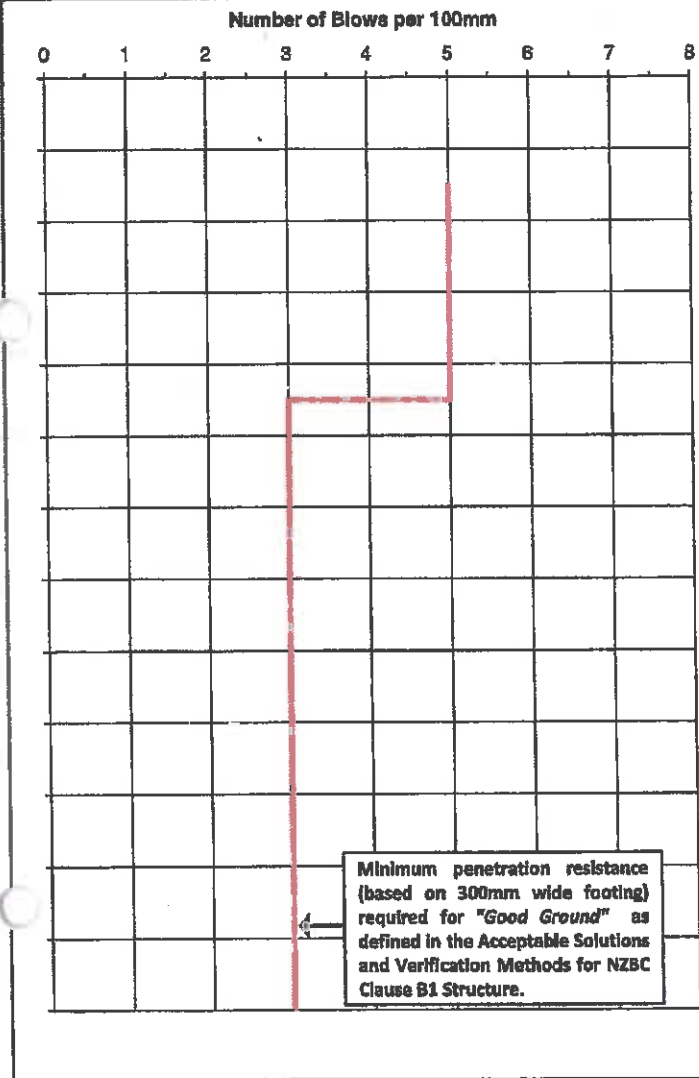
D.P. 471475
 Lot: 1

Client **GM & M Case Ltd**

Site **340 Cranford Street, Mairehau**

Technical Category
 10A - Urban Residential

SCALA PENETROMETER TESTS



BORE LOGS

DEPTH (m)	Hand Auger	Machine Auger	Test
GL	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(Borehole @ 3)

Dark brown silty TOPSOIL. Fill. some stones, some grey silt content with iron staining, moist

Dark brown silty TOPSOIL. Fill. some clasts of grey silt, moist to wet

Dark brown silty PEAT, wet

Dark brown fibrous PEAT. minor grey silt clasts, traces of charcoal, wet

Grey organic peaty SILT, very soft, peat <30%, wet to saturated, no resistance to auger

Water Table

Greyish brown silty PEAT, spongy, very soft, no resistance to auger

Grey organic SILT, very soft, saturated

Grey sandy SILT, soft, some organics <20%, saturated

Bluish grey silty SAND, saturated

Bluish grey sandy SILT, saturated

STOP - Target Depth

SITE PLAN (Not to Scale)



COMMENTS

LOGGED BY: **PLN** CHECKED BY: **JTA**

Submissions must be received no later than Friday 4 September 2015.

1

Make your submission:

Online: proposeddistrictplan.ccc.govt.nz

Email: dpreview@ccc.govt.nz

Post: District Plan Submissions Christchurch City Council PO Box 73001 Christchurch 8154

Deliver: Christchurch City Council 53 Hereford Street, Christchurch

2

Submitter Details

Full Name(s)*

GAVIN FREDERICK CASE, MARGARET MARY CASE AND MICHAEL GAVIN MAURICE CASE

I authorise the person below to represent my submission: (tick)

Submitter Agent's name

MR SIMON PRICE AT MALLEY & CO

Address for service (indicate your preference)*

C/- MALLEY & CO (MR SIMON PRICE)

Email* (tick)

simon.price@malley.co.nz

Post* (tick)

Phone number* (Telephone (03) 379 0712

Mobile number*

(0274) 144 665

Privacy Act 1993

Submissions are public information. Information on this form including your name and contact details will be accessible to the public on the Independent Hearings Panel (IHP) or the Council websites and at Council service centres and libraries. The Council is required to make this information available under the provisions of the Canterbury Earthquake (Christchurch Replacement District Plan) Order 2014. Your contact details will only be used by the Council, IHP or IHP Secretariat for the purpose of the District Plan Review process (for example to contact you about hearings and decisions on your submission). The information will be held by the Council, IHP or IHP Secretariat. You have the right to access the information and request any correction.

