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22 October 2026

Fast-track Substantive Application - Geotechnical Report

Dunns Crossing Road

WESTHAVEN RESIDENTIAL DEVELOPMENT

Carter Group Ltd

Job No. CHC2026-0005AC | Version 1



EXECUTIVE SUMMARY

This report presents the results of geotechnical investigations and a geohazard assessment to support a substantive application made under the Fast-track Approvals Act 2024 for the proposed ~263Ha Westhaven Residential Development Project, located to the southwest of Rolleston, Canterbury. The Project is a listed project per Schedule 2 of the Fast-Track Approvals Act.

The existing topography for the site is gently sloping with the geology of the site is mapped as River Alluvium consisting of brown-grey sandy gravels with some areas of silty sand / sandy silt where paleochannels have been infilled. Groundwater levels have been measured between 3.12 and 6.27mbgl in borehole investigations.

Based on the investigations and assessment completed to date, the site is considered suitable for the proposed subdivision development from a geotechnical perspective, subject to our geohazard assessment and geotechnical recommendations summarised as follows:

- Earthworks should be undertaken in general accordance with NZS 4431:2022 and Selwyn District Council Development Standards under the guidance of a suitably qualified geo-professional.
- Topsoil stripping and proof rolling should be observed by a geotechnical professional to identify and manage unsuitable low-strength soils, including localised paleochannel infill or undocumented fill.
- The seismic site subsoil class may be assessed as Class D – Deep or soft soil sites in accordance with NZS 1170.5:2004.
- A preliminary ultimate bearing pressure of 300 kPa is considered appropriate for shallow strip and pad foundations founded on suitable natural soils or engineered fill, subject to site-specific confirmation at building consent stage.
- The site is considered suitable for TC1 foundation types, based on the preliminary assessment completed to date.
- Stormwater disposal is understood to be by soakage to ground and should be confirmed through detailed civil design and any further soakage assessment required for consenting and construction.

STATEMENT OF QUALIFICATIONS AND EXPERIENCE

Hamish Gray

I am an Engineering Geologist at CMW Geotechnical NZ Limited, trading as CMW Geosciences. CMW Geosciences is a specialist geotechnical engineering and geological services consultancy with offices in New Zealand and Australia. I have been employed at CMW since February 2026.

I hold the qualifications of BSc in Geology and a Professional Masters in Engineering Geology both from the University of Canterbury, completed in 2019 and 2021 respectively.

I have 6 years of professional experience in engineering geology in Auckland, Christchurch and Western Australian regions. My experience has been primarily in land development and infrastructure, with my most recent experience being focused on projects in Christchurch.

Chris Thompson

I am a Principal Engineering Geologist at CMW Geosciences. I have been employed at CMW since February 2026. I hold the qualifications of BSc(Tech) from the University of Waikato, completed in 2006.

I have 19 years of professional experience in engineering geology and geotechnical engineering and have >13 years' experience with Canterbury geology. I have worked on large residential, commercial and infrastructure projects across the South Island and focus on providing practical solutions for projects.

Kori Lentfer

I am a Principal Engineering Geologist at CMW Geosciences and a Chartered Professional Engineering Geologist with Engineering New Zealand. I have been employed at CMW since August 2015.

I hold the qualifications of BSc(Tech) from the University of Waikato, completed in 1999 and a MSc in Geology with Honours from the University of Auckland, completed in 2008.

I have 25 years of professional experience in engineering geology working on delivering a broad range of projects across New Zealand and internationally. I focus on geotechnical investigations and data interpretation to develop robust ground modelling to facilitate practical and cost-effective geotechnical design.

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Version Control

Document version information	
Job number	CHC2026-0005AC
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Review and Update History

Revision	Date	Comments
A	01 July 2026	Initial draft for internal review
B	08 July 2026	Second draft for internal review
0	23 July 2026	Final draft for external comment
1	22 October 2026	Update with external comments

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1.0 INTRODUCTION

CMW Geosciences (CMW) was engaged by Carter Group Ltd to carry out a geotechnical investigation and assessment of suitability of ~263Ha of land for the Westhaven Residential Development (formerly referred to in the Fast-Track Approvals Act 2024 (FTAA or Act) as the 'Rolleston West Residential Development'). The site is located on the southwest edge of Rolleston, Canterbury.

CMW understands that the current proposal is to undertake a residential development of the land, involving the subdivision to create approximately 4,134 residential lots, three commercial areas, as well as reserves, roading and infrastructure. The purpose of this report is to support the substantive application under the FTAA to enable the development.

2.0 SCOPE

A scope of assessment work for the site was developed and carried out by CMW, as outlined in the signed contract (Ref. CHC2026-0005AA, dated 12 February 2026):

- Review of previous geotechnical investigation including previous work on the site and surrounding area.
- Site investigation where infiltration testing was undertaken.
- Assessment of geotechnical hazards at the site as per Section 106 of the Resource Management Act (RMA) and the National Policy Statement – Natural Hazards released in 2025.
- Geotechnical analysis and reporting.
- This assessment has been prepared in accordance with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. The authors have complied with that Code in preparing this report and confirm that the opinions expressed are within their respective areas of expertise, except where reliance has been placed on information or opinions provided by others.

