

535 Mill Road, Ohoka

Geotechnical Assessment Report

Rolleston Industrial Developments Ltd



Reference: 773-CHCGE288040

535 MILL ROAD, OHOKA

Geotechnical Assessment Report

Report reference number: 773-CHCGE288040

1 June 2021

PREPARED FOR

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QUALITY INFORMATION

Revision history

| Revision | Description | Date | Author | Reviewer | Approver |
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EXECUTIVE SUMMARY¹

Rolleston Industrial Developments Ltd has engaged Tetra Tech Coffey (NZ) Limited to carry out a geotechnical investigation and assessment of suitability for the proposed Plan Change and future subdivision of 535 Mill Road in Ohoka, Canterbury. The purpose of this report is to support a Plan Change application for the construction of residential Lots at the site.

The site investigations and preliminary liquefaction assessment indicates that the site is TC1-like. Other geotechnical hazards (erosion, slippage and inundation) are considered low to very low risk with appropriate future engineering design.

Our assessment has considered the items required by Section 106 of the RMA and in our opinion the site is considered geotechnically suitable for Plan Change and future subdivision. Further investigations and design will need to be carried out at the subdivision consent stage.

¹ This executive summary must be read in the context of the full report and the attached limitations.

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1. INTRODUCTION

Rolleston Industrial Developments Ltd has engaged Tetra Tech Coffey (NZ) Limited to carry out a geotechnical investigation and assessment of suitability for the proposed Plan Change and future subdivision of 535 Mill Road in Ohoka, Canterbury. The purpose of this report is to support a Plan Change application for the construction of residential Lots at the site.

Our assessment has considered the items required by Section 106 of the RMA and in our opinion the site is considered geotechnically suitable for Plan Change and future subdivision. Further investigations and design will need to be carried out at the subdivision consent stage.

2. SCOPE

A scope of assessment work for the approximately 152 Ha total area of the site was developed and carried out by Tetra Tech Coffey, as outlined below:

- Review of previous geotechnical investigations including previous work on the site and surrounding area.
- Site walkover to assess geotechnical hazards.
- Assessment of the geotechnical hazards at the site per Section 106 of the RMA.
- · Geotechnical analyses and reporting.

Tetra Tech Coffey have considered the following in the preparation of this report:

- Existing geotechnical investigation data available from the New Zealand Geotechnical Database (NZGD) and Environment Canterbury well database.
- · Our existing information for the site.
- Project correspondence with the wider Plan Change consultants engaged by Rolleston Industrial Developments Ltd.

Reference has also been made to the MBIE Guidance Part D: Subdivisions, to confirm that the requirements outlined in these documents have been incorporated in this report.

PROPOSED DEVELOPMENT

The proposed Plan Change area comprises five land parcels totalling approximately 152 Ha located to the southwest of Ohoka. The Plan Change area bordered by Bradleys Road, Whites Road, Mill Road, and to the south by rural residential and farmland.

The site is predominantly flat with the Ohoka Stream traversing the northern portion of the site. The site is currently used for farming and appears to have had the land usage for at least 100 years. An historic rail alignment is located near the northern boundary close to the intersection of Bradleys and Mill Roads.

4. SITE INVESTIGATION

The location of the geotechnical investigations carried out on the site to develop the ground models are provided in Figure 1 (in Appendix A) and are summarised below. Investigation logs are presented in Appendix B.

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Date: 1 June 2021

Table 1: 535 Mill Road investigation data

| Reference | Depth of test (metres below ground level) | Termination criteria | Reference | Depth of test (metres below ground level) | Termination criteria |
|-----------|---|-------------------------|-----------|---|-------------------------|
| TP1 | 1.7 | Target depth | TP18 | 1.2 | Target depth |
| TP2 | 1.9 | Target depth | TP19 | 1.4 | Target depth |
| TP3 | 2.0 | Target depth | TP20 | 1.4 | Target depth |
| TP4 | 0.6 | Target depth | TP21 | 1.6 | Target depth |
| TP5 | 1.0 | Target depth | TP22 | 1.4 | Target depth |
| TP6 | 1.6 | Target depth | BH1 | 16.5 | Target depth |
| TP7 | 1.6 | Target depth | BW24/0297 | 18.0 | Target depth |
| TP8 | 1.7 | Target depth | M35/0300 | 114.0 | Target depth |
| TP9 | 1.8 | Target depth | BW24/0520 | 11.2 | Target depth |
| TP10 | 1.4 | Target depth | M35/0595 | 9.8 | Target depth |
| TP11 | 1.2 | Target depth | M35/4428 | 20.3 | Target depth |
| TP12 | 1.6 | Target depth | M35/4795 | 13.0 | Target depth |
| TP13 | 1.25 | Target depth | M35/5609 | 18.8 | Target depth |
| TP14 | 1.5 | Target depth | M35/6483 | 20.0 | Target depth |
| TP15 | 1.5 | Target depth | M35/6688 | 18.0 | Target depth |
| TP16 | 1.7 | Target depth | M35/6773 | 24.0 | Target depth |
| TP17 | 1.0 | Target depth | M35/10517 | 23.2 | Target depth |

BH1 was drilled (in 2011) under the supervision of Coffey for a Vodafone tower located on the site and the ECan well logs have been sourced from https://www.ecan.govt.nz/data/well-search/.

SITE PERFORMANCE 5.

5.1 **GROUND MOTION**

The site is not in an area mapped for ground damage effects as part of the Canterbury Earthquake Sequence response. A report commissioned by ECan² mapped the site as being in an area where 'damaging liquefaction is unlikely'. An extract from the ECan report is shown in Figure 1 below with the site location indicated.

2

Tetra Tech Coffey Date: 1 June 2021

² ECan (2012), Review of liquefaction hazard information in Eastern Canterbury, including Christchurch City, and parts of Selwyn, Waimakariri and Hurunui Districts, ref. R12/83

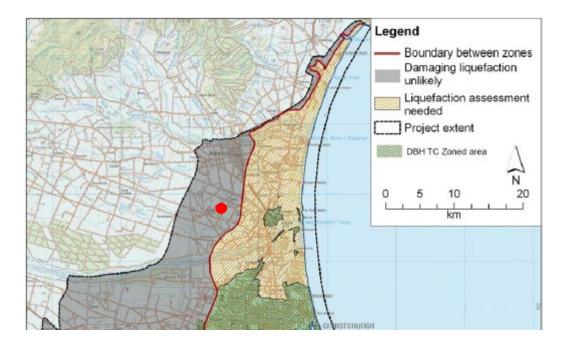


Figure 1: Extract from ECan liquefaction report (site location marked with red dot)

GROUND MODEL 6.

6.1 **GEOLOGY**

The geological map³ of the area indicates that the site is underlain by "Brownish-grey river alluvium (Q2a)."

6.2 **GROUNDWATER**

Based on the geotechnical investigations carried out on site, groundwater was encountered between 0.9m and 1.5mbgl. We consider these groundwater levels to be relatively consistent and representative of the general area.

SUBSURFACE PROFILE 6.3

A summary of the ground model for the site is provided below:

Table 2: 535 Mill Road ground profile

| Description | Strength/ consistency | Thickness (m) | Depth to top of layer (mbgl) |
|--------------------------------------|--------------------------|------------------|---------------------------------|
| Silt (topsoil) | N/A | 0.25 to 0.35 | 0.0 |
| Clayey Silt | Stiff to hard | 0.5 to 1.2 | 0.25 to 0.35 |
| Sandy Gravel, with minor silt lenses | Dense to very dense | >30 | 0.6 to 1.5 |

Fill was encountered along the alignment of the historic railway line, typically this comprised a sandy gravel and was up to 0.3m thick.

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³ Forsyth, P.J.; Barrell, D.J.A.; Jongens, R. (compilers) 2008: Geology of the Christchurch area: scale 1:250,000. Lower Hutt: GNS Science. Institute of Geological & Nuclear Sciences 1:250,000 geological map 16. 67 p. + 1 folded map

6.4 SITE SUB-SOIL CLASS

In accordance with NZS1170.5, Section 3.1.3, a subsoil classification of "Class D – Deep or soft soil sites" can be assumed for the site.

GEOTECHNICAL HAZARD ASSESSMENT

7.1 EROSION

The site has relatively flat topography and is bounded by newly developed residential areas as well as grassed paddock land. Provided appropriate stormwater systems are installed as part of the development, there will be few viable sources of erosion at this site.

7.2 FALLING DEBRIS

As there are no slopes or exposed hills or rock faces surrounding the site, there are no sources of falling debris at the site, or for the surrounding area.

7.3 SUBSIDENCE

7.3.1 Liquefaction induced settlement

Saturated, loose, uniform fine grained alluvial soils are subject to seismic (liquefaction-induced) settlement during a significant earthquake. Liquefaction typically affects saturated, loose granular soils ranging from sandy silts to sands, but seismic shaking can also result in strength losses in fine-grained, cohesive soils. Liquefaction does not occur in dense, well-graded alluvial gravel soils that are present at this site.

Due to the dense nature of the gravel encountered, liquefaction risk is considered to be negligible for this project.

7.3.2 Static settlement

Settlement is a crucial factor that can cause structure serviceability issues. Static load-induced settlement typically occurs in low-lying areas underlain by soft, compressible soils as a result of increased overburden loads. As the site is underlain by stiff to hard clayey silts and then dense river gravels, static settlement is not deemed a hazard for the site provided any earthworks are carried out to the relevant standards.

7.4 SLIPPAGE

We have not observed any sources of land instability on the site and due to the flat site topography, we consider the risk of slope failure to be very low. The appropriate design of batter slopes near waterways will mitigate this risk further.

7.5 INUNDATION

In relation to stormwater inundation, we recommend that drainage design and management at the site be addressed by specialist consultants as it is beyond the scope of this report. We expect that with appropriate stormwater and flood control systems, the risk of inundation will be low.

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8. CONCLUSIONS

We consider that the site is suitable for development subject to further investigation and design at the subdivision consent stage. Based on the mapped geology and on-site testing carried out to date, the site is considered TC1-like.

Additional geotechnical investigation will be required to refine the ground model and address any geotechnical risks for the proposed Lots once a subdivision plan has been further developed.

9. LIMITATIONS

This report has been prepared solely for the use of our client, Rolleston Industrial Developments Ltd, their professional advisers and Waimakariri District Council (WDC) in relation to the specific project described herein. No liability is accepted in respect of its use for any other purpose or by any other person or entity.

It is recommended that all other parties seek professional geotechnical advice to satisfy themselves as to its on-going suitability for their intended use.

As subsurface information has been obtained from discrete investigation locations, which by their nature only provide information about a relatively small volume of subsoils, there may be special conditions pertaining to this site which have not been disclosed by the investigation and which have not been taken into account in the report. If variations in the subsoils occur from those described or assumed to exist, then the matter should be referred to us immediately.

Please also refer to the enclosed Important Information about Your Tetra Tech Coffey Report.

10. CLOSURE

If you have queries or require further clarification regarding aspects of this report, please contact the undersigned.

For and on behalf of Tetra Tech Coffey

Prepared by

Chris Thompson

BSc (Tech)

Associate Engineering Geologist

Reviewed by

Kah-Weng Ho BE(Civil) CMEngNZ Senior Principal

Tetra Tech Coffey Report reference number: 773-CHCGE288040

Date: 1 June 2021



IMPORTANT INFORMATION ABOUT YOUR TETRA TECH COFFEY REPORT

As a client of Tetra Tech Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Tetra Tech Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Tetra Tech Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Tetra Tech Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Tetra Tech Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Tetra Tech Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Tetra Tech Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Tetra Tech Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Tetra Tech Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Tetra Tech Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Tetra Tech Coffey to work with other project design professionals who are affected by the report. Have Tetra Tech Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Tetra Tech Coffey for information relating to geoenvironmental issues.

