

12 August 2014

Fulton Hogan Land Development Limited
 29 Sir William Pickering Drive
 PO Box 39185
 Christchurch 8545
 Attn: Greg Dewe

Dear Greg,

**FULTON HOGAN LAND DEVELOPMENT LIMITED STAGE 5 ROSEMERRYN SUBDIVISION
 GEOTECHNICAL COMPLETION LETTER REPORT – RESOURCE CONSENT 135618
 Our Ref: 224464**

This geotechnical completion letter report is submitted in accordance with Section 12.4.1 of the Selwyn District Council Engineering Code of Practise.

1. Introduction

As part of the Fulton Hogan Land Development Limited (FHLD) Rosemerryn Subdivision Development located at Lincoln, Aurecon has completed a geotechnical investigation and assessment for Stages 3 to 6. This is detailed in the Aurecon geotechnical report “*Geotechnical Assessment Report Rev 3, Rosemerryn Farm Stages 3 to 6, Fulton Hogan Land Development Limited*”, dated 3 May 2012.

The report was issued following the publication of the Ministry of Business Innovation & Employment (MBIE) formerly the Department of Building and Housing, guidelines in November 2011, which define the new Technical Category zoning and the liquefaction induced deformation limits for each Technical Category.

The categories and corresponding criteria are summarised as follows:

- **Technical Category 1 (TC1)** – Future land damage from liquefaction is unlikely, and ground settlements are expected to be within normally accepted tolerances.
- **Technical Category 2 (TC2)** – Minor to moderate land damage from liquefaction is possible in future large earthquakes.
- **Technical Category 3 (TC3)** – Moderate to significant land damage from liquefaction is possible in future large earthquakes.

For the Canterbury region, the MBIE has released a new classification system for residential ‘Green Zone’ land on the flat in regard to liquefaction susceptibility. These are summarised below:

Table 1: Liquefaction Deformation Limits and House Foundation Implications

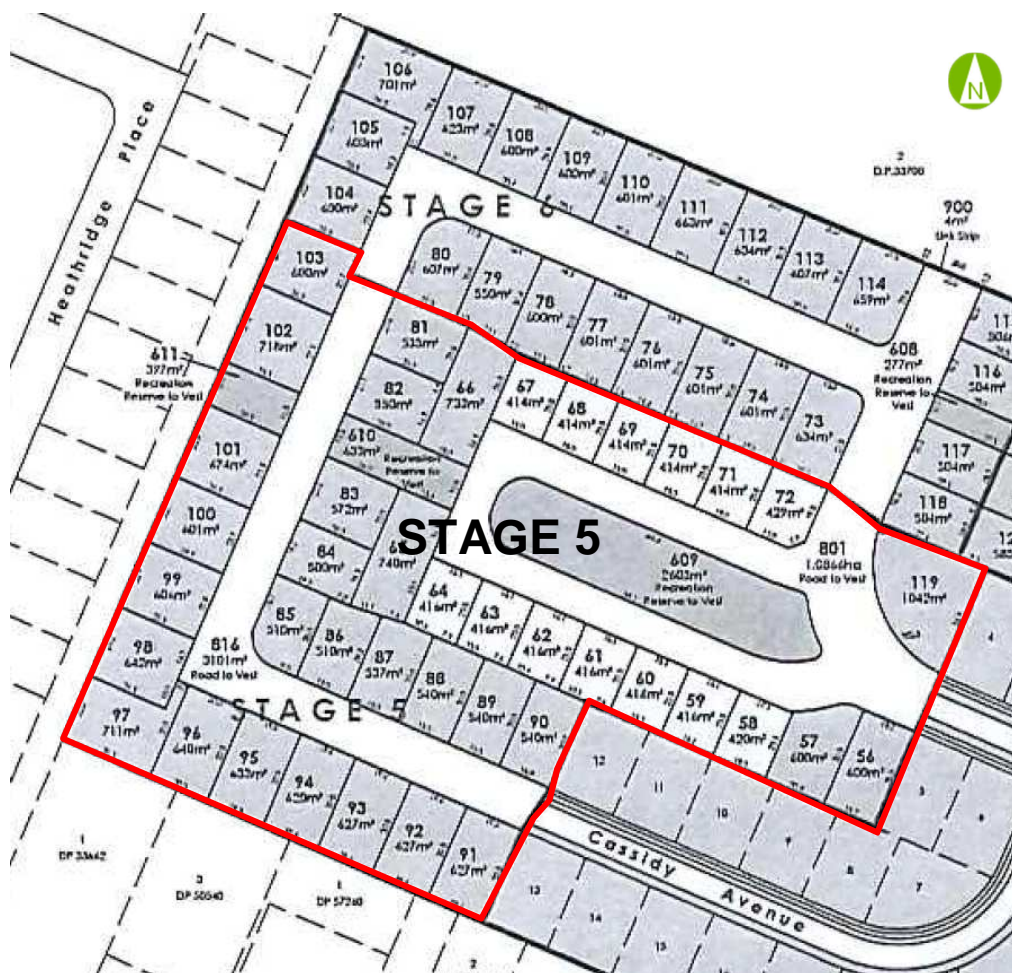
Technical Category	Liquefaction Deformation Limits				Likely Implication for House Foundations (subject to individual assessment)
	Vertical		Lateral Spread		
	SLS	ULS	SLS	ULS	
TC1	15mm	25mm	Nil	Nil	Standard NZS3604 type foundations with tied slabs
TC2	50mm	100mm	50mm	100mm	Enhanced foundation solutions
TC3	>50mm	>100mm	>50mm	>100mm	Site specific foundation solution

