

02 September 2026

Document Ref: CHC2026-0002AD | Rev 1

Earlsbrook West Residential Ltd
Level 2, ASB House
166 Cashel Street, Christchurch

RE: LOT 449 GEOTECHNICAL REPORT EARLSBROOK SUBDIVISION STAGE 2, LINCOLN

1.0 INTRODUCTION

Earlsbrook West Residential Limited has engaged CMW Geotechnical (NZ) Limited (CMW) to provide lot specific geotechnical reports for Stage 2 of the Earlsbrook Subdivision in Lincoln.

The purpose of this report is to provide foundation options and recommendations for residential development on Lot 449. This report can be included within an application for residential building consent.

The scope of work and associated terms and conditions of our engagement were detailed in our Short Form Agreement (SFA) referenced CHC2026-0002AA, dated 4 February 2026.

Key references include:

- Ministry of Business, Innovation and Employment (MBIE), Repairing and rebuilding houses affected by the Canterbury earthquakes¹, published December 2012.
- MBIE, Updates and clarifications to the residential guidance², last updated June 2018.
- Tetra Tech Coffey, Geotechnical Assessment Report³, issued 10 June 2025.
- CMW, Earthworks Completion Report⁴, issued August 2026.
- Inovo, As-Built Engineer Fill Plan⁵, issued June 2026.

¹ <https://www.building.govt.nz/building-code-compliance/canterbury-rebuild/repairing-and-rebuilding-houses-affected-by-the-canterbury-earthquakes>, accessed September 2026.

² <http://www.building.govt.nz/building-code-compliance/canterbury-rebuild/updates-clarifications-residential-guidance/>, accessed September 2026.

³ Tetra Tech Coffey (NZ) Limited, Earlsbrook Subdivision Stages 2 and 3, Geotechnical Assessment Report, dated: 10/06/2025.

⁴ CMW Geotechnical NZ Ltd, Earlsbrook Subdivision – Stage 2 South, Earthworks Completion Report, dated August 2026.

⁵ Inovo Projects Limited, As-Built Engineer Fill Plan, drawing nos: 15721-S1-AB 2000 to 2009, rev: 4, dated: 29/06/2026.

2.0 LOT 449: GEOTECHNICAL REPORT

Table 1: Geotechnical Summary

Item	Comment
Development Proposal	Domestic dwelling to be designed (by others) to NZS 3604:2011, incorporating relevant supplementary recommendations issued by the MBIE.
Earthworks & Ground Preparation	Earthworks have been completed across the entirety of the lot and consisted of: removal of topsoil and unsuitable material; placement and compaction of engineered fill to design levels; and placement of topsoil. CMW conducted observations during construction, reviewed contractor provided quality assurance information, and have confirmed that earthworks were completed as specified in our ECR⁴.
Site Investigation	CMW completed 1 hand augered borehole (HA) within the lot to a maximum depth of 0.6mbgl, and 2 dynamic cone penetrometer tests (DCPs) to a maximum depth of 0.9mbgl. These investigation locations are shown within the attached plan.
Ground Conditions	Based on our lot specific investigation and review of the <i>Inovo As-Built Engineer Fill Plans</i>, we expect the ground profile to comprise 0.3m of topsoil underlain by engineered fill, followed by natural soils. Topsoil depths away from the hand auger location may vary. The Tetra Tech Coffey Geotechnical Assessment Report³ for Stage 2 of the Earlsbrook Subdivision describes a seasonal high groundwater starting from approximately 1.0 to 2.5mbgl, with seasonal lows up to 1.5m lower. The HA completed within the lot to a maximum depth of 0.6mbgl did not encounter groundwater.
Bearing Capacity	A geotechnical ultimate bearing capacity (GUBC) of 200kPa may be adopted from below topsoil, which is expected to be 0.3mbgl. See Ground Preparation section below. CMW should be contacted for further advice if the foundation design requires a static ultimate bearing capacity in excess of 200kPa.
Liquefaction Hazard Assessment	A liquefaction assessment³ has been carried out by Tetra Tech Coffey for Stage 2 of the Earlsbrook Subdivision. Lot 449 has been assessed to have TC1-like liquefaction performance after completion of subdivision development. The future land performance expectation for a TC1 site is “<i>liquefaction damage is unlikely in a future large earthquake</i>” (MBIE Table 3.1)^{1, 2}.
Foundation Requirements	Use foundations provided in NZS 3604:2011 Timber Framed Buildings, as modified by MBIE amendments and guidance documents, along with specific design to accommodate the GUBC noted above. Due to varying fill types within this lot, the minimum foundation requirements for a concrete slab-on-grade foundation is outlined in section 5.3.1 of the MBIE guidance, with an overview of the TC2 design process shown in Figure 5.2. In accordance with NZS1170.5, Section 3.1.3, a Site Subsoil Class of “Class D – Deep Soft soil sites” may be assumed for this site. Any development (e.g. foundations) planned within a 45-degree zone of influence above pipe inverts will require engineering input.
Ground Preparation	Topsoil is required to be excavated prior to installing the foundations. It is recommended that the foundation excavation is proof rolled prior to placing concrete. This ensures the founding soils are tight and free of soft or loose material. If required, engineered backfill (e.g. GAP40) should be placed in layers to reach the design founding level. Each layer should have a maximum compacted thickness of 200mm and be compacted to achieve 95% of its maximum dry density (MDD).
Ground Inspection	We recommend the good practice of having a competent, suitably experienced person to confirm that the ground at the actual foundation location is consistent with the ground conditions