Rely on Tetra Tech Coffey for additional assistance

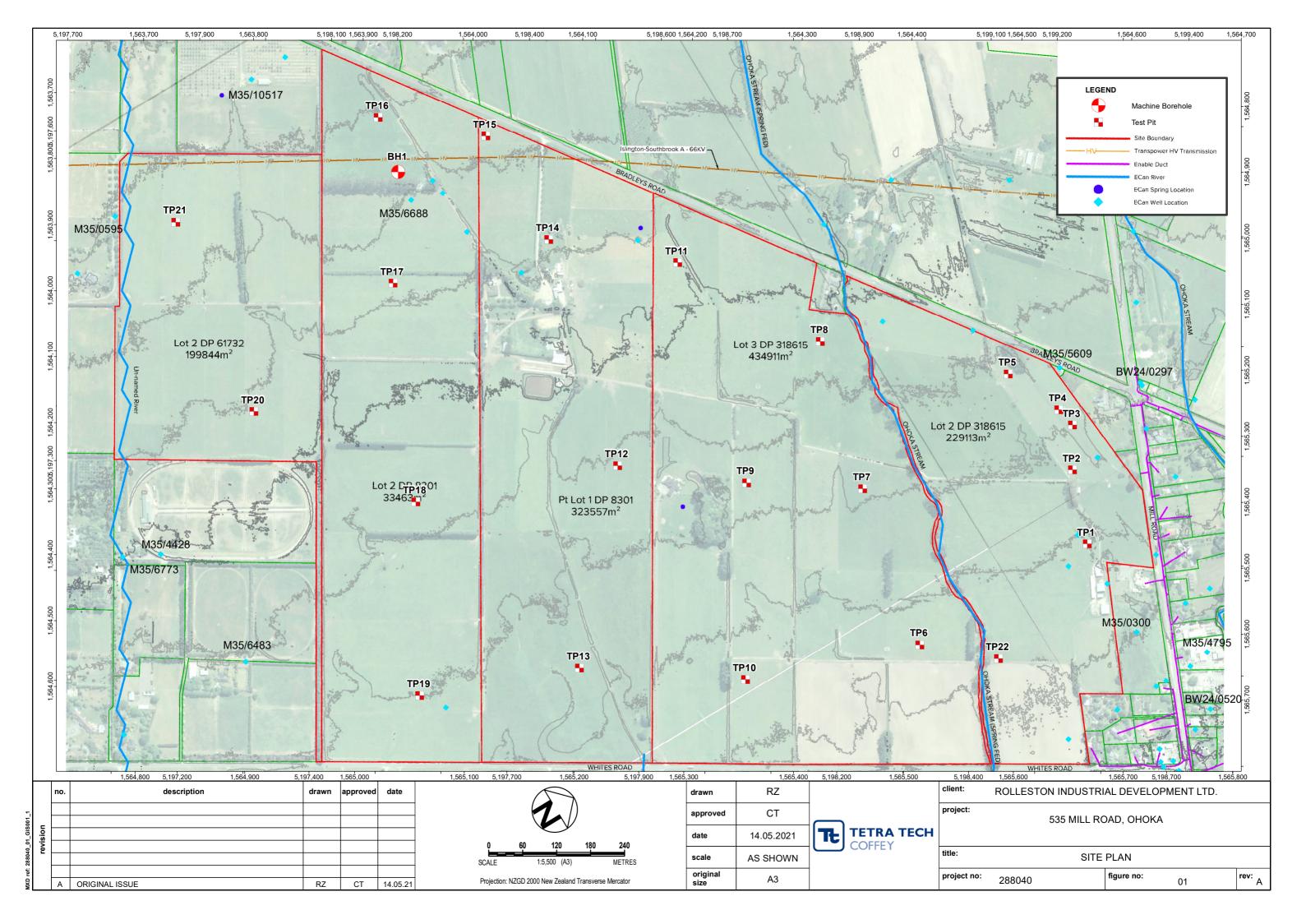
Tetra Tech Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Tetra Tech Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Tetra Tech Coffey to other parties but are included to identify where Tetra Tech Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Tetra Tech Coffey closely and do not hesitate to ask any questions you may have.

APPENDIX A: SITE PLAN

Tetra Tech Coffey Report reference number: 773-CHCGE288040 Date: 1 June 2021



APPENDIX B: INVESTIGATION DATA

Tetra Tech Coffey Report reference number: 773-CHCGE288040

Date: 1 June 2021



535 Mill Road

project:

Engineering Log - Excavation

TP01 sheet: 1 of 1

Borehole ID.

logged by:

773-CHCGE288040 project no.

B. Chau

Rolleston Industrial Developments Limited client: date started: 05 May 2021

principal: -05 May 2021 date completed:

location: Ohoka. Christchurch 7676 C. Thompson checked by

| location: | On | oka, Ch | rist | chur | ch 7 | 676 | | | С | hecked by: | | C. Thompson |
|--|------------------------------------|-----------------------|--------|-----------------------------------|-------------|----------------------|--|--------------------------------|------------------------------------|--|------------|--|
| position: No | t Spec | ified | | | | | surface elevation: Not Specified | ; | angle fro | om horizontal: 9 | 90° | DCP id.: - |
| drill model: H | litachi | 14t, Track | moun | ted | | | drilling fluid: Swamp Bucket | | hole dia | meter : | | vane id.: 1508 |
| drilling info | rmati | on | | | mate | rial sub | stance | | | | | |
| method & support | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear hermoulded peak (kPa) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | ws/ nm) | structure and additional observations |
| | | | | - | | ML | SILT : low plasticity, brown, with trace of rootlets. | D | 0.2 | | | TOPSOIL |
| | | | | 0.5 — | | ML | SILT : low plasticity, brown-grey with orange mottling. | | St - VS | | ⊢ | QUATERNARY ALLUVIUM - |
| W Z | | | | - 1.0 — | | GW | Sandy GRAVEL: medium to coarse grained, grey with orange mottling. | W | MD - D | | " | - |
| | . | | | - - 1.5— | | | | | | | | - |
| V V V I I I I I I I I I I I I I I I I I | | | | 2.0 — | <u>,</u> | | Excavation TP01 terminated at 1.7 m Target depth | | | | | - |
| method AD auger AS auger HA hand a W washb * bit sho e.g. AD/T B blank I T TC bit | screwir luger ore wn by s | ng* | pene | etration S S er 10-0 leve wate | | ater shown | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | moistu D dr M m W w S sa Wp pl | soil desc ed on AS are condi | 1726:2017 | | soft firm t stiff St very stiff hard o friable L very loose loose D medium dense dense |



project no. **773-CHCGE288040**

Borehole ID.

sheet:

TP02

1 of 1

client: Rolleston Industrial Developments Limited date started: 05 May 2021

principal: - date completed: 05 May 2021

project: 535 Mill Road logged by: B. Chau

| | n: No odel: H | • | cified 14t, Track | moun | ted | | | surface elevation: Not Specified drilling fluid: Swamp Bucket | | angle fro nole dia | om horizor meter : | ntal: 90° | DCP id.: vane id.: 1508 |
|---------------------|--|-----------------|-----------------------|--------|--------------|--|----------------------|---|------------------------|-----------------------------------|---|--------------------------|---|
| drillir | ng info | rmati | on | | | mate | rial sub | estance | | | _ | | |
| metnod & support | 1 2 penetration 3 | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear ⊕ remoulded ⊛ peak (kPa) | DCP (blows/ 100 mm |) |
| | | | | | 1 1 | \rangle | ML | SILT: low plasticity, brown. | D | | | | |
| | | | | | 0.5 | | ML | Clayey SILT: low - medium plasticity, pale brown with orange mottling. | | | | | QUATERNARY ALLUVIUN |
| z | | | | | 1.0 | 0.00 | GW | Sandy GRAVEL: medium to coarse grained, grey-brown. | W | - | | | |
| | | | | | - | 0 0 0 | | | S | _ | | | |
| | | | | | 1.5— | | | | 3 | | | | |
| • | | - | | | 2.0 | . ae. | | Excavation TP02 terminated at 1.9 m Target depth | | | | | |
| | | | | | 2.5 — | | | | | | | | |
| | | | | | 3.0 — | | | | | | | | |
| | | | | | 3.5— | | | | | | | | |
| AS HA | od auger augers hand a | screwir uger | | | | ⊢ no res | nil istance | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter | base | ed on AS | 1726:2017 | | consistency / relative density VS very soft S soft F firm St stiff VSt very stiff |
| e.g. В Г | bit sho AD/T blank to TC bit V bit | • | suffix | wate | 10-0 leve | rangin refusa Oct-12 wa el on date er inflow er outflow | ater shown | HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | W we S sa Wp pl: | oist | t | | H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense |



sheet: 1 of 1 project no. **773-CHCGE288040**

TP03

Borehole ID.

client: Rolleston Industrial Developments Limited project no. 773-CHCGE28

principal: - date completed: 05 May 2021

project: 535 Mill Road logged by: B. Chau

| | on: No odel: H | | cified 14t, Track | mour | nted | | | surface elevation: Not Specified drilling fluid: Swamp Bucket | | • | om horizo meter : | ntal: 90 | ° DCP id.: vane id.: 1508 |
|---------------------|--|----------|-----------------------|----------|-------------|---------------------------------------|----------------------|--|-----------------------|-----------------------------------|--|----------------------------|---|
| drillir | ng info | rmati | ion | | | mate | rial sub | estance | | | | | |
| metnod & support | 2 penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear ⊕ remoulded ⊛ peak (kPa) 0,000,000 | | additional observations |
| • | | | | | - | | ML | SILT: low plasticity, brown. | D | | | | FILL |
| | iii | | | | - | \bowtie | GP | Sandy GRAVEL: brown-grey. | | | | Hiiii | |
| | 111 | | | | 0.5 | | ML | Clayey SILT: medium plasticity, grey with orange mottling. | | | | | i |
| | | | VS 150/ 40 kPa | | - | | ML | Clayey SILT: low to medium plasticity, grey-brown with orange mottling. | | VSt | | | QUATERNARY ALLUVIUM |
| | | | | | - | | | | W - S | | | |] ! |
| z | | | | | 1.0 - | | | | | | | | |
| | | | VS 120/ 21 kPa | | - | | | | | | | | i |
| | | — | | | 1.5— | | GW | Sandy GRAVEL: medium to coarse grained, | s | | | | <u>i</u> |
| | | | | | - | 0 0 0 0 0 0 | | grey-brown, with trace of cobbles. | | | | | i ! |
| | | | | | - | 0 0 | | | | | | | i i |
| | | | | | 2.0 - | | | Excavation TP03 terminated at 2.0 m Target depth | | | | | |
| | | | | | - | | | | | | | |] |
| | | | | | 2.5 | | | | | | | | i ! |
| | | | | | - | | | | | | | | i ! |
| | | | | | 3.0 — | | | | | | | | |
| | | | | | - | | | | | | | |] |
| | | | | | - | - | | | | | | | i |
| | | | | | 3.5 — | | | | | | | | |
| | | | | | - | | | | | | | | i I |
| | 111 | | | Mi | port mud | I N | nil | samples & field tests B bulk disturbed sample | | soil des | symbol & | | consistency / relative density VS very soft |
| ΗA | hand a washb | auger | 3 | | etration | 1− no res | istance | D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter | | ed on AS | ition | | S soft F firm St stiff VSt very stiff |
| | bit sho | wn by | suffix | wat | 10- | rangin refusa | g to I ater | HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered | D dr M m W we | y oist | | | H hard Fb friable VL very loose |
| e.g. З Г | AD/T blank I TC bit V bit | oit | | <u> </u> | leve | el on date er inflow er outflow | shown | Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | Wp pl | astic limi puid limit | t | | L loose MD medium dense D dense VD very dense |



Borehole ID. **TP04** sheet: 1 of 1

project no. **773-CHCGE288040**

client: Rolleston Industrial Developments Limited date started: 05 May 2021

principal: - date completed: 05 May 2021

project: 535 Mill Road logged by: B. Chau

| UCA | ocation: Ohoka, Christch | | | | | CII / | 0/0 | | | С | hecked l | C. Thompson | | | |
|------------------------|---------------------------------|-----------------|-----------------------|--------|-----------------------|--------------------------------------|----------------------|--|-----------------------|-----------------------------------|--|----------------------|---|--|--|
| ositi | on: No | ot Spe | cified | | | | | surface elevation: Not Specified | | angle fro | m horizor | ntal: 90° | 0° DCP id.: | | |
| drill m | nodel: l | Hitach | i 14t, Track | mour | nted | | | drilling fluid: Swamp Bucket | 1 | hole dia | meter: | | vane id.: 1508 | | |
| drilli | ing inf | ormat | ion | | | mate | rial sub | ostance | | | | | | | |
| | ion | | | | | D | | material description | | // isity | vane | DCP | structure and | | |
| support | 1 2 penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture | consistency / relative density | shear ⊕ remoulded ⊕ peak (kPa) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | (blows) | 1) | | |
| | | ntered | | | - | | GP GW | SILTY GRAVEL: medium to coarse grained, pale brown, with trace of cobbles. | М | | | | 1 | | |
| ı z | 111 | Not Encountered | | | _ | | | SILTY GRAVEL: medium to coarse grained, pale brown. | | | | 1111 | ! | | |
| | | Not | VS 203/ 53 kPa | | 0.5 | | ML | Clayey SILT: low to medium plasticity, grey-brown with orange mottling. | | VSt - H | | | | | |
| | | | | | - | | | Excavation TP04 terminated at 0.6 m Target depth | | | | | ! ! | | |
| | | | | | 1.0 - | | | | | | | | ! ! | | |
| | | | | | - | | | | | | | | ! ! | | |
| | | | | | 1.5 | | | | | | | | 1 | | |
| | | | | | - | | | | | | | | <u> </u> | | |
| | | | | | 2.0 — | | | | | | | | 1 1 | | |
| | | | | | - | | | | | | | | 1 | | |
| | | | | | 2.5 | | | | | | | | | | |
| | | | | | - | | | | | | | | | | |
| | | | | | 3.0 — | | | | | | | | | | |
| | | | | | - | | | | | | | | 1 | | |
| | | | | | 3.5 — | | | | | | | i i i i I I I I | | | |
| | | | | | - | | | | | | | | i I | | |
| | | | | | - | | | | | | | | i | | |
| meth AD AS HA | auger auger hand | | | M i | port mud casing | | nil | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample | : | soil desc | symbol & ription 1726:2017 | | consistency / relative density VS very soft S soft F firm | | |
| N | washl | oore | | | etration | | istance g to | SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) | D dr | re condi | tion | | St stiff VSt very stiff H hard Fb friable | | |
| • e.g. B | bit she AD/T blank | | suffix | wat | Ieve | Oct-12 wa el on date er inflow | | N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) | W we S sa Wp pl | | | | VL very loose L loose MD medium dense | | |
| Γ / | TC bit | | | - | | er outflow | , | R refusal HB hammer bouncing | **1 119 | jaia illill | | | D dense VD very dense | | |