2. Liquefaction Analysis and Results

The liquefaction analysis for Stage 5 was based on the CPT testing carried out as part of the geotechnical investigations for the larger subdivision. The geotechnical investigation information used to assess Stage 5 is part of a large group of geotechnical information and only the tests that are relevant for this stage has been assessed. Consideration was given to information and data from outside the stage boundary when assessing geotechnical hazards and issues.

Based on the liquefaction and lateral spreading results, we consider Stage 5 falls within the liquefaction deformation limits of Technical Category TC2.

Figure 1: Stage 5 Rosemerryn Subdivision



Taken from: Davie Lovell Smith Stages 4-8 Plan for Rosemerryn Subdivision, Drawing No. E. 17975 Rev22 Dated Nov 2013

Table 2: Inferred Technical Category of Lots within Stage 5

LOT	Technical Category (Based on calculated liquefaction deformation limits)	LOT	Technical Category (Based on liquefaction deformation limits)
56	TC2	85	TC2
57	TC2	86	TC2
58	TC2	87	TC2
59	TC2	88	TC2
60	TC2	89	TC2
61	TC2	90	TC2
62	TC2	91	TC2
63	TC2	92	TC2
64	TC2	93	TC2
65	TC2	94	TC2
66	TC2	95	TC2
67	TC2	96	TC2
68	TC2	97	TC2
69	TC2	98	TC2
70	TC2	99	TC2
71	TC2	100	TC2
72	TC2	101	TC2
81	TC2	102	TC2
82	TC2	103	TC2
83	TC2	119	TC2
84	TC2		

For Technical Category TC2, MBIE has recommended foundation systems for residential houses in their publication '*Repairing and rebuilding houses affected by the Canterbury earthquakes*' dated December 2012. Schematics and typical cross sections of these foundation systems are presented in the MBIE publication. These are discussed in depth in our geotechnical investigation report.

As required under the new MBIE guidelines for detailed house design, a site specific shallow geotechnical assessment shall be carried out by a suitability qualified chartered engineer with experience in residential house development.

3. Limitations

The contents of this letter are for the sole use of the Client and no responsibility or liability will be accepted to any third party. Information or opinions contained within this letter may not be used in other contexts or for any other purposes without our prior agreement. The comments in this letter are based on our investigations of the site for the sole purposes of the geotechnical aspects only, as requested by the Client. Only a finite amount of information has been collected and this letter does not purport to completely describe all the site characteristics and properties. The extent of our investigations and the results of all the tests carried out are as described in the geotechnical report for Stages 3 to 6 "Geotechnical Assessment Report Revision 3, Rosemerryn Farm Stages 3 to 6, Fulton Hogan Land Development Limited", dated 3 May 2012.

We trust this meets your requirements and if there are any further queries please do not hesitate to contact us.

Yours sincerely



Robert Smith
Geotechnical Engineer



Dr Jan Kupec
Technical Director

Attached – SDC Approved Subdivision Plan for Rosemerryn Subdivision

NOTES :

- 1) Areas and dimensions are subject to final survey and deposit of plans.
- 2) Service easements to be created as required.
- 3) This plan has been prepared for subdivision consent purposes only. No liability is accepted if the plan is used for any other purpose.
- 4) Any measurements taken from information which is not dimensioned on the electronic copy are at the risk of the recipient.
- 5) This plan is subject to the granting of subdivision consent and the plan may be altered or cancelled as a proposal unless such limitations have been specifically consented to by the relevant authorities.