Item	Comment
	encountered during earthworks construction (i.e. as reported above – see <i>Ground Conditions</i>). CMW can provide this service.

3.0 CLOSURE

This report has been prepared for use by Earlsbrook West Residential Ltd and future owners of the Lot in relation to Stage 2 of the Earlsbrook Subdivision in accordance with the scope, proposed uses and limitations described in the report. Should you have further questions relating to the use of your report please do not hesitate to contact us.

Where a party other than Earlsbrook West Residential Ltd seeks to rely upon or otherwise use this report, the consent of CMW should be sought prior to any such use. CMW can then advise whether the report and its contents are suitable for the intended use by the other party.

For and on behalf of CMW Geosciences

Prepared by:



Nathan Cash
Geotechnical Engineer

Reviewed and authorised by:

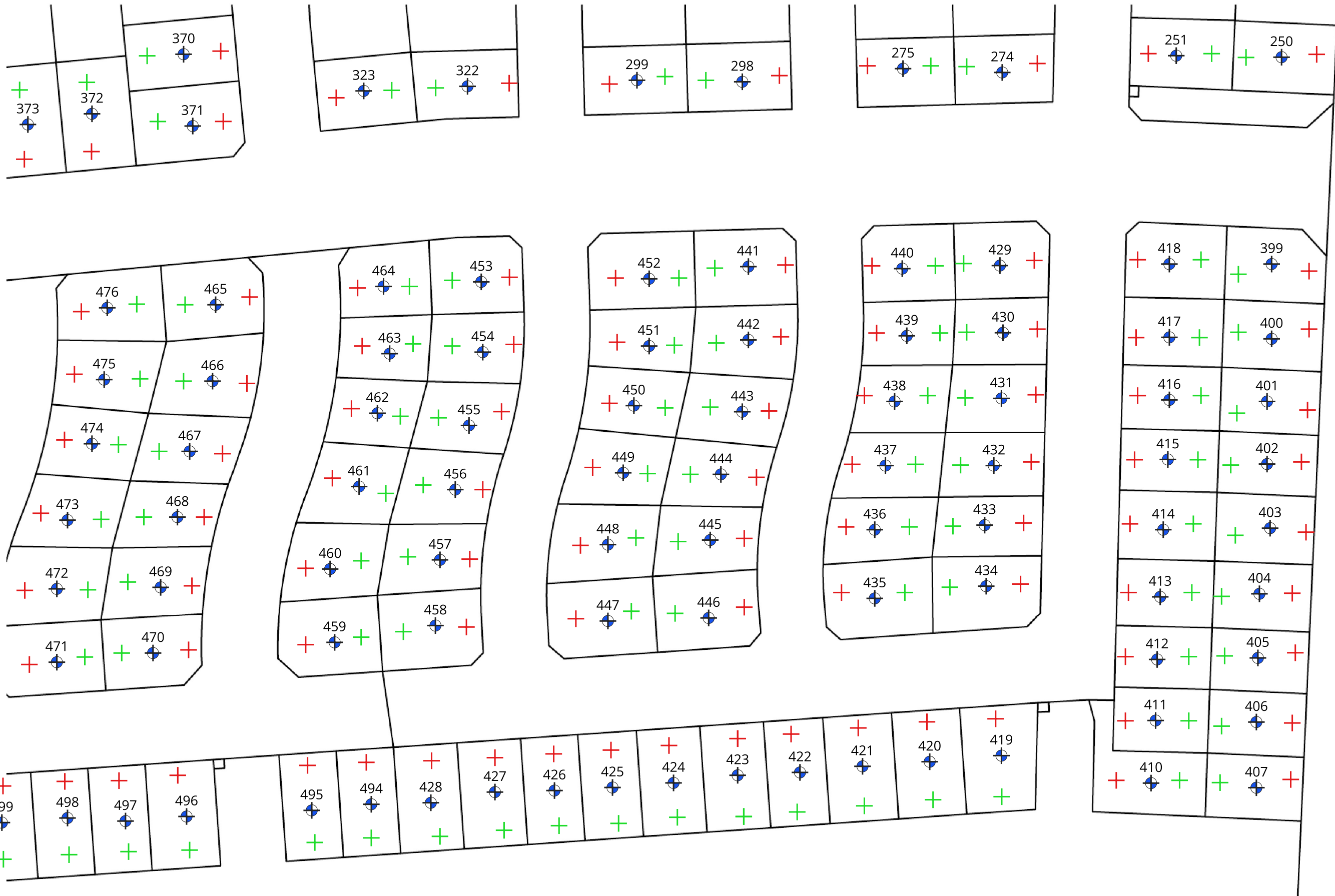


Kori Lentfer
Principal Engineering Geologist CMEngNZ,
PEngGeol

Distribution: 1 electronic copy to Earlsbrook West Residential Ltd via email
Original held at CMW Geosciences

Attachments: Geotechnical Investigation Plan
Hand Auger logs





LEGEND:
Test Locations
+ DCP1
+ DCP2
• HAND AUGER TEST LOCATION

NOTES:
1. Hand Auger locations are approximately at center of the lot.
2. Map not to scale