3

Trade Competition (All details marked with an * must be provided)

If you are a person who could gain an advantage in trade competition through making a submission, your right to make a submission may be limited by Clause 6(2) Schedule 1 of the Canterbury Earthquake (Christchurch Replacement District Plan) Order 2014.

I could gain an advantage in trade competition through this submission.*

Y N (N checked)

If you answered Yes to the above statement please complete the following.

I am directly affected by an effect of the proposal that -

(a) adversely affects the environment; and

(b) does not relate to trade competition or the effects of trade competition

Y N

4

Notes for Stage one and Stage two Submitters

Refer to submission form guidelines for notes to submitters who made submissions on Stage one and Stage two. I made a submission on Stage one or Stage two and Note 4 applies to my Stage one or Stage two submission. (Y checked)

5

Hearing (All details marked with an * must be provided)

I wish to be heard in support of my submission.*

(Y checked) N

If you answered Yes to the above statement please complete the following:

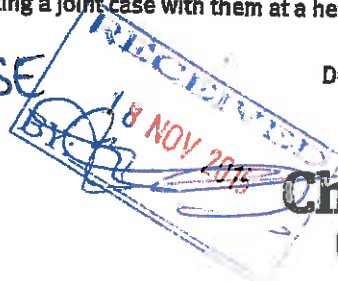
If others make a similar submission, I will consider presenting a joint case with them at a hearing.

Y (Y checked) N

Signature of submitter*

M. G. M. CASE

Date* 18 NOV 2015



Christchurch City Council

Please use the Stage three submission form to complete this form.

6 The Specific Provision that your submission relates to is: *(All details marked with an * must be provided)*
Please identify the specific provision of the proposal that your submission point relates to by providing the proposal or clause number or planning map number e.g. Proposal 17 Provision 17.2.3.2 Building Reflectivity

Proposal number* Provision number and name* Map Number*
(if applicable)

My submission is: SEE ATTACHED

I support I oppose I seek to have the above provision amended

The decision will be made: Be retained Be deleted Be amended as follows *(you must specify your amended wording):*

SEE ATTACHED

SEE ATTACHED

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FREEPOST Authority No.178



fold here

District Plan Submissions
Christchurch City Council
PO Box 73001
Christchurch 8154

**FURTHER SUBMISSION OF CASE FAMILY IN RELATION TO
PROVISIONS OF STAGE 3 OF THE CHRISTCHURCH
REPLACEMENT DISTRICT PLAN**

1. Introduction

- 1.1 The submitters G F Case, M M Case and M G M Case ("the Case family") are the owners of land and improvements situated at 340 Cranford Street, Mairehau, Christchurch, being Lot 1 DP 471475 having a land area of 2.2650 hectares ("the Case family land").
- 1.2 The Case family filed submissions in relation to both Stages 1, Stage 2 and Stage 3 of the Christchurch Replacement District Plan ("the Proposed Plan"). A copy of the Stage 3 submission (without attachments) is **attached** as **Attachment 1**. In the Stage 3 submission, the Case family sought the rezoning of its property to Residential Suburban.

2. Provisions of Stage 3 of the Proposed Plan requiring change

Relevant provisions

- 2.1 Planning Map 25 provides that the Case family land is subject to a **High Flood Hazard Management Area** overlay. This overlay was introduced when Stage 3 was notified. A copy of the relevant part of the planning map is **attached** as **Attachment 2**.

Decision sought

- 2.2 Planning Map 25 should be amended so as to remove the **High Flood Hazard Management Area** overlay from the Case family land.

3. Background to request for change

Zoning request

- 3.1 As will be noted from the content of the three submissions, the Case family wishes to have its land zoned Residential Suburban. The earlier submission in relation to the provisions of Stage 3 of the Christchurch Replacement District Plan sought this zoning.

Natural hazards decision / Stage 1

- 3.2 The Case family members filed a submission in relation to certain natural hazard provisions contained in Stage 1 of the Proposed Plan which affected their property. They sought the removal of two natural hazard overlays, both of which potentially impeded development, as follows:-

- (i) Floor Level and Fill Management Area;
- (ii) Flood Ponding.