535 Mill Road

project:

Engineering Log - Excavation

sheet: 1 of 1

Borehole ID.

logged by:

project no. **773-CHCGE288040**

TP05

B. Chau

client: Rolleston Industrial Developments Limited date started: 05 May 2021

principal: - date completed: 05 May 2021

| I | ocat | ion: | Oh | oka, Ch | rist | chur | ch 7 | 676 | | | С | hecked l | oy: | C. Thompson |
|---|-----------------------------|---|---------------|-----------------------|--------|---------------------------|--|-----------------------|--|-------------------------|-----------------------------------|---|-------------------------|---|
| F | ositio | on: Not | Spec | ified | | | | | surface elevation: Not Specified | а | ingle fro | om horizor | ntal: 90° | DCP id.: - |
| ď | drill m | odel: Hi | achi | 14t, Track | moun | ted | | | drilling fluid: Swamp Bucket | h | ole dia | meter : | | vane id.: 1508 |
| L | drilli | ng infor | mati | on | | | mate | rial sub | stance | | | | | |
| : | method & support | 1 2 penetration 3 | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear eremoulded epeak (kPa) | DCP (blows/100 mm) | structure and additional observations |
| ľ | 1 | | | | | - | | ML | SILT: low plasticity, pale brown. | D | | | | TOPSOIL |
| ш | Z | | | VS 81/ 33 kPa | | 0.5 | | ML | Clayey SILT: medium plasticity, grey-brown with orange mottling. | | St | | | QUATERNARY ALLUVIUM |
| | | | | | | - | | ML | SILTY GRAVEL : medium to coarse grained, grey with orange staining. | | D | | | - |
| 5/2021 12:06 | | | | | | -1.0 - - | , , , , , , , , , , , , , , , , , , , | | Excavation TP05 terminated at 1.0 m Target depth | | | | | DCP 1.0 - 1.1m: Refusal |
| ingFile>> 24/0 | | | | | | - 1.5 | | | | | | | | - - |
| .GPJ < <drawi< td=""><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></drawi<> | | | | | | - | | | | | | | | |
| 288040 GINT | | | | | | 2.0 | | | | | | | | - |
| COF BOREHOLE: NON CORED + DCP CHCGE288040 GINT.GPJ < <drawingfile>> 24/05/2021 12:06</drawingfile> | | | | | | - | | | | | | | | |
| NON CORED | | | | | | 2.5 — - | | | | | | | | - |
| - BOREHOLE: | | | | | | - | | | | | | | | |
| Log | | | | | | 3.0 — | | | | | | | | - - |
| RARY.GLB rev | | | | | | - 3.5— | | | | | | 1111 | | - - - |
| CDF_0_9_07_LIBRARY.GLB rev:AU | | | | | | - | | | | | | | | - |
| G | | | | | | _ | | | | | | | | |
| | meth AD AS HA W | od auger d auger s hand au washbo | crewir ger | | pen | mud casing etration | | nil stance g to | samples & field tests B | moistur D dry M mo | d on AS re condi | 1726:2017 | | consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable |
| | * e.g. B T V | bit show AD/T blank bi TC bit V bit | - | suffix | wate | leve wate | Oct-12 wa el on date er inflow er outflow | shown | N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | W we S sat Wp pla | | | | VL very loose loose MD medium dense dense VD very dense |



client:

Engineering Log - Excavation

sheet: 1 of 1

TP06

Borehole ID.

Rolleston Industrial Developments Limited project no. 773-CHCGE288040

principal: - date completed: 05 May 2021

project: 535 Mill Road logged by: B. Chau

| drill mo | | itachi | 14t, Track | moun | ted | | | surface elevation: Not Specified drilling fluid: Swamp Bucket | | - | om horizoi meter : | ntal: 90° | DCP id.: - vane id.: 1508 |
|---------------|--|------------------------|-----------------------|----------|---------------------------|---|----------------------|--|---------------------------------------|---|--|---------------------------|---|
| drillir | ng info | rmati | on | | | mate | rial sub | | | > | | P.6- | |
| support | 1 2 penetration 3 | water | samples & field tests | RL (m) | (m) depth | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear eremoulded e peak (kPa) | DCP (blows/ 100 mm) | |
| | | | | | - | $\left \begin{array}{c} \\ \\ \end{array} \right $ | ML | SILT: low plasticity, brown, with trace of rootlets. | D | | | | TOPSOIL |
| | | Encountered | VS 156/ 42 kPa | | 0.5— | | ML | Clayey SILT: medium plasticity, pale grey with orange mottling. | | VSt | | | QUATERNARY ALLUVIUM |
| Z | | Not Enc | | | - 1.0 — - - | | GW | Sandy GRAVEL: medium to coarse grained, grey-brown with orange staining. | M | D | | | DCP 0.8 - 0.9m: Refusal |
| | | | | | 1.5 | a | | Excavation TP06 terminated at 1.6 m Target depth | | | | | |
| | | | | | - - 2.5 — - - | | | | | | | | |
| | | | | | 3.0 — - - - | | | | | | | | |
| | | | _ | | 3.5 | | | | | | | | |
| AS HA W | auger of auger of hand a washbo | screwir uger ore | ng* | pend | etration | | nter | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (KPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone | moistu D dr M m W we S sa | re condi y oist et aturated | ition | - | consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose |
| B T | blank b TC bit V bit | it | | <u>►</u> | wat | er inflow er outflow | | VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | | astic limi uid limit | t | | MD medium dense D dense VD very dense |



ng Log - Excavation project no. 773-CHCGE288040

Borehole ID.

sheet:

TP07

1 of 1

client: Rolleston Industrial Developments Limited date started: 05 May 2021

principal: - date completed: 05 May 2021

project: 535 Mill Road logged by: B. Chau

| | | t Sped litachi | cified 14t, Track | moun | ted | | | surface elevation: Not Specified drilling fluid: Swamp Bucket | | angle fro hole diar | m horizon neter : | ital: 90° | DCP id.: vane id.: 1508 |
|---------------------|---|-------------------|-----------------------|--------|----------------------|--|----------------------|---|-----------------------|-----------------------------------|---|------------------------------------|---|
| drillin | g info | rmati | on | | | mate | rial sub | ostance | | | | | |
| metnod & support | 1 2 penetration 3 | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | Vane shear ⊕ remoulded ⊕ peak (kPa) 06 06 08 | 100 mm) | |
| A | | | | | - | | ML | SILT: low plasticity, pale brown, with trace of rootlets. | D | | | | TOPSOIL |
| | | | VS UTP | | 0.5 | | ML | Clayey SILT: pale grey-brown with orange mottling. | М | VSt - H | vs UтР | | QUATERNARY ALLUVIUM |
| z | | | | | - | | GW | Sandy GRAVEL: medium to coarse grained, grey, with trace of cobbles. | W | | | | |
| | | — | | | - 1.0 — - | | | groy, war tace or cossice. | | | | | |
| | | | | | - 1.5 — | | | | | | | | |
| | | | | | 2.0 — | | | Excavation TP07 terminated at 1.6 m Target depth | | | | | |
| | | | | | - 2.5 — - - | | | | | | | | |
| | | | | | 3.0 | | | | | | | | |
| | | | | | - 3.5 — - - | | | | | | | | |
| AS HA | d auger | | | | | ⊢ no res | nil | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter | base | re condit | ymbol & ription 1726:2017 | | consistency / relative density VS very soft S soft F firm St stiff VSt very stiff |
| e.g. В Г | bit sho AD/T blank l TC bit V bit | wn by s | suffix | wate | 10-0 leve | rangin refusa Oct-12 wa el on date er inflow er outflov | ater shown | HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | W w S sa Wp pl | oist | | | H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense |



535 Mill Road

project:

Engineering Log - Excavation

TP08 sheet: 1 of 1

Borehole ID.

logged by:

773-CHCGE288040 project no.

B. Chau

Rolleston Industrial Developments Limited client: date started: 05 May 2021

principal: -05 May 2021 date completed:

location: Ohoka. Christchurch 7676 C. Thompson checked by

| location: Ohoka, Ch | hristchurch 7676 | | checked by: | C. Thompson |
|--|---|--|--|---|
| position: Not Specified | | surface elevation: Not Specified | angle from horizontal: 90° | DCP id.: - |
| drill model: Hitachi 14t, Track | mounted | drilling fluid: Swamp Bucket | hole diameter : | vane id.: 1508 |
| drilling information | material su | ostance | | |
| method & support suppo | RL (m) depth (m) graphic log soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition conditi | structure and additional observations |
| A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | - ML | SILT: low plasticity, brown. | M | TOPSOIL |
| U VS 75/ 30 kPa | 0.5 — ML | Clayey SILT: medium plasticity, grey with orange mottling. | St - VSt | QUATERNARY ALLUVIUM - |
| 33 kPa | 1.0 GW | Sandy GRAVEL: medium to coarse grained, grey-brown, with trace of cobbles. | S D 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | DCP: 1.0 - 1.1m: Refusal |
| | 2.0- | Excavation TP08 terminated at 1.7 m Target depth | | - |
| | - 2.5 - - | | | - |
| | 3.0 | | | |
| | 3.5 — | | | - |
| method AD auger drilling* AS auger screwing* HA hand auger W washbore | support M mud N nil C casing penetration penetration ranging to refusal water | samples & field tests B | soil group symbol & soil description based on AS 1726:2017 moisture condition D dry M moist | Consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose |
| * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit | 10-Oct-12 water level on date shown water inflow water outflow | Nc SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | S saturated Wp plastic limit WI liquid limit | VL very loose L loose MD medium dense D dense VD very dense |



client:

principal: -

Engineering Log - Excavation

Rolleston Industrial Developments Limited

sheet: 1 of 1

sneet: 1 of 1

project no. **773-CHCGE288040**

date completed:

Borehole ID.

date started: 05 May 2021

TP09

05 May 2021

project: 535 Mill Road logged by: B. Chau

| ocat | ion: | Oii | oka, Cr | 11131 | Criur | CII 7 | 0/0 | | | checked | ı by: | C. Thompson |
|-----------------------------|---|----------|-----------------------|--------|---------------------------|--|------------------------|--|-------------------------------|--|------------|---|
| positio | on: No | t Spec | cified | | | | | surface elevation: Not Specified | 6 | angle from horiz | ontal: 90° | DCP id.: |
| drill m | nodel: H | litachi | 14t, Track | mour | nted | | | drilling fluid: Swamp Bucket | | nole diameter : | | vane id.: 1508 |
| drilli | ing info | rmati | on | | | mate | rial sub | stance | | | | |
| method & support | penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density / shear @ heavel @ (kba) % (kba | 100 mm) | |
| \ A | 1 | > | | | - | 33 | ML | SILT: low plasticity, brown. | M | | | TOPSOIL |
| | | | VS 114/ 31 kPa | | 0.5 | | ML | Clayey SILT: medium plasticity, pale grey-brown with orange staining. | | St - VSt | | QUATERNARY ALLUVIUM |
| | | | VS 141/ 42 kPa | | 1.0 — | | | | W | | | |
| | | - | | | 1.5 — - | | GW | Sandy GRAVEL: medium to coarse grained, grey. | S | 111 | | |
| | | | | | 2.0 — | | | Excavation TP09 terminated at 1.8 m Target depth | | 111 | | |
| | | | | | 2.5 — | | | | | 111 | | |
| | | | | | 3.0 — | | | | | 111 | | |
| | | | | | 3.5 — | | | | | | | |
| meth AD AS HA W | auger drilling* auger screwing* hand auger washbore M mu C cas penetr washbore water | | | | mud casing etration | ı | nil istance g to | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) | base moistu D dr M m | ii group symbol & soil description ed on AS 1726:201 | 17 | consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable |
| * e.g. B T V | bit shown by suffix g. AD/T blank bit TC bit | | | | | Oct-12 wa el on date er inflow er outflov | shown | N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | Wp pl | et aturated astic limit uid limit | | VL very loose L loose MD medium dense D dense VD very dense |



client:

principal: -

Engineering Log - Excavation

Rolleston Industrial Developments Limited

TP10 sheet: 1 of 1

Borehole ID.