 CMW Geosciences Great People Practical Solutions	CLIENT: Earlsbrook West Residential Ltd	DRAWN: PR	PROJECT: CHC2026-0002
	PROJECT: Earlsbrook Land Development	CHECKED: NC	DRAWING: 01
	TITLE: LSGR Investigation Plan	REVISION: 0	SCALE: NTS
		DATE: 08/05/2026	SHEET: A3L

HAND AUGER BOREHOLE LOG - HA-449

Client: Earlsbrook West Residential Ltd
Project: Earlsbrook Land Development
Site Location: Lincoln
Project No.: CHC2026-0002
Date: 16/06/2026
Borehole Location: Refer to Site Plan



CMW Geosciences
Great People | Practical Solutions

Logged by: PN Checked by: HG Scale: 1:15 Sheet 1 of 1

Position: 1557019.2mE; 5165929.6mN Projection: NZTM 2000 Survey Source: Hand-held GPS
Elevation: m Datum: NZVD2016

Groundwater	Samples & Insitu Tests		RL (m)	Depth (m)	Graphic Log	Material Description Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/ geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)							
	Depth	Type & Results							DCP01				DCP02			
									5	10	15	5	10	15		
					ML: SILT : with trace of fine to medium grained gravels, dark brown, low plasticity. (Topsoil)	D to M	VSt to H	3				2				
								3				2				
					5						2					
					8						7					
					4						5					
					6						5					
					6						4					
					7						19					
					11						20					
					20											

Termination Reason: Refusal on gravel.
Shear Vane No: DCP No: 39
Remarks: Groundwater not encountered.