3.0 SITE DESCRIPTION

The proposed site area is made up of multiple land parcels between the intersections of Dunns Crossing Road and Selwyn Road, Burnham School Road, Brookside Road, SH1 and the intersection of Brookside and Edwards Road as shown below in Figure 1 and outlined in red. The site is zoned General Residential (GRZ) under the Partially Operative Selwyn District Plan (Appeals Version) ('the District Plan').

The site is predominantly flat with Relative Levels (RL) between 58m and 35m using the New Zealand Vertical Datum (NZVD) and is currently being used to graze stock and crops with one block utilised as a poultry farm (which is ceasing in early-to-mid 2027) and another with a single residential dwelling.

Figure 1: Site Location Plan



4.0 PROPOSED DEVELOPMENT

The proposal is a listed project under Schedule 2 of the FTAA. The project is proposed as a comprehensively planned urban extension to Rolleston, integrating residential neighbourhoods, commercial services, open space and supporting infrastructure.

The proposed development consists of approximately 4,134 residential lots for medium (shaded yellow in figure 2 below) and high density (shaded red below) residential development, and commercial development (blue). Figure 2 below depicts the proposed layout of the site.

Figure 2: Proposed Site Layout. Inovo Scheme Plan ref. 16521-00-AP-1000, dated 21/10/2026



5.0 BACKGROUND INFORMATION

The site was previously rezoned to General Residential Zone (GRZ) and multiple geotechnical reports have previously been prepared by Fraser Thomas[1] and Tetra Tech Coffey[2&3&4] for areas within the proposed development, with additional data sourced for the New Zealand Geotechnical Database (NZGD). All test locations are shown in Figures 1 to 5 in Appendix A and presented in Table 1 of Appendix B.

A breakdown of all test types and the source is presented below:

1. Test Pit Investigations
   - CMW completed twelve (12) to depths of 2.5 to 4.6mbgl.
   - Fraser Thomas completed thirty (30) to depths of 1.5 to 5.0mbgl.
   - ENGEO completed eighteen (18) to depths of 1.9 to 2.3mbgl.
   - Connell Wagner completed six (6) to depths of 1.4 to 1.5mbgl.
2. Borehole Investigations
   - CMW completed four (4) to depths of 10.87 to 15.34mbgl.
3. Well Investigations
   - Nine (9) wells accessed from the Environment Canterbury well search which were logged up to depths of 97mbgl.
4. Other Investigations
   - Inovo Projects completed nine (9) soakage test pits to depths of 2.1 to 2.7mbgl.

[1] Fraser Thomas Limited, Brookside Road Plan Change, Rolleston – Geotechnical Investigation Report, ref: CH01082 Rev 2, dated 14 October 2021
[2] Tetra Tech Coffey (NZ) Limited, Rolleston West Plan Change – Geotechnical Assessment Report, ref: 773-CHCGE281253 Version 1, dated 9 November 2020
[3] Tetra Tech Coffey (NZ) Limited, Geotechnical Peer Review/RFI Response – Rolleston West Plan Change Application, ref: 773-CHCGE281253, Dated 25 January 2021
[4] Tetra Tech Coffey (NZ) Limited, Skellerup South Plan Change – Preliminary Geotechnical Assessment Report, ref: 773-CHCGE293048 version 1, Dated 27 September 2021

- CMW completed forty-three (43) dynamic cone penetrometer tests to depths of 0.3 to 1.8mbgl.
- Investigations taken from the NZGD include eight (8) test pit investigations to depths of 0.8 to 4.0mbgl and one (1) machine borehole investigation to depth of 15.08mbgl.

6.0 GROUND MODEL

6.1 Published Geology

The geological map[5] of the area indicates that the site in underlain by Late Pleistocene aged river deposits comprising "*Unweathered, brownish-grey, variable mix of gravels, sand, silt and clay river alluvium (Qa2)*".

6.2 Ground Conditions

The ground conditions encountered and inferred from the investigation and previous investigations were considered to be generally consistent with the published geology for the areas and is summarised in Table 1 below.

Table 1: Ground Profile Summary

Description	Approximate depth to the top of the layer (mbgl)	Approximate thickness of layer (m)	Characteristics
Topsoil	0.0	0.15 to 0.5	N/A
Sandy Silt / Silty Sand*	0.15 to 0.5	0.3 to 1.0	Very loose to medium dense
Sandy Gravel	0.15 to 0.5	>30	Medium dense to very dense

* Typically encountered within isolated areas where historical paleochannels have been infilled.

6.3 Site Subsoil Class

In accordance with NZS1170.5, Section 3.1.3, a Site Subsoil Class of "*Class D – Deep soft soil sites*" may be assumed for the site.

