



Lot Specific Geotechnical Report - SAMPLE

Stage 4, Sterling Park Subdivision, Prebbleton,
Selwyn District, Canterbury

Suburban Estates Ltd

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1. Introduction

CGW Consulting Engineers have been engaged by Suburban Estates Ltd, to undertake a geotechnical investigation and report for Lot ##, Sterling Park Subdivision, Selwyn District, Canterbury. This report can be relied upon as part of the residential development of this allotment.

The site has been specifically investigated and the CGW Consulting Engineers subdivision report should be referred to in conjunction with this report. The purpose of this investigation is to confirm the shallow bearing capacity and soils as well as provide foundation recommendations.

This report summarises our findings and recommendations and may be used to support a Building Consent application to Selwyn District Council. Our geotechnical limitations are presented in Appendix A.

2. Site Information

2.1. Site Description

The subject site, Lot ##, Sterling Park Subdivision is located approximately 0.7 km southwest of Central Prebbleton. The site (Depicted in Figure 1) is located within the final stage of Sterling Park subdivision. The wider subdivision is located to the west of Springs Road.

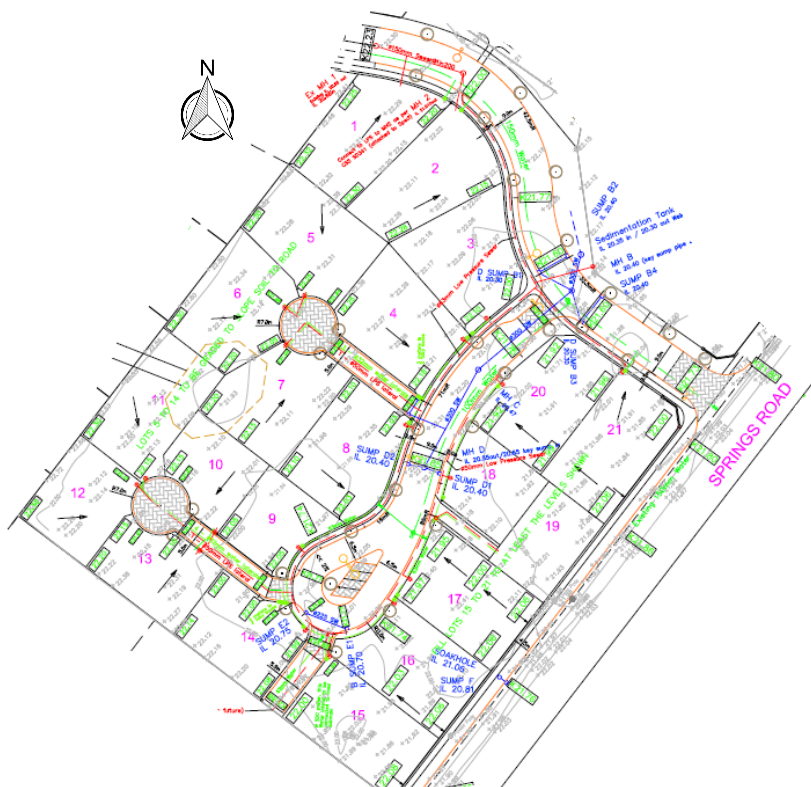


Figure 1: Site Location

2.2. Land Classification

Based on the subdivision geotechnical report, the site has been assessed as being consistent with a Technical Category TC1 area (Grey) as per the Ministry of Business Innovation and Employment (MBIE) Technical Category classification.

2.3. Site Specific Investigation

Following an initial site walkover, the field investigations comprised:

- Two hand augerholes and two Dynamic Cone Penetrometer Tests undertaken from the surface.

A visual-tactile field classification of the subsoils encountered during hand augerhole drilling was carried out in accordance with 'Guidelines for the Field Classification and Description of Soil and Rock for Engineering Purposes' (NZGS, 2005) and Scala Penetrometer testing was carried out in accordance with NZS 4402:1988, Test 6.5.2, 'Dynamic Cone Penetrometer'.

Investigation details are provided in Table 3. The tests were positioned to provide coverage of the site considering site access and the proposed dwelling footprint. Test locations are approximate only.

Test ID	Termination Depth (m bgl)	Further Information (Groundwater, piezometer, etc.)
HA01	3.0	Groundwater Encountered at 2.1 m
HA02	3.0	No Groundwater Recorded
DCP01	3.0	No Groundwater Recorded
DCP02	3.0	No Groundwater Recorded

All test locations are presented on drawing 18258/1 in Appendix B with hand augerhole and Dynamic Cone Penetrometer results showing detailed soil descriptions and blows per 100 mm penetration are presented in Appendix C.

2.4. Site Subsurface Conditions

Subsurface conditions based on those encountered within the hand augerholes is given in Table 4.