773-CHCGE288040 project no.

date started: 05 May 2021 05 May 2021 date completed:

project: 535 Mill Road logged by: B. Chau

Ohoka, Christchurch 7676 C. Thompson checked by: location:

| oou | tion: | Oii | oka, Cr | IIISL | Criur | CH 7 | 0/0 | | checked by | . (| C. Thompson |
|-----------------------------|---|----------|-----------------------|--------|-----------------|---|-----------------------|---|--|---|---|
| ositi | ion: No | t Spe | cified | | | | | surface elevation: Not Specified | angle from horizonta | : 90° | DCP id.: |
| drill m | nodel: I | litach | i 14t, Track | mour | ited | | | drilling fluid: Swamp Bucket | hole diameter : | | vane id.: 1508 |
| drill | ing info | ormat | ion | | | mate | rial sub | estance | | | |
| method & support | penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | ondition slative d (kba) (kba) (kba) | DCP blows/ 00 mm) | structure and additional observations |
| - 00 | | | | | - | | ML | SILT: low plasticity, brown. | M | | OPSOIL |
| | | | VS 90/ 28 kPa | | 0.5 | | ML | Clayey SILT: medium plasticity, grey with orange mottling. | St - VSt | | UATERNARY ALLUVIUN |
| 2 | | | VS 132/ 15 kPa | | - | | | | ₩ | | |
| | | - | | | - | | GW | Sandy GRAVEL: medium to coarse grained, grey with orange mottling. | S | | |
| | | | | | 1.5 — | | | Excavation TP10 terminated at 1.4 m Target depth | | ++++ | |
| | | | | | 2.0 — | | | | | | |
| | | | | | 2.5— - - | | | | | | |
| | | | | | 3.0 | | | | | | |
| | | | | | 3.5 — - - | | | | | | |
| meth AD AS HA W | hod auger drilling* auger screwing* hand auger washbore suppo M mu C cas penetr penetr | | | | | no res | nil sistance og to | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) | soil group symbol & soil description based on AS 1726:2017 | <u> </u> | sistency / relative density very soft soft firm stiff very stiff hard |
| e.g. 3 | bit sho AD/T blank TC bit V bit | | suffix | wat | 10-0 leve | Tefusa Oct-12 was el on date er inflow er outflow | af ater e shown | N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | M moist W wet S saturated Wp plastic limit WI liquid limit | Fb VL L MD D VD | friable very loose loose medium dense dense very dense |



ering Log - Excavation project no. 773-CHCGE288040

Borehole ID.

sheet:

TP11

1 of 1

client: Rolleston Industrial Developments Limited date started: 05 May 2021

principal: - date completed: 05 May 2021

project: 535 Mill Road logged by: B. Chau

 Iocation:
 Ohoka, Christchurch 7676
 checked by:
 C. Thompson

 position:
 Not Specified
 angle from horizontal:
 90°
 DCP id.:

 drill model:
 Hitachi 14t, Track mounted
 drilling fluid:
 Swamp Bucket
 hole diameter:
 vane id.:
 1508

 drilling information
 material substance

 5
 vane
 DCP
 structure and

| drill ı | mode | el: Hit | achi | 14t, Track | moun | ted | | | drilling fluid: Swamp Bucket | h | ole dian | meter : | | vane id.: 1508 |
|----------------------------|---------------------------------------|---|--------------------|-----------------------|------------|---------------------------|---------------------------------------|----------------------|--|--------------------------------|-------------------------------------|---|---------------------------|---|
| dril | ling | infor | mati | on | | | mate | erial sub | stance | | | | | |
| method & support | | 2 penetration3 | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | Vane shear ⊕ remoulded ⊚ peak (kPa) ⊗ 00 € 00 000 | DCP (blows/ 100 mm) | |
| A 4 | 1 1 1 1 1 1 1 1 1 1 | | | VS 156/ 39 kPa | | 0.5— | | ML ML | SILT: low plasticity, brown. Clayey SILT: medium plasticity, grey-brown with orange mottling. | M | VSt | • • • • • • • • • • • • • • • • • • • | | QUATERNARY ALLUVIUM |
| | z | | | 55 N 4 | | - - - 1.0 | 0 0 | GW | Sandy GRAVEL: medium to coarse grained, grey with orange staining. | W | | | | |
| | | | | | | 1.5 — | · · · · · · · · · · · · · · · · · · · | | Excavation TP11 terminated at 1.2 m Target depth | | | | | |
| | | | | | | 2.5 — 3.0 — | | | | | | | | |
| | | | | | | - - 3.5 — - - | | | | | | | | |
| met AD AS HA W | hod au au hai wa | iger di iger so ind au ashboi | crewin ger e | ng* | pene | mud casing etration | ı | al . | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered | moistu D dr M mo W we | d on AS re condit / bist | 1726:2017 | | consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose |
| e.g. B T V | AD bla | D/T ank bit C bit | • | | - <u>-</u> | leve | el on date er inflow er outflow | shown | Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | Wp pla | turated astic limit uid limit | | | L loose MD medium dense D dense VD very dense |



client:

Engineering Log - Excavation

Rolleston Industrial Developments Limited

sheet: 1 of 1

Borehole ID.

project no. **773-CHCGE288040**

TP12

date started: 05 May 2021

principal: - date completed: 05 May 2021

project: 535 Mill Road logged by: B. Chau

| drill m | odel: | Hitach | cified i 14t, Track | mour | nted | | | surface elevation: Not Specified drilling fluid: Swamp Bucket | | angle fro | om horizon meter : | tal: 90° | DCP id.: - vane id.: 1508 |
|---------------------|---|--------|------------------------|--------|--|-------------|-----------------------|--|----------------------------------|-----------------------------------|--|---------------------------|---|
| drilli | _ | ormat | ion | | | mate | rial sub | estance | | _ | т т | | I |
| metnod & support | , penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture | consistency / relative density | vane shear ⊕remoulded ⊚ peak (kPa) 08 05 00 | DCP (blows/ 100 mm) | structure and additional observations |
| 1 | | | | | - | | ML | SILT: low plasticity, brown. | М | | | | TOPSOIL |
| | | | VS 124/ 43 kPa | | 0.5 — | | ML | Clayey SILT: medium plasticity, brown-grey with orange staining. | | VSt | | | QUATERNARY ALLUVIUM |
| | | | VS 113/ 18 kPa | | 1.0 — | | GW | Sandy GRAVEL: medium to coarse grained, | W | | | | DCP 1.0 - 1.1: Refusal |
| _\ | | | - | | - - 1.5- | | | grey with orange staining. | s | _ | | | |
| | | | | | 2.5— | | | Excavation TP12 terminated at 1.6 m Target depth | | | | | |
| * e.g. B T | auger screwing* C casi hand auger washbore bit shown by suffix C casi penetra water | | | | etration or of the control of the c | | g to iter shown | B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | moistu D dr M m W we S sa Wp pla | ed on AS re condi y oist | eription 1726:2017 ition | | consistency / relative density // very soft // soft // soft // simm // st stiff // st very stiff // hard // hard // very loose // loose // medium dense // very dense // very dense |



535 Mill Road

client:

project:

principal: -

Engineering Log - Excavation

Rolleston Industrial Developments Limited

sheet: 1 of 1

Borehole ID.

project no. **773-CHCGE288040**

TP13

date started: 05 May 2021

date completed: 05 May 2021

logged by: **B. Chau**

| loca | tion: | Oh | oka, Ch | rist | chur | ch 7 | 676 | | | cl | necked b | by: | C. Thompson |
|-----------------------------|---|---------|-----------------------|--------|-------------|--|------------------------|--|-------------------------------|-----------------------------------|---|---------------------------|---|
| positi | ion: N | ot Spec | cified | | | | | surface elevation: Not Specified | ; | angle fro | m horizon | tal: 90° | DCP id.: |
| drill m | nodel: | Hitachi | 14t, Track | mour | nted | | | drilling fluid: Swamp Bucket | | hole diar | neter : | | vane id.: 1508 |
| drill | ing inf | ormati | on | | | mate | rial sub | estance | | | | | |
| method & support | penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear ⊕remoulded • peak (kPa) % 00 00 | DCP (blows/ 100 mm) | structure and additional observations |
| A A | | | | | - | | ML | SILT: low plasticity, brown. | M | 0.2 | | 1 | TOPSOIL |
| Z L | | Ž | VS UTP | | 0.5 — | | ML | Clayey SILT: low to medium plasticity, grey with orange mottling. | | VSt - H | VS UTP | | QUATERNARY ALLUVIUM |
| | | | | | 1.0 — | | GW | Sandy GRAVEL: medium to coarse grained, grey with orange staining, and trace of cobbles. | W | _ | | | |
| | | | | | 1.5 — | | | Excavation TP13 terminated at 1.25 m Target depth | | | | | |
| | | | | | 2.0 — | | | | | | | | |
| | | | | | 2.5 — | | | | | | | | |
| | | | | | 3.0 — | | | | | | | | |
| | | | | | 3.5 — | | | | | | | | |
| meth AD AS HA W | auger screwing* C cas hand auger washbore penetri | | | | | ı | nil istance g to | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) | base moistu D dr M m | re condit | ription 1726:2017 | | consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable |
| * e.g. B T V | bit sh AD/T blank TC bi V bit | | suffix | | leve wat | Oct-12 wa el on date er inflow er outflow | shown | N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | W w S sa Wp pl | | | 1 | VL very loose L loose MD medium dense D dense VD very dense |



sheet: 1 of 1

TP14

773-CHCGE288040

Borehole ID.

project no.

Rolleston Industrial Developments Limited client: date started: 05 May 2021

05 May 2021 principal: date completed:

project: 535 Mill Road logged by: B. Chau

Ohoka, Christchurch 7676 C. Thompson location: checked by:

| ositior Irill mo | | | ified 14t, Track | moun | ted | | | surface elevation: Not Specified drilling fluid: Swamp Bucket | | angle fro nole diar | m horizon neter : | ntal: 90° | DCP id.: vane id.: 1508 |
|---------------------|--|-----------------|-----------------------|--------|---------------------------------|--|------------------------|---|--|-----------------------------------|--|--------------------------|--|
| drillin | g info | rmati | on | | | mate | rial sub | estance | | | | | |
| support | 1 2 penetration 3 | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear ⊕ remoulded • peak (kPa) % 00 00 | DCP (blows/ 100 mm | |
| | | | | | 1 1 1 | | ML ML | SILT: low plasticity, brown. Clayey SILT: low to medium plasticity, grey-brown with orange mottling. | D | VSt - H | | | QUATERNARY ALLUVIUM |
| z | | Not Encountered | VS UTP | | 0.5 | | | | W - M | | Vs UтР | | |
| | | | | | 1.0 — | 0 0 0 | SP | SILTY SAND: medium grained, yellow-brown with orange staining. Sandy GRAVEL: medium to coarse grained, brown-grey. | s | | | | |
| | <u> </u> | | | | - - 1.5 - - | o o o | | Excavation TP14 terminated at 1.5 m Target depth | | | | | |
| | | | | | 2.0 - | | | | | | | | |
| | | | | | 2.5 — - | | | | | | | | |
| | | | | | 3.0 | | | | | | | | |
| | | | | | 3.5— | | | | | | | | |
| method | | | T | sup | | | | samples & field tests | soi | I group s | symbol & | | consistency / relative density |
| AS a | auger of auger s hand a washbo | screwir uger | | pen | etration | | nil istance g to | B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) | moistu D dr | re condit | 1726:2017 | | VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable |
| e.g. / B I | bit show AD/T blank b TC bit V bit | • | suffix | wate | 10-0 leve | Oct-12 wa el on date er inflow er outflow | shown | N' SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | M moist W wet S saturated Wp plastic limit WI liquid limit | | | | VL very loose L loose MD medium dense D dense VD very dense |



project:

Engineering Log - Excavation

sheet: 1 of 1

Borehole ID.

project no.