- 3.3 The matter proceeded to a hearing before the Independent Panel. It will be noted that in the decision on natural hazards (Stage 1) released by the Independent Hearings Panel on 17 July 2015 there is the following:-

"The Case family (957) : Cranford Street

[454] The Case family submitted in relation to their property at Cranford Street just north of McFaddens Road on Planning Map 25. This is within FLFMA and Flood Ponding overlays.

[455] Mr Hughes-Johnson QC, counsel for the Case family, informed us that the family accepted the location of the overlays on their property at Cranford Street, but continued to seek more flexible policies to enable the development of their property."

- 3.4 The result of the above hearing was that Policy 5.2.2.1d was amended by the addition of the footnote ...

"This Policy does not foreclose compensatory storage being provided for where filling is required."

4. High Flood Hazard Management Area overlay / Case family seeks removal

- 4.1 The presence of the High Flood Hazard Management Area overlay, introduced when Stage 3 was publicly notified, and affecting the Case family land, was overlooked when the primary submission was lodged in relation to Stage 3, seeking a change to the zoning of the Case family land from RuUF to Residential Suburban. The Case family wishes to argue for the removal of the relevant overlay affecting the Case family land.

- 4.2 The following matters are relied upon in support of the view that the overlay should be removed from the Case family land:-

- (i) The presence of the High Flood Management Area overlay, having regard to the constraints on development which are associated with that overlay, unreasonably restricts the development of the Case family land.

Particulars

- (a) Policy 5.2.2.1 of the Proposed Plan provides as follows

"Avoid subdivision, use or development in areas where there is a high flood hazard where it will increase the potential risk to people's safety, wellbeing and property."

Given the strict interpretation accorded to the word "avoid" in the recent decision of the Supreme Court in *Environmental Defence Society Inc v The New Zealand King Salmon Co Limited* [2014] 1 NZLR 593, this policy represents a significant hurdle to any development.

- (b) There are no permitted, controlled, restricted discretionary, discretionary or discretionary activities in the High Flood Hazard Management Areas. All activities including the

erection of new buildings and subdivision are non-complying activities.

- (c) In Chapter 11 of the Canterbury Regional Policy Statement, Policy 11.3.1 provides for the avoidance of inappropriate development in high hazard areas, again being a constraint to the proposed development of the Case family land.
- (ii) The area which is the subject of the overlay has been crudely defined and cannot be taken to represent the actual areas which are likely to flood. For example when the map is examined, affecting the Case family land, there are small squares which are intended to indicate flooding areas where areas immediately adjacent to the small squares are not shown as likely to flood. Given the constraints associated with the overlay, further investigations need to be made to establish with precision the boundaries of the area the subject of the overlay.
- (iii) The presence of the overlay represents an unreasonable constraint on the ability of the Case family to develop its land in circumstances where there is no countervailing public benefit associated with the imposition of the overlay.
- (iv) Having regard to the background to the retention by the Case family of the Case family land, associated with the sale of the balance of its land to the Christchurch City Council for the purpose of public works, it is unreasonable for there to be a significant constraint on the ability to develop the Case family land which will occur if the High Flood Hazard Management Area overlay remains.
- 4.3 Alternatively the overlay affecting the Case family land should be removed as part of a smoothing exercise such as that as was adopted in Decision 6 at para 480 where it was stated

"Smoothing of flooding hazard lines

[480] Council witnesses explained that it would be possible to "smooth" the boundary lines of the FLFMA in a manner that would not result in any addition of any sites to the FLFMA. By minute, we directed the Council to provide an updated set of planning maps to implement this refinement. As a number of further changes will be required to those maps to implement changes made by this decision, we have made a direction to the Council to provide us with a further updated set of maps."

When one looks at the line defining the extremity of the High Flood Management Area, it clearly calls for "smoothing". It is submitted that this is unlikely to have any repercussions in terms of the fulfilment of the overall policy relating to the margins of the High Flood Hazard Management Areas.

5. **Decision sought**

- 5.1 The relevant planning map should be amended in accordance with the above submission to provide for the removal of the High Flood Management Hazard Area overlay from the Case family land.

4 PM25

5.2 Alternatively should the above amendment not be made removing the overlay (contrary to the position of the Case family) the relevant planning map should be amended to provide for the alteration of the High Flood Hazard Management Area overlay in respect of the Case family land to reflect the matters referred to in paragraph 4 above.

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