Stages	Residential Lots
4	25
5	41
6	23
7	28
8A	28
8B	25

Total Area: 79.1055ha
Composed In: CFR 608420



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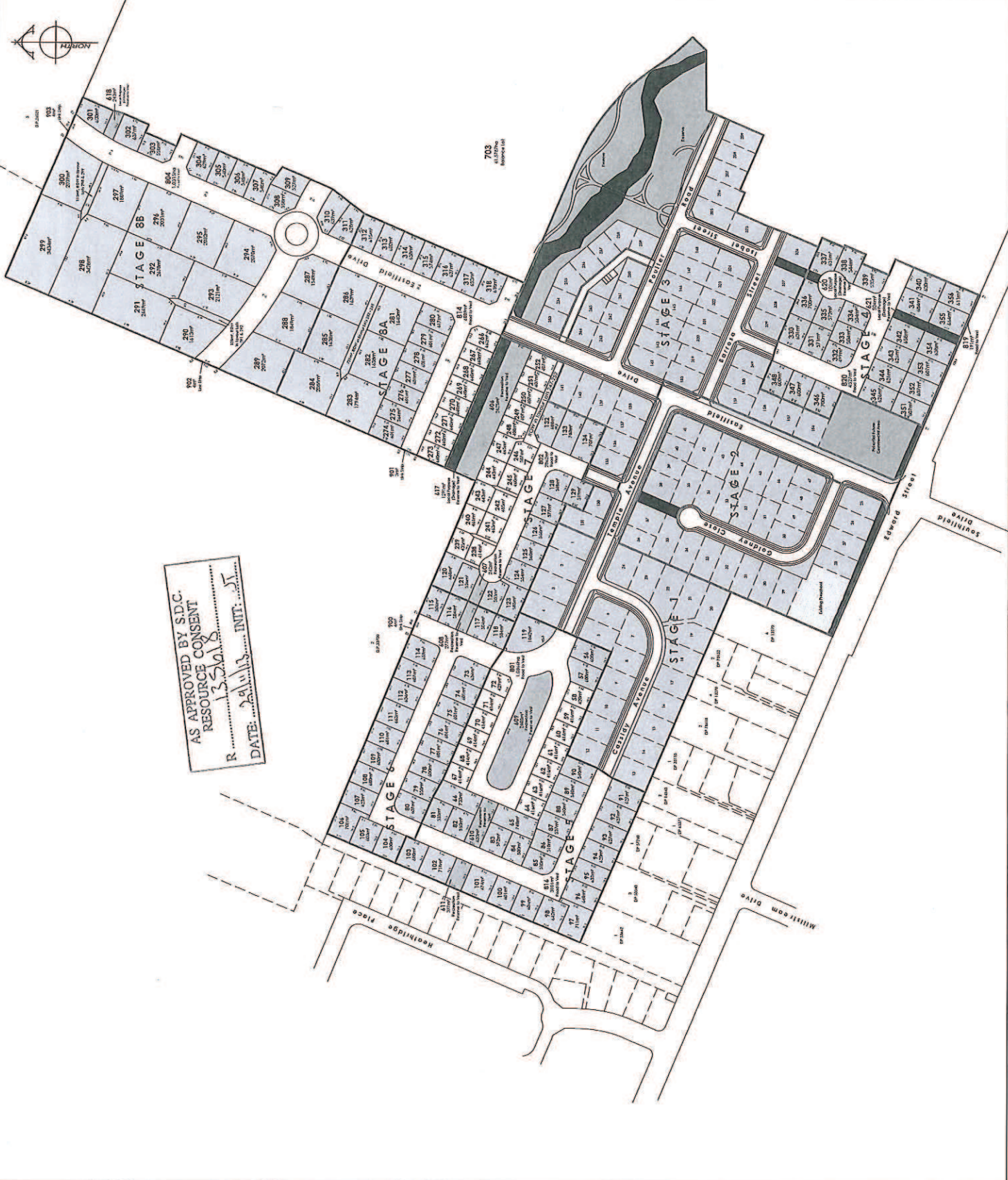
JOB TITLE :
Fulton Hogan Limited
Edward Street, Lincoln

SHEET TITLE :
Proposed Subdivision of
Lot 703 DP461935

DRAWING STATUS
Stages 4 - 8

SCALE : 1:25000A1
DATE : November 2013

CAD FILE : E:\1725\subdiv\1725\SUBDIV\PROJ\1725.dwg
DRAWING NO. : E17975
SHEET NO. : R22



AS APPROVED BY S.D.C.
RESOURCE CONSENT
R 1352018
DATE: 24/11/13 INIT: J