773-CHCGE288040

TP15

Rolleston Industrial Developments Limited client: date started: 06 May 2021

06 May 2021 principal: date completed: 535 Mill Road logged by: B. Chau

Ohoka, Christchurch 7676 C. Thompson checked by: location:

| _ | locat | lion: | UII | oka, Ch | 1130 | CHUI | CII 7 | 070 | | checked by: | U. 11 | nompson |
|---|-----------------------------|---|-----------------|-----------------------|--------|---------------------------|--|------------------------|--|--|---------------------------------------|--|
| ſ | positi | on: Not | Spec | cified | | | | | surface elevation: Not Specified | angle from horizontal: | 90° | DCP id.: |
| | drill m | nodel: Hi | tachi | 14t, Track | moun | ted | | | drilling fluid: Swamp Bucket | hole diameter : | | vane id.: 1508 |
| | drilli | ing info | mati | on | | | mate | rial sub | estance | | | |
| | method & support | penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | ondition shear ending the hold of the hold | CP ows/ mm) add | structure and itional observations |
| | | | | | _ | - | | ML | SILT: low plasticity, brown. | M | | L . |
| | — Ш Z | | Not Encountered | VS 209/ 62 kPa | | 0.5 — | | ML | Clayey SILT: medium plasticity, grey with orange mottling. | VSt - H | | RNARY ALLUVIUM |
| File>> 24/05/2021 12:06 | | | | | | - | | GW | Sandy GRAVEL: medium to coarse grained, grey with orange staining, and trace of cobbles. | S | i i i | - - - |
| SINT.GPJ < <drawing< td=""><td></td><td></td><td></td><td></td><td></td><td>1.5 - - - -</td><td></td><td></td><td>Excavation TP15 terminated at 1.5 m Target depth</td><td></td><td> </td><td>- - -</td></drawing<> | | | | | | 1.5 - - - - | | | Excavation TP15 terminated at 1.5 m Target depth | | | - - - |
| + DCP CHCGE288040 | | | | | | 2.0 — | | | | | | - - |
| Log COF BOREHOLE: NON CORED + DCP CHCGE288040 GINT.GPJ < <drawingfile>></drawingfile> | | | | | | 2.5— | | | | | | - - - |
| | | | | | | 3.0 — | | | | | | - - |
| CDF_0_9_07_LIBRARY.GLB rev:AU | | | | | | 3.5 — - - - | | | | | | - - |
| | meth AD AS HA W | auger d auger s hand au washbo | crewir ıger | | pen | mud casing etration | | nil istance g to | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) | soil group symbol & soil description based on AS 1726:2017 moisture condition D dry M moist | VS S F St VSt H Fb | y / relative density very soft soft firm stiff very stiff hard friable |
| | e.g. B T V | bit show AD/T blank bi TC bit V bit | • | suffix | | 10-0 leve | Oct-12 wa el on date er inflow er outflow | shown | N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | W wet S saturated Wp plastic limit WI liquid limit | VL L MD D VD | very loose loose medium dense dense very dense |



535 Mill Road

client:

principal:

project:

Engineering Log - Excavation

Rolleston Industrial Developments Limited

TP16

sheet: 1 of 1

Borehole ID.

773-CHCGE288040 project no.

date started: 06 May 2021

date completed: 06 May 2021

B. Chau logged by:

Ohoka, Christchurch 7676 location: checked by: C. Thompson

position: Not Specified surface elevation: Not Specified angle from horizontal: 90° DCP id.: drill model: Hitachi 14t, Track mounted drilling fluid: Swamp Bucket vane id.: 1508 hole diameter: drilling information material substance consistency / relative density DCP material description structure and penetratio samples & (blows/ 100 mm) additional observations soil group symbol $\widehat{\Xi}$ moisture condition field tests method a SOIL NAME: plasticity or particle characteristic, graphic Ξ depth (colour, secondary and minor components (kPa) 02 02 02 02 R ML SILT: low plasticity, brown. М $\Box\Box\Box$ 1111 **3**1111 ML Clayey SILT: low to medium plasticity, pale VSt QUATERNARY ALLUVIUM grey with orange mottling. VS 166/ 67 kPa ÐІ 6 0.5 \perp VS 106/ 60 kPa 11111 1.0 \perp \perp VS 54/ 1111121 kPa W ++++11111Sandy GRAVEL: medium to coarse grained, grey with orange staining, and trace of cobbles. GW 11111 S 11111 11111 Excavation TP16 terminated at 1.7 m GINT.GP. Target depth IIIIII \perp 11111 2.0 \perp \perp 111I + I + I $\perp 1 \perp 1 \perp 1 \perp 1$ \Box +111112.5 1111111111 1111111111 \perp IIII3.0 \perp 11111| | |+111113.5 $\Pi\Pi\Pi$ 11111 IIIIII \perp 11111 \perp IIIIII11111auger drilling* support imples & field tests soil group symbol & consistency / relative density N nil bulk disturbed sample soil description very soft AS auger screwing C casing disturbed sample based on AS 1726:2017 soft hand auger НА Ε environmental sample firm penetration W washbore SS split spoon sample St stiff no resistance ranging to refusal undisturbed sample ##mm diameter verv stiff VSt U## moisture condition HP hand penetrometer (kPa) H Fb dry moist wet saturated D M W standard penetration test (SPT) Ν friable SPT - sample recovered very loose bit shown by suffix SPT with solid cone Nc loose e.g. B AD/T level on date showr medium dense VS vane shear; peak/remouded (kPa) Wp plastic limit WI liquid limit MD blank bit vater inflow R refusal D dense TC bit vater outflow НВ VD very dense



project no. 773-CHCGE288040

Borehole ID.

sheet:

TP17

1 of 1

client: Rolleston Industrial Developments Limited date started: 06 May 2021

principal: - date completed: 06 May 2021
project: 535 Mill Road logged by: B. Chau

| lo | cati | ion: | Oh | oka, Ch | rist | chur | ch 7 | 676 | | checked by: | C. Thompson |
|------------------|----------------|---|-----------------|-----------------------|--------|--------------|--|-----------------------------|---|--|---|
| pc | ositio | n: Not | Spec | cified | | | | | surface elevation: Not Specified | angle from horizontal: 9 | 0° DCP id.: |
| dr | ill mo | odel: Hi | tachi | 14t, Track | moun | ted | | | drilling fluid: Swamp Bucket | hole diameter : | vane id.: 1508 |
| ٥ | Irillir | ng info | mati | on | | | mate | rial sub | estance | | |
| method & | support | 1 2 penetration 3 | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition conditi | ws/ nm) additional observations |
| | 1 | | | | | - | | ML | SILT: low plasticity, brown. | M | TOPSOIL |
| - - - | | | Not Encountered | VS 209/ 33 kPa | | 0.5 | | ML | Clayey SILT: low to medium plasticity, grey with orange mottling. | VSt - H | 11 |
| | | | | | | - | 0 0 0 0 0 0 | GW | Sandy GRAVEL : medium to coarse grained, grey with orange staining, and trace of cobbles. | | |
| • | • | | | | | 1.0 - - | 0 | | Excavation TP17 terminated at 1.0 m Target depth | | |
| Þ | | | | | | 1.5— | | | | | |
| | | | | | | - | | | | | |
| | | | | | | 2.0 | | | | | |
| | | | | | | - 2.5— | | | | | |
| | | | | | | | | | | | |
| | | | | | | 3.0 | | | | | |
| | | | | | | - | | | | | |
| | | | | | | 3.5 — | | | | | |
| _ | netho | | | Ī | 6115 | - port | | | complex 9 field texts | soil group symbol & | |
| A | ND NS NA | auger d auger s hand au washbo | crewir ıger | | M i | | | nil istance | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter | soil description based on AS 1726:2017 moisture condition | consistency / relative density |
| * e B T | | bit show AD/T blank bi TC bit | • | suffix | wate | 10-0 leve | no res rangin refusa Oct-12 was el on date er inflow er outflow | g to il ater shown | HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal | Moisture condition D dry M moist W wet S saturated Wp plastic limit WI liquid limit | H hard Fb friable VL very loose L loose MD medium dense D dense |



client:

principal: -

Engineering Log - Excavation

Rolleston Industrial Developments Limited

sheet: 1 of 1

Borehole ID.

date completed:

773-CHCGE288040 project no. date started: 06 May 2021

06 May 2021

TP18

project: 535 Mill Road B. Chau logged by:

Ohoka, Christchurch 7676 C. Thompson location. checked by:

| ocation: | On | oka, Ch | rist | chur | cn / | 676 | | | С | hecked b | oy: | C. Thompson |
|--------------------------------|--|-----------------------|-------------------|--|---------------------------------------|----------------------|---|----------------------------------|-----------------------------------|--|----------------|---|
| position: No | ot Spec | cified | | | | | surface elevation: Not Specified | á | angle fro | om horizon | ıtal: 90° | DCP id.: |
| drill model: I | Hitachi | 14t, Track | moun | ited | | | drilling fluid: Swamp Bucket | h | nole dia | meter: | | vane id.: 1508 |
| drilling inf | ormati | on | | | mate | rial sub | estance | | | | | |
| support 2 penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear eremoulded e peak (kPa) | DCP (blows/DCP | structure and additional observations |
| | Not Encountered | VS 70/ 34 kPa | | 0.5 — | | ML ML | SILT: low plasticity, brown. Clayey SILT: medium plasticity, grey with orange mottling. Sandy GRAVEL: medium to coarse grained, grey with orange staining. | M | St | ₩ | | |
| | | | | 1.5 — | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | | Excavation TP18 terminated at 1.2 m Target depth | | | | | |
| AS auger HA hand W washb | drilling ³ screwir auger pore | ng* | M r C c pen | etration or o | ı | ater shown | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | moistu D dr M m W we S sa Wp pla | re condi y oist | 1726:2017 tion | | consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense |



principal: -

Engineering Log - Excavation

sheet: 1 of 1

Borehole ID.

date completed:

project no. **773-CHCGE288040**

TP19

06 May 2021

client: Rolleston Industrial Developments Limited date started: 06 May 2021

project: 535 Mill Road logged by: B. Chau

| | n: C | | oka, Ch | 1131 | Ciiui | CII 7 | 070 | | | checked | т бу. | C. Thompson |
|-----------------------------------|----------------------------------|-----------------|-----------------------|---------|-----------------------------------|---------------|---|--|-----------------------|--|---|--|
| oosition: | Not S | peci | fied | | | | | surface elevation: Not Specified | á | angle from horiz | ontal: 90° | DCP id.: - |
| drill mode | lel: Hita | chi 1 | 4t, Track | moun | nted | | | drilling fluid: Swamp Bucket | ŀ | hole diameter : | | vane id.: 1508 |
| drilling | inforn | natio | n | | | mate | rial sub | estance | | | | |
| | 2 penetration 3 | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density / see Shear (Kba) (Kba) (Kba) | ^{ed} 100 mm) | structure and additional observations |
| | | | | | - | | ML | SILT: low plasticity, brown. | М | | | TOPSOIL |
| | | Not Encountered | VS UTP | | 0.5— | | ML | Clayey SILT: low to medium plasticity, grey with orange staining. | | VSt - H | | QUATERNARY ALLUVIUM |
| | | | VS UTP | | 1.0 | 0 0 0 | GW | Sandy GRAVEL: medium to coarse grained, brown-grey with orange staining. | | D | i | |
| | | | | | 1.5 — - - | | | Excavation TP19 terminated at 1.4 m Target depth | | | | |
| | | | | | 2.0 — | | | | | | | |
| | | | | | 2.5— | | | | | 111 | | |
| | | | | | 3.0 — | | | | | | | |
| | | | | | 3.5 — | | | | | | | |
| method AD au AS au HA ha | uger dril uger scr and aug | ewino er |)* | M i | port mud casing etration | | nil | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample | : | il group symbol 8 soil description ed on AS 1726:20 | 17 | consistency / relative density S very soft S soft F firm |
| | by si | uffix | wate | er 10-0 | | ater shown | SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal | D dr M m W we S sa Wp pla | oist | | St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense | |



535 Mill Road

client:

project:

principal: -

Engineering Log - Excavation

Rolleston Industrial Developments Limited

TP20 sheet: 1 of 1

Borehole ID.