Soil Type	Depth to bottom of Layer (m)	Layer Thickness (m)	DCP Reading (Blows/100mm)	Relative Density / Consistency
SILT (Topsoil)	0.3	0.3	2 - 9	Soft to firm
SILT and Sandy SILT (Fill)	0.8 – 1.0	0.5 – 0.7	2 - 16	Soft to stiff
SAND	3.0	1.1 – 1.5	2 - 17	Loose to Dense

2.5. Groundwater

Based on previous data collected for the site we consider groundwater depths to be approximately greater than 6 m bgl.

2.6. Geotechnical Ultimate Bearing Capacity

With reference to the Scala Penetrometer results, An Ultimate Bearing Capacity (UBC) of 300kPa is available at 0.3 m to 0.5m bgl. In accordance with the principles of AS/NZS1170:2002 Section 3.2, a Strength Reduction Factor of $\Phi = 0.5$, as per B1/VM4 Section 3.5, should be applied to the Ultimate Bearing Capacity, which should then equal or exceed the factored Ultimate Limit State design actions.

Most of the allotments within this stage of the subdivision will likely have 300kPa available at a similar depth of 0.3m depth.

3. Foundation Recommendations

In this section we will provide both an NZS 3604 solution and an alternative concrete slab solution similar to a MBIE Option 4 foundation system (waffle slab).

3.1. NZS3604 Foundation Solution

We consider TC1 NZ3604 foundations are suitable for the proposed development with Type A or Type B foundations founding at 0.35m to 0.55m depth where a minimum 300 kPa UBC is available. A slab on grade NZS3604 Type C foundation system is also suitable with B1/AS1 modifications.

3.2. Enhanced Foundation Solution

Alternatively, we recommend an enhanced foundation solution in accordance with Section 5 of the MBIE Guidelines. Whilst any of the MBIE Guidance Section 5 enhanced foundation solutions would be suitable, we recommend an Option 4 waffle slab solution to be a suitable alternative. This Waffle Slab foundation system would require founding the foundations at least 0.3m depth on natural ground or engineered fill.

Any further placed fill should comprise well graded crushed aggregate (CAP65 to Christchurch City Council standard specifications) and should extend at least 500 mm beyond the edge of the foundations. The granular fill should be compacted to achieve no less than 95% maximum dry density as achieved with a vibratory hammer compaction curve. Excavation sidewalls should be battered no steeper than 1H:1V to a maximum depth of 1 m bgl.

4. Construction Considerations

4.1. Site Formation Works

All earthworks should be carried out to the requirements of NZS 4431:1989, 'Code of Practice for Earth filling for Residential Development'. All unsuitable materials

(vegetation, organic or deleterious material, topsoil and non-engineered fill etc.) should be stripped from any areas of earthworks and stockpiled well clear of earthwork operations or carted from the site. Compaction of non-cohesive fill should be carried out using pad foot compaction plant of a minimum 10 tonne static weight, in loose layers no greater than 200 mm thickness. All fill materials should be clear of unsuitable materials as described above.

4.2. Excavations

If works are undertaken following a period of precipitation, the subgrade should be protected to minimise disturbance or contamination of the exposed subgrade. This may require filter fabric (Bidim A19) which should be confirmed by a geotechnical engineer familiar with this report.

5. Further Geotechnical Involvement

5.1. Geotechnical Drawing Review

A geotechnical engineer familiar with the findings of this report should be engaged to review the final working drawings of the proposed development prior to submission to the Building Consent Authority, to ensure the geotechnical recommendations of this report have been implemented correctly. Further geotechnical analysis may be warranted at this stage subject to the specifics of the development proposal.

5.2. Construction Observations

A Geotechnical Engineer familiar with the findings of this report should be engaged to carry out observations during foundation excavations to confirm soil and foundation conditions are consistent with those adopted within this report. Inspections will not be carried out prior to Council issuing the required Building Consents, and unconsented works will not be inspected.

The recommendations given in this report are based on limited site data from discrete locations. Variations in ground conditions could exist across the site. It is in the interests of all parties that we be retained to observe excavations and foundation conditions exposed during construction, so that ground conditions can be compared with those assumed in formulating this report. In any event, we should be notified of any variations in ground conditions from those described or assumed to exist.

Without sufficient observations during the subgrade preparation prior to placement of fill or concrete, CGW Consulting Engineers will not be in a position to provide engineering signoff (i.e. Producer Statement PS4). We recommend once a Building Consent be issued it be forwarded to us for review. We will then on-forward a schedule of inspections required by us in order to meet the consent conditions.

Areas where concrete or fill are placed without prior geotechnical observation will be specifically excluded from completion documentation.

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Appendix A Limitations

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Appendix B Test Location Plan

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Appendix C Hand Auger & Scala Penetrometer Logs

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