

2021-08-05

Greg Dewe
Operations Manager
Fulton Hogan Land Development Limited

Via Email: Gregory.dewe@fultonhogan.com

Dear Greg

Rosemerryn Subdivision – Stage 15 Geotechnical Completion Letter

1 Introduction

Fulton Hogan Land Development Limited (FHL) have over the past decade developed the Rosemerryn Subdivision in Lincoln. FHL have engaged Aurecon New Zealand Limited to provide geotechnical engineering services for the project. Aurecon previously completed a geotechnical investigation and assessment for Stages 10 to 18 of the proposed subdivision. This assessment is detailed in the report *Rosemerryn Subdivision, Lincoln, Stage 10 to 18 Geotechnical Investigation Report Rev3*, dated 25 September 2015.

This geotechnical completion letter report is submitted to fulfil the geotechnical requirements of Condition 21 of the Selwyn District Council Resource Consent RC185574 for Stage 15 of the Rosemerryn Subdivision.

2 Liquefaction Hazard & Technical Category Hazard Assessment

2.1 Introduction

Technical Category zoning and liquefaction induced deformation limits are specified the Ministry of Business, Innovation and Employment (MBIE) Guidelines (2014). Aurecon's liquefaction hazard assessment undertaken in *Rosemerryn Subdivision, Lincoln, Stage 10 to 18 Geotechnical Investigation Report Rev3*, was completed in accordance with the MBIE Guidelines (2014).

The definitions for the respective technical category classifications are:

- **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.

Vertical and horizontal deformation limits have been assigned to each technical category classification. These deformation limits and the required foundations are given in Table 1 below.

Table 1 Liquefaction Deformation Limits and Residential Foundation Implications

Technical Category	Index 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 are acceptable, subject to lot specific shallow geotechnical investigation.
TC2	50mm	100mm	50mm	100mm	MBIE enhanced foundation solutions.
TC3	>50mm	>100mm	>50mm	>100mm	Site specific foundation solution.

2.2 Technical Category Assessment

Aurecon understands from the project civil engineers (Davie Lovell Smith) that earthworks within Stage 15 has comprised only minor cutting and filling less than 0.5m in thickness. Therefore, Aurecon considers the technical category assessment completed in *Rosemerryn Subdivision, Lincoln, Stage 10 to 18 Geotechnical Investigation Report Rev3* remains relevant for the completed lots in Stage 15. Based on this, the lots in Stage 15 meet the following technical category classification:

- Lot 579 fulfils the requirement of a TC1 Classification.
- Lot 544 to 578 and 580-585 fulfil the requirement of a TC2 Classification.
- Lot 7006 is a road reserve which will be vested to Selwyn District Council and does not require a technical category classification.

3 Surficial Soft Soils

Investigations undertaken by Aurecon indicate soft to firm silty and clayey soils may be encountered at shallow depths across the entire Stage 15 of Rosemerryn Subdivision.

Thus, despite Lot 579 meeting the requirements of Technical Category 1 from a liquefaction hazard perspective, shallow NZS3604 type foundations are unlikely to be suitable where soft surficial soils are present as 300kPa shallow bearing capacity and subsequently the definition of 'Good Ground' in accordance with NZS3604 is unlikely to be met based on historical investigations undertaken by Aurecon. Therefore, Aurecon recommend that site specific shallow ground investigations are completed at building consent stage for Lot 579 and all other allotments of Stage 15. Aurecon suggest that, where required, the presence of soft surficial soil can be readily accommodated by a TC2 type foundation system, pending detailed foundation design at the building consent stage.

4 Recommendations

Due to the identified underlying ground conditions, lot and building specific shallow geotechnical investigations shall be undertaken for all lots in Stage 15 in accordance with NZS3604:2011.

This report is not intended to be used for detailed design of site-specific foundations for any structures on Stage 15, as it is not suitable to support a building consent application.

Site specific investigations are required on all lots at building consent stage.

5 References

Aurecon, 2015. *Rosemerryn Subdivision, Lincoln, Stages 10 to 18 Geotechnical Investigation Report, Rev3* - dated 25 September 2015. Aurecon New Zealand Limited, Christchurch, New Zealand.

MBIE, 2012. *Repairing and rebuilding houses affected by the Canterbury earthquakes*. Ministry of Business, Innovation and Employment, Wellington, New Zealand – December 2012.

MBIE, 2014. *Repairing and rebuilding houses affected by the Canterbury earthquakes*. Ministry of Business, Innovation and Employment, Wellington, New Zealand – October 2014.

6 Explanatory Statement

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 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 presented in the geotechnical report for Stages 10 to 18 "*Rosemerryn Subdivision, Lincoln, Stages 10 to 18 Geotechnical Investigation Report*", dated 25 September 2015.

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

Authored

Verified and Approved

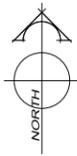


Kieran Foote CEngNZ CPEng
Geotechnical Engineer



Dr Jan Kupec CEngNZ CPEng IntPE
Principal, Ground Engineering

Enc: Engineered Fill As-Built Plan for Rosemerryn Subdivision Stage 15



AMENDMENTS:		
AMENDMENT	DATE	DESCRIPTION

- NOTES:**
- 1) This plan has been prepared for Earth Fill asbuilt purposes only. No liability is accepted if the plan is used for any other purpose.
 - 2) Any measurements taken from information which is not dimensioned on the electronic copy are at the risk of the recipient.
 - 3) All roading and footpath information is asbuilt.
 - 4) Origin of Levels
SS 11A SO 797
Brass Plaque
RL=9.42m
- All levels in terms of Lyttelton Vertical Datum 1937.
Levels pre 2010 & 2011 Canterbury earthquakes.

LEGEND

CONTOURS SHOWN ARE APPROXIMATELY
CUT (-ve) AND FILL (+ve) AT
0.1m INTERVALS.

	CUT
	FILL ≥ 0.2m

ASBUILT KERB

ASBUILT FOOTPATH



116 Wrights Road P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Website: www.dls.co.nz E-mail: office@dls.co.nz

JOB TITLE:
Rosemerryn - Stage 15

SHEET TITLE:
Earthfill Asbuilt

DRAWING STATUS:
Asbuilt

SCALE: 1:500@A1 DATE: July 2021
1:1,000@A3

DRAWING No.:	SHEET No.:	DRAWN: DG
E20198.AB.EF01	R0	