773-CHCGE288040 project no.

date started: 06 May 2021

06 May 2021 date completed:

B. Chau logged by:

location: Ohoka. Christchurch 7676 C. Thompson checked by

| locatio | on: | Oh | oka, Ch | rist | chur | ch 7 | 676 | | | C | hecked b | oy: | C. Thompson |
|----------------------|--|-----------------|-----------------------|--------|-----------|--|------------------------|--|-------------------------------|---|---|---------------------------|---|
| positior | n: No | t Spec | ified | | | | | surface elevation: Not Specified | í | angle fr | om horizor | ıtal: 90° | DCP id.: - |
| drill mo | del: H | itachi | 14t, Track | mour | ited | | | drilling fluid: Swamp Bucket | ı | hole dia | meter: | | vane id.: 1508 |
| drillin | g info | rmati | on | | | mate | rial sub | estance | | | | | |
| method & support | penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear ⊕ remoulded ⊕ peak (kPa) 05 05 05 | DCP (blows/ 100 mm) | |
| A A | | | | | - | | ML | SILT: low plasticity, brown. | M | 0.2 | | 111 | TOPSOIL |
| Z | | Not Encountered | VS 171/ 36 kPa | | 0.5 | | ML | Clayey SILT: medium plasticity, brown-grey with orange mottling. | | VSt | | | QUATERNARY ALLUVIUM |
| | | | VS 203/ 46 kPa | | 1.0 — | 0 0 0 0 0 | GW | Sandy GRAVEL: medium to coarse grained, brown-grey with orange staining. | | D | - + + + + + + + + + + + + + + + + + + + | | |
| | | | | | 1.5 — | | | Excavation TP20 terminated at 1.4 m Target depth | | | | | |
| | | | | | 2.0 — | | | | | | | | |
| | | | | | 2.5— | | | | | | | | |
| | | | | | 3.0 — | | | | | | | | |
| | | | | | 3.5 — | | | | | | | | |
| AD : AS : HA ! | nethod D auger drilling* S auger screwing* HA hand auger V washbore bit shown by suffix AD/T B blank bit TC bit | | | | | ı | nil istance g to | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) | base moistu D dr M m | soil desc ed on AS are condi y oist | symbol & cription 1726:2017 | | consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable |
| e.g. / B I T | | | | | | Oct-12 wa el on date er inflow er outflow | shown | N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | Wp pl | et aturated astic limi juid limit | t | | VL very loose L loose MD medium dense D dense VD very dense |



client:

Engineering Log - Excavation

Rolleston Industrial Developments Limited project no. 773-CHCGE288040

Borehole ID.

sheet:

TP21

1 of 1

principal: - date completed: 06 May 2021

project: 535 Mill Road logged by: B. Chau

| position: Not Specified surface elevation: Not Specified drill model: Hitachi 14t, Track mounted drilling fluid: Swamp Bucket | | | | | | | | | | angle fr | om horizor meter : | ntal: 90° | DCP id.: vane id.: 1508 |
|---|---|----------------------|-----------------------|--------|---------------------------|-------------|----------------------|---|---|---|---|--------------------------|--|
| drilling | | matio | on | | | mate | rial sub | | _ | | 1 | | |
| | 2 penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear ⊕ remoulded ⊚ peak (kPa) % 00 00 00 | 00 mm) DCP (blows/ | structure and additional observations |
| | | Not Encountered | VS 151/ 60 kPa | | 0.5 — | | ML ML GW | SILT: low plasticity, brown. Clayey SILT: low to medium plasticity, grey-brown with orange mottling. Sandy GRAVEL: medium to coarse grained, grey-brown with orange staining, and trace of cobbles. | M | VSt | □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ | | |
| , \ | | | | | 1.5— | | | Excavation TP21 terminated at 1.6 m Target depth | | | | | |
| method AD au AS au HA ha W wa | uger di uger so and au rashbor | crewin iger re | g* | pend | poort mud casing etration | | ater shown | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample ss spilt spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | moistu D dr M m W w S sa Wp pl | soil desc ed on AS are condi y oist | 1726:2017 | | soft firm stiff St very stiff hard friable very loose loose medium dense dense |



sheet: 1 of 1
project no. 773-CHCGE288040

TP22

Borehole ID.

client: Rolleston Industrial Developments Limited date started: 06 May 2021

principal: - date completed: 06 May 2021

project: 535 Mill Road logged by: C. Thompson location: Ohoka, Christchurch 7676 checked by: C. Thompson

| lc | ocation: Ohoka, Christchurch 7676 checked by: | | | | | | | | | | | oy: | C. Thompson | |
|--|---|--|-------|-----------------------|--|----------------------|--|---|--|--|-----------------------------------|---|--|--|
| р | ositic | sition: Not Specified surface elevation: Not Specified | | | | | | | | | angle fro | m horizon | DCP id.: - | |
| d | drill model: Hitachi 14t, Track mounted | | | | | | | | drilling fluid: Swamp Bucket | hole diameter : | | | vane id.: 1508 | |
| | Irilling information material substance | | | | | | | | | | | | | |
| method & | support | 2 penetration | water | samples & field tests | RL (m) | depth (m) | graphic log | soil group symbol | material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components | moisture condition | consistency / relative density | vane shear ⊕ remoulded • peak (kPa) 02 00 00 | DCP (blows/ 100 mm) | structure and additional observations |
| Ā | | | | | | - | | ML ML | SILT: low plasticity, brown. Clayey SILT: medium plasticity, grey with | М | St - VSt | | | TOPSOIL |
| 24/05/2021 12:06 | | | | | | 0.5 — | | GW | Sandy GRAVEL: medium to coarse grained, grey-brown with orange staining. | W | D | | | |
| < <drawingfile>></drawingfile> | • | | | | | 1.5 | ···• · · · · | | Excavation TP22 terminated at 1.4 m Target depth | | | | +++++ | |
| COF BOREHOLE: NON CORED + DCP CHCGE288040 GINT.GPJ | | | | | | - 2.0 — - | | | | | | | | - - - - |
| EHOLE: NON CORED + DC | | | | | | 2.5— - - | | | | | | | | - - - - - |
| _S | | | | | | 3.0 — | | | | | | | | - - - - - |
| CDF_0_9_07_LIBRARY.GLB rev.AU | | | | | | 3.5 — - - - | | | | | | | | - - - - - |
| H | 1 2 2 2 | | | | M mud N nil C casing penetration | | stance g to | samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered | soil group symbol & soil description based on AS 1726:2017 moisture condition D dry M moist | | | | St stiff //St very stiff H hard Fb friable | |
| 6 E | | | | | | 10-0 leve | Oct-12 wa el on date er inflow er outflow | shown | N° SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing | S saturated Wp plastic limit WI liquid limit | | | | /L very loose L loose MD medium dense D dense //D very dense |



Vodafone NZ

Principal:

Engineering Log - Machine Borehole

Sheet 1 of 3

Date completed:

Machine Borehole No. **BH01**

GENZCHRI15188 Project No:

7.7.2011

7.7.2011

Date started:

SKK 236 Bradleys Road, Ohoka Project: Logged by:

Machine Borehole Refer to site plan Checked by: NH

| Lo | cati | on: | | | F | Refe | r to | site | plan | | | | | | | CI | hecke | d by | : | | ^ | VH |
|-------------------------------------|------------|---|------------------------|---------------------------------|-------|------------------------------|---|---|--|---|------------------------|--|------------|---------------|---------------|----------------------------|--|-----------------------------|-------|--------------------|--|---|
| Dril | ll mo | del | & n | nounting: | VTR | 9700 | -Track | 70mr | n (DT) Ea | asting: 24 | 74175 | m | | Slope | e: -90° | | R.L | . Sur | face | : m | | Vane No: |
| _ | | | | mm | | D | rilling f | | | orthing: 5 | 75972 | 3 m | | Beari | ng: | | Dat | um: | | | | |
| dr | rillin | ıg i | nfo | rmation | 1 | | | _ | substance | | | | | | | | | rc | ck | mass | def | + |
| stratigraphy | method | noddns | water | notes samples, tests, etc | RL | depth metres | graphic log core recovery | classification symbol | material Soil - Soil type; colour, structul bedding; plasticity, sensitivity. S minor components. Rock - Colour, fabric, rocl discontinuities, additional inf | re. Grading; econdary ar k type; ormation. | moisture condition | consistency/ density index | weathering | estin stre | nated ngth | 25 50 75 vane shear | 100 (remoulded 125 /peak) kPa 150 175 | recovery % | RQD % | defe spac mr | ing n | defect description number, type, orientation, sha roughness, aperture, infill description (refer to defect description explanation shee particular gener |
| Topsoil | | | | | | - | | | TOPSOIL; No core from 0. 0.40m | 00 to | М | F | | | | | | | | | | |
| 2 | | | | | | _ | × × × | ML | TOPSOIL; dark grey friable with roots | e topsoil | | | | | | | | _ | | | | |
| 6 | | , | ▼ | SPT | | 1 | × × × × × × × × × × × × × × × × × × × | | SILT with traces of rootlets brownish grey (mottled), fir plasticity, homogeneous | | | | | | | | | 73 | | | | |
| ds) m | | | | 11,15,21 N*=36 | | - | | SP GW | SAND wity traces of rootlet grey, friable | | | D | | | | | | | | | | |
| Springston Fm (sps) | | | | | | 2 | | | Sandy fine to coarse GRA\ coloured, sub-rounded to ri loose to medium dense, homogeneous | | | | | | | | | 87 | | | | |
| | | | | SPT 50 N*=R | | 3 | | GW | Sandy silty fine to coarse of brownish, sub-rounded to roose to medium dense, trasilt | ounded, | _ | VD | | | | | | | | | | |
| | | | | IN -IX | | - | | GP | Medium to coarse GRAVE colour, sub-rounded to rou very loose, bedded | | | | | | | | | 100 | | | | |
| guaterilary Age | | | | SPT 37,13 N*=R | | <u>4</u> - - - - | | GW | Sandy fine to medium GRA greyish, sub-angular to rou loose to medium dense, homogeneous | | | | | | | | | 1 | | | | |
| ; | | | | | | <u> </u> | | | | | | | | | | | | 100 | | | | |
| Carmiani Camadon (mi) | | | | SPT 50 N*=R | | <u>6</u> - | | GP | Sandy fine to medium GRA greyish, sub-angular to rou loose to medium dense, | inded, | _ | | | | | | | | | | | |
| | | | | SPT | | 7 | | GW | homogeneous, more sandy Sandy fine to coarse GRA\ greyish, sub-rounded to rou loose to medium dense, homogeneous | √EL; | | | | | | | | 100 | | | | |
| | | | | 50 N*=R | | - 8 | ••• | SP | Medium to coarse SAND; gloose, homogeneous | greyish, | 1 | | | | | | | 100 | | | | |
| AC OE TT W su N C | t ppor | auge oper triple wash t nil casir | n bai e tub nbor | e e | | r L | oased on New Zea notes, s J ₅₀ J ₆₃ | ation s cription n Field aland G amples undistrundi | Description of Soil and Rock, seatechnical Society Inc 2005 s, tests urbed sample 50mm diameter urbed sample 63mm diameter urbed sample 63mm diameter | water V moist | on wa pai cor | date s ter infl tial dri nplete | ill fluid | | | consist VS S F St VSt H VL | sofi firm stiff ver har | y soft t n y stiff | | ex | UW SW MW HW CW RS rock | hering unweathered slightly weathered moderately weathered highly weathered completely weathered residual soil mass strength extremely weak |
| va ◆ × ≫: | ре × ре | emoi eak eak | ulde grea | | 00kPa | N E | √ √c 3s | SPT - SPT w bulk sa | sample recovered rith solid cone | D M W S | W | oist | ed | | | L MD D VD | loo: me der | se dium | dens | е | VW W MS S VS ES | very weak weak moderately strong strong very strong extremely strong |



Vodafone NZ

Principal:

Engineering Log - Machine Borehole

Machine Borehole No. **BH01**

Sheet 2 of 3

GENZCHRI15188 Project No:

7.7.2011 Date started:

7.7.2011 Date completed:

236 Bradleys Road, Ohoka SKK Project: Logged by: Machine Borehole

| OCE | | | | nounting: | | | | | plan o (DT) | Easting: 24 | 7/175 | m | | Slope: | -Q0° | Checked | | rface | | IH Vane | No: |
|--------|---|--|---|---------------------------------|-------|----------------------|--|---|---|--|--|--|-----------------------------|------------------|------------|--|----------------------------------|------------|--|--|--|
| | | | | • | VIK | | | | • | ū | | | | | | | | | | vane | NO: |
| | | | | mm rmation | | D | rilling f | | substance | Northing: 57 | 75972 | 3 m | | Bearing |] : | Dat | | Gro | una mass def | ects | |
| 1 | ····; | 9 " | | mation | _ | | _ | _ | | | | | | | | L D - | H | | mass acr | | description |
| method | support | 100 | water | notes samples, tests, etc | RL | depth metres | graphic log core recovery | classification symbol | Soil - Soil type; colour, struct bedding; plasticity, sensitivity. minor components Rock - Colour, fabric, ro discontinuities, additional in | ture. Grading; Secondary an s. ock type; nformation. | moisture condition | consistency/ density index | weathering alteration | estima streng | | 25 50 vane shear 100 (remoulded 125 /peak) kPa 175 | recovery % | RQD % | defect spacing mm | number, type roughness description | orientation, sh s, aperture, infil n (refer to defect explanation she gene |
| | | | | SPT 50 | | 9 | | GW (cont) GP GW | Sandy fine to coarse GRA greyish, sub-angular to sub-rounded, loose to me dense, homogeneous (cc Fine GRAVEL; greyish, sub-rounded to rounded, medium dense, laminated Sandy fine to coarse GRA | edium ontinued) | M | VD | | | | | 100 | | | | |
| | | | | N*=R | | - - - 10 | | GW | greyish, sub-angular to sub-rounded, medium del homogeneous Medium to coarse GRAVI greyish, sub-angular to sub-rounded, very loose, homogeneous Sandy fine to coarse GRA | nse, | М | | | | | | 80 | | | | |
| | | | | SPT 50 N*=R | | - - 1 <u>1</u> | X | GW | greyish, sub-angular to sub-rounded, medium developmeneous Sandy fine to coarse GRA greyish, sub-angular to sub-rounded, medium developmeneous | nse, AVEL; | <u>/</u> | | | | | | 98 | | | | |
| | | | | SPT 39,11 N*=R | | 1 <u>2</u> | | GW | Sandy fine to coarse GRA greyish, sub-rounded to rumedium dense, homogen | ounded, | | | | | | | | | | | |
| | | | | SPT 5,19,18 | | 1 <u>3</u> | | | to medium sand | | _ | | | | | | 63 | | | | |
| | | | | N*=37 | | 1 <u>4</u> | | GW | Fine SAND; brownish colonedium dense, lensoidal Sandy fine to coarse GRA greyish colour, sub-round rounded, medium dense, homogeneous - minor silt | AVEL; | | D | | | | | 100 | | | | |
| | | | | SPT 50 N*=R | | 1 <u>5</u> | | GW | Sandy silty fine to coarse grey, sub-rounded to rour loose. | GRAVEL; nded, very | W | VD | | | | | | | | | |
| neth | lod | | | | | 16 16 | lassific | ation s | Core collected in a sampl symbols and | + | | | | | | | | . : : | weath | nering | |
| | op tri w nort ni ca sh rer pe | pper riple wash t asir mear mou eak | tub tub nbor ng (kP ulde | e e 'a) | 00kPa | n U U | lew Zea lotes, s J ₅₀ J ₆₃) l* lc Ss | amples undistuun | Description of Soil and Rock, seotechnical Society Inc 2005 s, tests urbed sample 50mm diameter urbed sample 63mm diameter sed sample sample recovered ith solid cone | moistu D W S | on wa par cor ure dr m | date s ter infletial dri nplete y oist | ow II fluid drill flu | | \ | S soft = firm St stiff //St very H hard //L very - loos MD med D den | y soft y stiff d y loos se dium | se dens | SW SW MW HW CW RS rock EW VW | highly we | eathered ly weathered athered ly weathered soil weak k ly strong |



Vodafone NZ

Principal:

Engineering Log - Machine Borehole

Machine Borehole No. **BH01**

Sheet 3 of 3

Project No: **GENZCHRI15188**

Date started: **7.7.2011**

Date completed: **7.7.2011**

Project: 236 Bradleys Road, Ohoka Logged by: SKK

Machine Borehole
Location: Refer to site plan Checked by: NH

| | cat | | | orehole | F | Refe | r to | site | plan | | | | | | | | (| Chec | ckec | by: | | | NH | | |
|---------------|--------|------------|----------------------|---------------------------------|-------|-----------------|------------------------------------|----------------|---|--|-----------------------|--------------------------------|-----------------------|-----------|------------|--------------|----------|---|-----------------------|------------------|--------|-------------------------|--------------------------|---|-----------------|
| Dri | ll m | ode | el & | mounting: | VTR | 9700- | Track | 70mr | m (DT) | Easting: 24 | 74175 | m | | Slo | pe: - | 90° | | | R.L. | Surfa | ce: | m | ١ | ane No: | |
| | | | | r: mm | | D | rilling | | | Northing: 5 | 75972 | 3 m | | Bea | aring: | | | | Datu | um: G | rour | nd | | | |
| d | rilli | ing | inf | ormation | 1 | | | _ | substance | | | | _ | | | | | | | roc | k m | ass de | | | |
| stratigraphy | method | support | water | notes samples, tests, etc | RL | depth metres | graphic log core recovery | classification | material Soil - Soil type; colour, stru bedding; plasticity, sensitivity minor componer Rock - Colour, fabric, discontinuities, additiona | cture. Grading; /. Secondary ar nts. rock type; I information. | moisture condition | consistency/ density index | weathering alteration | est st | imaterengt | ed h | 25 50 | 75 Vane snear 100 (remoulded 125 (2012) 150 | 150 /peak) KPa 175 | recovery % | פ ב | defect spacing mm | number roug descri | hness, ape ription (refe ption explar | ntation, sha |
| | | | | | | _ | | GW (cont) | | | W | VD | | | | | | | | | | | | | |
| \exists | | | | | | - | | 1 | BH01 terminated at 16.5 | 5 metres. | | | | | | | П | | | | | | | | |
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| | | | | | | 24 | | | | | | | | | | | | | | | | | | | |
| m Al Ol | | au | ger d | rilling arrel | | S | oil des | criptio | l symbols and n Description of Soil and Rock | water | | 1/98 w | | vel | | V | S | stenc | very | nsity ii soft | ndex | UW SW | slig | reathered | ered |
| W | Γ | trip wa | ole tu ishbo | be | | ١ | lew Ze | aland C | Geotechnical Society Inc 2009 | | wa | date s ter infl tial dri | ow | loss | | S F Si | | | soft firm stiff | | | MW HW CW | mod high com | lerately we ily weather ipletely we | eathered red |
| Ν | ıppc | nil | | | | ι | J ₅₀ J ₆₃ | undist | urbed sample 50mm diamete urbed sample 63mm diamete | er 🔫 | | nplete | | | s | V: | St | | very | | | RS | | dual soil | |
| C va | ne s | | sing ar (k | Pa) | | [|) | disturb | ped sample sample recovered | moist | ure dr | v | | | | VI L | | | | loose | | EW VW | extr | emely wea weak | ık |
| • × | | rem pea | oulde k | ed | | N | i Ic Ss | | vith solid cone | M W | | oist | | | | M D | | | | lium de | nse | W MS | | lerately str | ong |
| | | | | ater than 20 penetrate | 00kPa | E | | | nmental sample | s | | aturate | d | | | V | | | | dense | | S VS ES | | ng [,] strong emely stro | na |

Borelog for well BW24/0297

Grid Reference (NZTM): 1576754 mE, 5210602 mN

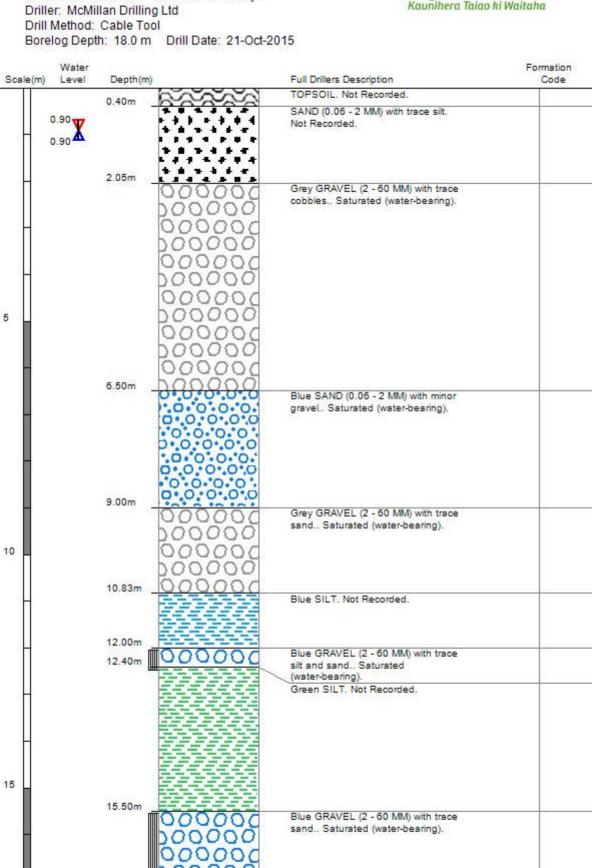
Location Accuracy: 10 - 50m

Ground Level Altitude: m +MSD Accuracy:

17.50m

18.02m





Brown GRAVEL (2 - 60 MM) with some sand.. Not Recorded.

Borelog for well M35/0300 Environment Grid Reference (NZTM): 1565501 mE, 5198781 mN anterbury Location Accuracy: 50 - 300m Regional Council Ground Level Altitude: 23.9 m +MSD Accuracy: < 0.5 m Kaunihera Taiao ki Waitaha Driller: Job Osborne (& Co/Ltd) Drill Method: Unknown Borelog Depth: 114.0 m Drill Date: 07-Dec-1894 Water Formation Scale(m) Level Depth(m) Full Drillers Description Code Topsoil 0.30m 0.30m Topsoi Loose shingle 18.29m 18.29m Loose shingle Hard shingle 24.40m Hard shingle 24.40m Close shingle 59.70m 59.70m Close shingle Hard shingle 70.09m Hard shingle 70.09m Loose shingle 76.19m Loose shingle 76.19m Hard shingle 93.00m 93.00m Hard shingle Loose shingle 97.50m 97.50m Loose shingle Hard shingle

106.70m

106.70m

114.00m

Hard shingle Loose shingle

Borelog for well BW24/0520

Grid Reference (NZTM): 1565685 mE, 5198823 mN



| Wat cale(m) Leve | 70 | Full Drillers Description | Formation Code |
|---------------------|---------------------------------------|--|-------------------|
| | 0.20m QQQC | Not Logged GRAVEL (2 - 60 MM). Not Recorded. | |
| | 0.60m | Not Logged TOPSOIL. Not Recorded. | |
| | 01010 | <i>0</i> = =< | |
| | 2.40m 0=0 | Not Logged gravelly CLAY. Not Recorded. | |
| | 0 0 0 0 0 0 0 0 0 0 | 0= 0= 0= =0 | |
| | o = 0 | Not Logged gravelly CLAY, Not | |

| | 2.4011 | 0101010 | Not Logged gravelly CLAY. Not Recorded. | |
|---|--------|---|---|--|
| 5 | 5.00m | 0 | Not Logged gravelly CLAY, Not Recorded. | |
| | 6.70m | 010110110110110110110110110110110110110 | Not Logged clayey GRAVEL (2 - 60 MM). Saturated (water-bearing). | |

Not Logged clayey GRAVEL (2 - 60 MM), Saturated (water-bearing).

| Grou Drille Drill | nd Leve er: Clem Method: | ence Drillii Rotary/Pe | m +MSD Accuracy: ng Contractors | Regional Co Kaunihera Taiao ki | | |
|-------------------------|--------------------------------|---------------------------|------------------------------------|---|-------|--|
| ale(m) | Water Level | Depth(m) | | Full Drillers Description | Forms | |
| | | 0.20m | 202000 | Not Logged GRAVEL (2 - 60 MM). Not Recorded. | | |
| | | 0.60m | | Not Logged TOPSOIL. Not Recorded. | | |
| | | 8.7 | | Not Logged clayey GRAVEL (2 - 60 MM). Not Recorded. | | |
| | | 2.40m | 0=0=0 | Not Logged gravelly CLAY, Not Recorded. | | |

8.20m

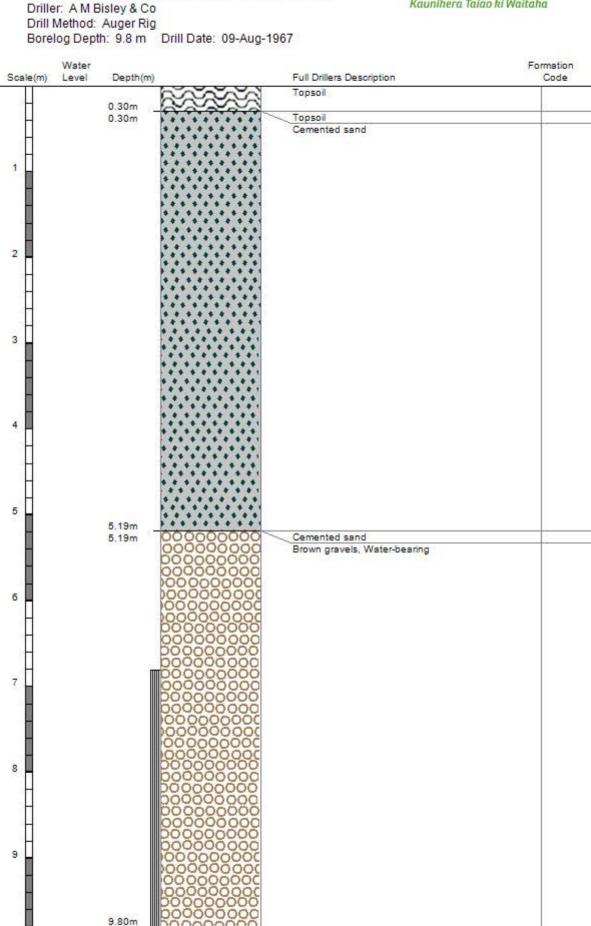
11.22m

Grid Reference (NZTM): 1563949 mE, 5197621 mN

Location Accuracy: 2 - 15m

Ground Level Altitude: 30.8 m +MSD Accuracy: < 0.5 m





Grid Reference (NZTM): 1564502 mE, 5197382 mN

Location Accuracy: 50 - 300m Ground Level Altitude: 28.1 m +MSD Accuracy: < 0.5 m

Driller: A M Bisley & Co Drill Method: Cable Tool

Borelog Depth: 20.3 m Drill Date:



| Scale(m) Level Depth(m) O.20m | Code |
|--|------|
| 0.20m Topsoil Silt and Grey gravel 1.30m 1.30m 1.50m Silt and Grey gravel Yellow clay and gravel Yellow clay and gravel Yellow clay and gravel | |
| 1.30m 1.30m 1.50m 1.50m Silt and Grey gravel Yellow clay and gravel Yellow clay and gravel | |
| 1.30m 1.50m Silt and Grey gravel Yellow clay and gravel Yellow clay and gravel | |
| 1.50m Yellow clay and gravel 1.50m Yellow clay and gravel | |
| 1.50m Yellow clay and gravel | |
| Medium gr, Brown gravel and sand | |
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| D: 0: 0: 0 | |
| 0 | |
| 14.40m | |
| 14.40m Medium gr, Brown gravel and sand | |
| 15 Sandy Grey gravels | |
| 15.40m | |
| 45 40m OOOOOOOO Sendy Gray grayels | |
| 00000000 Medium Brown/Grey stained gravel | |
| _000000000 | |
| ■ 00000000 | |
| | |
| 00000000 Medium Brown/Grey stained gravel 000000000 Medium Brown/Grey stained gravel 0000000000 Medium Brown/Grey stained gravel 000000000000000000000000000000000000 | |
| | |
| | |
| | |
| | |
| 19.29m 0000000 | |
| 19.29m Medium Brown/Grey stained gravel | |
| Sandy, medium Grey gravels and clay | |
| 20.29m . 0 . 0 . 0 | |

Grid Reference (NZTM): 1565596 mE, 5198870 mN

Location Accuracy: 1 - 2m
Ground Level Altitude: 21.1 m +MSD Accuracy: < 0.1 m



| Drill Metho Borelog De | | n Drill Date: 01-Jul-1 | 983 | |
|---------------------------|--------|---|-------------------------------------|-------------------|
| Wate ale(m) Level | | n) | Full Drillers Description | Formation Code |
| П | 271.01 | 2222 | Topsoil | |
| | 0.40m | 2222 | Blue clay | |
| 1.02 | 0.80m | | Sand and clay | |
| A. | | | Sand and day | |
| 1.25 | 1.50m | | | |
| | | 00000000 00000000 00000000 00000000 0000 | Bl/Gr gravel | |
| | 4.40m | 00000000 | Brown stained gravel, Water-bearing | × |
| | 5.60m | | Brown and gr gravel and sand | |
| | 7.80m | 00000000 00000000 00000000 000000000 0000 | Med gr gravel, Water-bearing | |

13.00m

Borelog for well M35/5609 Environment Grid Reference (NZTM): 1565032 mE, 5198906 mN anterbury Location Accuracy: 2 - 15m Regional Council Ground Level Altitude: 26.4 m +MSD Accuracy: < 0.5 m Kaunihera Taiao ki Waitaha Driller: McMillan Drilling Ltd Drill Method: Cable Tool Borelog Depth: 18.8 m Drill Date: 26-Jan-1989 Formation Water Level Full Drillers Description Code Depth(m) Topsoil 0.30m 0.30m Topsoil Brown silt, Black/Brown small to medium sandy gravels 1.20m 1.20m Brown silt, Black/Brown small to medium sandy gravels Black stained small to medium sandy gravels 3.50m Black stained small to medium sandy 3.50m gravels Medium Brown stained sandy gravels, trace Brown/Yellow clay, wl 2.4 4.19m Medium Brown stained sandy gravels, 4.19m trace Brown/Yellow clay, wl 2.4 Grey/Brown small to medium sandy gravel, odd large stone, Water-bearing, wl 2.4 to end of well 4.80m Grey/Brown small to medium sandy 4.80m gravel, odd large stone. Water-bearing, wl 2.4 to end of well Very sandy Grey/Brown gravels nb 5.40m Very sandy Grey/Brown gravels no Brown and Black stained small to 5.40m medium sandy gravels, Water-bearing

5

9.10m Brown and Black stained small to 9.10m medium sandy gravels, Water-bearing Grey/Brown sandy gravels, trace Brown clay, Water-bearing 9.60m Grey/Brown sandy gravels, trace 9.60m Brown clay, Water-bearing Grey/Brown sandy gravels, Water-bearing

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Grey/Brown sandy gravels,

Grey/Brown sandy gravels, trace Brown clay, Water-bearing

Grey/Brown sandy gravels, trace

Grey/Brown sandy gravels, trace

Grey/Brown sandy gravels, sticky Brown clay, Water-bearing

Grey/Brown sandy gravels, sticky

Grey/Brown sandy gravels, trace Brown clay, Water-bearing Small to medium Brown polished gravels, sandy large lumps, sticky

Small to medium Brown polished

gravels, sandy large lumps, sticky

Grey/Brown small to medium sandy gravels, trace Black stained

Grey/Brown small to medium sandy

gravels, trace Black stained Pea gravels, Grey/Brown and sandy,

Pea gravels, Grey/Brown and sandy,

trace Brown clay, free flowing Small to medium Grey/Brown sandy

Small to medium Grey/Brown sandy

Small to medium Grey/Brown sandy

gravels, trace Brown clay,

gravels, trace Brown clay,

gravels, trace Brown clay, Water-bearing, tighter

Water-bearing

Water-bearing

trace Brown clay, free flowing

Brown clay

Brown clay

Brown clay, Water-bearing Grey/Brown sandy gravels, trace Brown clay, Water-bearing

Brown clay, Water-bearing, very loose

Grey/Brown sandy gravels, trace Brown clay, Water-bearing, very loose

Brown clay, Water-bearing

Water-bearing

10

10.70m

10.70m

11.80m

11.80m

13.20m

13.20m

14.50m

14.50m

15.60m 15.60m

16.10m

16.10m

16.79m

16.79m

17.60m

17.60m

18.00m

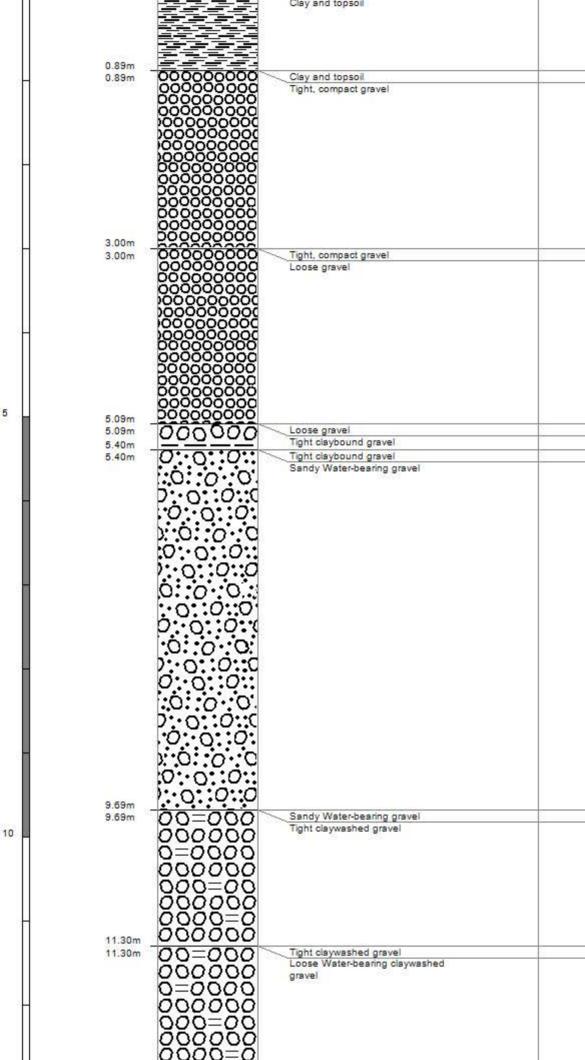
18.00m

18.79m

15

Scale(m)

Borelog for well M35/6483 Environment Grid Reference (NZTM): 1564742 mE, 5197412 mN anterbury Location Accuracy: 50 - 300m Regional Council Ground Level Altitude: 27.1 m +MSD Accuracy: < 0.5 m Kaunihera Taiao ki Waitaha Driller: Clemence Drilling Contractors Drill Method: Cable Tool Borelog Depth: 20.0 m Drill Date: 29-Nov-1990 Water Formation Level Full Drillers Description Code Depth(m) Clay and topsoil 0.89m Clay and topsoil 0.89m Tight, compact gravel 3.00m 3.00m Tight, compact gravel Loose gravel 5.09m 5.09m Loose gravel Tight claybound gravel 5.40m 5.40m Tight claybound gravel Sandy Water-bearing gravel



10 ŎŎŎŎŎŎ 0000 00000 00=000 000000 =000C 00000 14.60m 868666 Loose Water-bearing claywashed 14.60m gravel 15 Tight claybound gravel 000000 000000 000000 000000 000000 000000 000000 000000 000000 18.00m Tight claybound gravel 18.00m Good loose Water-bearing gravel

20.00m

Scale(m)

Grid Reference (NZTM): 1564192 mE, 5198081 mN

Location Accuracy: 50 - 300m

Ground Level Altitude: 31.0 m +MSD Accuracy: < 0.5 m

Driller: McMillan Drilling Ltd Drill Method: Cable Tool



| | | Cable Too h: 18.0 m | Drill Date: 04-May- | -1992 | |
|----------|----------------|------------------------|---|--|-------------------|
| Scale(m) | Water Level | Depth(m) | | Full Drillers Description | Formation Code |
| | Level | 0.40m | 22222 | Topsoil | Code |
| | | 0.40m | | Topsoil Brown clay | |
| Н | | 1.20m | Marie | | |
| | | 1.20m | 000. | Brown clay Brown sandy gravel and clay | 3 |
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| | | 11.80m | 0:.0:.0: | | |
| Н | | 11.80m | 0:0:0:: | Brown sandy gravel and clay Brown stained sandy gravel | |
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| | | 18.00m | .000. | | |

Grid Reference (NZTM): 1564472 mE, 5197322 mN Location Accuracy: 50 - 300m Ground Level Altitude: 28.1 m +MSD Accuracy: < 0.5 m

Environment Canterbury Regional Council

| ale(m) | Water Level | Depth(m) | | Full Drillers Description | Formation Code |
|--------|----------------|--|---|--|-------------------|
| | | 0.30m _ 0.30m | 84444A | Topsoil Topsoil | |
| | | U.30M | | Yellow clay | |
| H | | 1.00m 1.00m | 00=000 | Yellow clay | <u> </u> |
| | | 111 | 000000 | Heavy claywashed gravel | |
| | | | 000000 | | |
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| | | | 000000 | | |
| | | 2 00 | ŎŎŌŌŎŎ | | |
| | | 3.09m 3.09m | 000000000 | Heavy claywashed gravel Good loose Water-bearing gravel | |
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| | | | 500000000 | | |
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| To a | | | 000000000 | | |
| | | | 500000000 | | |
| | | 5.90m | 1000000000 | Good Josep Water has read a server | |
| 100 | | 5.90m | 5.5.5 | Good loose Water-bearing gravel Tight sandy claybound gravel | |
| | | | 0.0.0 | | |
| | | 7.00m 7.00m | 000000000 | Tight sandy claybound gravel | |
| | | r.oum | 00000000 | Water-bearing gravel | |
| | | 7.90m | 000000000 | | |
| | | 7.90m 7.90m | 000000 | Water-bearing gravel Tight silty claywashed gravel | |
| | | | 0=0000 | The second section of the second section of the second sec | |
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| | | | 868868 | | |
| Ц | | 12.90m _ 12.90m | 50000 S | Tight silty claywashed gravel | |
| | | | 000000000 | Good loose well sorted gravel | |
| | | | 000000000 | | |
| | | 14.00m _ 14.00m | 000000000 | Good loose well sorted gravel | |
| | | a real real real real real real real rea | <u>ŏŏŏŏŏŏ</u> | Tighter silty heavy claywashed gravel | |
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| | | 22.40m 22.40m | 000-00 | Tighter silty heavy claywashed gravel | |
| . 1 | | | 22-200 | Good Water-bearing claywashed | 100 |

Grid Reference (NZTM): 1563865 mE, 5197951 mN

Location Accuracy: 50 - 300m Ground Level Altitude: 32.0 m +MSD Accuracy: < 2.5 m

Driller: Clemence Drilling Contractors Drill Method: Rotary/Percussion



| | Water Level | Depth(m) | | Full Drillers Description | Formation Code |
|----|----------------|----------|--|--------------------------------------|-------------------|
| | | 0.50m | 22222 | top soil | |
| | | | | solid yellow clay | |
| | | 1.50m _ | 0:-0::0:: :0::0::0::0 D:-0::0::0 | sandy gravel | |
| | | 3.70m | 0.,0.,0. | | |
| 14 | | 4.00m | 000 | sity claybound gravel | - 6 |
| | | 4.55m | 00-000 | claywashed gravel | |
| 5 | | 5.50m | 000000000 | poor water-bearing gravel | |
| | | 5.80m | 9: 0::9:: | sandy claywashed gravel | |
| | | | :0:0:0 D:0:0:0 D:0:0:0 | very sandy water-bearing gravel | |
| 10 | | 8.20m _ | 00000000 00000000 00000000 00000000 0000 | orange water-bearing gravel | |
| 15 | | 15.10m | | very sandy water-bearing gravel | |
| | | | 00000000 00000000 00000000 00000000 0000 | better water-bearing gravel | |
| | | | 000000000 | orange water-bearing gravel | |
| 20 | | 18.80m _ | 00000000 00000000 00000000 00000000 0000 | lightly stained water-bearing gravel | |

23.16m