6.4 Groundwater

During the 2026 investigation, which was conducted in early Winter conditions (June 2026), groundwater was not encountered across the site within the shallow investigations. Within the deeper borehole investigations, groundwater was encountered and these wells were dipped in July 2026 with groundwater levels between 3.12 and 6.27mbgl. See Pattle Delamore Partners report "Westhaven Residential Development Fast-track Substantive Application – Groundwater Level Assessment" dated October 2026 for further information on groundwater.

[5] Forsyth, P.J.; Barrell, D.J.A.; Jongen, 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. 1 sheet. ISBN 987-0-478-19649-8

7.0 GEOHAZARD ASSESSMENT

7.1 Flood Hazard

Flooding is not a geotechnical hazard, however current information from the District Plan[6] shows that the site falls within the "Plains Flood Management Overlay". The development finished floor levels should meet New Zealand Building Code and Selwyn District requirements.

7.2 Paleochannel Assessment

During the desktop study, it has been noted that multiple paleochannels are visible from recent and historical aerial photographs. The paleochannels may include loose soil deposits with remedial options discussed in Section 8.1.2.

7.3 Geohazards Assessment Summary

The National Policy Statement – Natural Hazards ('NPS-NH') released in 2025 and Section 106 of the Resource Management Act 1991[7] (RMA) requires consideration of risk from natural hazards to be carried out when considering the granting of a subdivision consent. S106(1A) of the RMA states an assessment of risk from natural hazards must consider the combined effect of the likelihood of natural hazards and material damage to land or structures (consequence).

These are summarised in Table 2 below and a definition of terms is attached in Appendix C.

Table 2: Geohazard Risk Assessment

Geotechnical Hazard	Comment	Existing Risk of Damage to Land / Structures		
		Likelihood	Consequence	Risk Rating
Active Faults	The nearest fault is the Greendale Fault approximately 6km to the north with a recurrence interval of 10,000 years	Possible	Negligible	Low
Tsunami	N/A for this site, 25km from nearest coastline			Low
Coastal Erosion	Flat site located 25km from nearest coastline			Low
Coastal Inundation	N/A for this site, 25km from nearest coastline			Low
Liquefaction	Depth to groundwater and soil type make liquefaction risk low	Possible	Negligible	Low
Volcanic and geothermal activity	N/A for this site			Low
Landslip	N/A for this site as it is flat			Low
Subsidence	Potential for differential settlement to occur within paleochannel infill	Unlikely	Minor	Low
Sedimentation		Unlikely	Minor	Low
Flooding	Risk would be considered low provided SDC minimum floor levels are utilised			Low

[6] https://eplan.selwyn.govt.nz/review/property/2405208600/0/194?_t=property, Accessed June 2026
[7] Resource Management Act (1991), at 19 June 2026

Note: Wind, drought and fire are not included in above table as these are not geotechnical hazards

8.0 RECOMMENDATIONS

8.1 Earthworks

8.1.1 Site Preparation and Bulk Earthworks

All earthworks activities must be carried out in general accordance with the requirements of NZS 4431:2022 and the requirements of the Selwyn District Council Development Standards under the guidance of a suitably qualified person.

Where earthworks are to be carried out, topsoil should be stripped from earthworks areas and stockpiled for later use or offsite disposal. Confirmation by a suitable qualified person of suitable stripping of topsoil will be required along with proof rolling / compaction of natural subgrade soils prior to any filling.

Where existing fill material is encountered (as noted during the investigation) at the site during earthworks, it is recommended that this fill is excavated, checked for suitability and, if required, replaced with engineered fill according to NZS 4431:2022. This process also applies to any soft layers of organic silts, topsoil or other unsuitable material. It is recommended that any such excavation works, and placement of engineered fill be observed, tested, and/or approved by a suitably qualified person during construction.

Where any particularly weak materials are encountered that weave excessively during the proof rolling process, they should be undercut and removed prior to placing engineered fill.

Engineered fill, where required, should be approved site won soils (unless specified) placed and compacted on an approved subgrade in layers not exceeding 250mm thickness. Each layer should be compacted to achieve a relative compaction of at least 95% of the maximum dry density as indicated in NZS 4407:2015 Test 4.3.

Laboratory compaction tests within the past 6 months to assess the maximum dry density of on-site materials will be required prior to commencement of earthworks.

8.1.2 Topsoil Depth and Paleochannel Infill

Topsoil depths across the site, based on the shallow investigations, range from 0.15 to 0.5mbgl. Deeper topsoil horizons between 0.4 to 0.6mbgl are typically present and unsuitable low-strength / loose soils were identified up to 1mbgl in paleochannels. Paleochannels have the potential to be naturally infilled with silts or infilled with undocumented fill for farming practices such as tilling and cultivation.

During earthworks it is recommended that a suitably qualified person observe the topsoil removal across the site to identify where unsuitable low-strength soils within paleochannels are present. Guidance should be provided to mitigate these issues such as undercut the unsuitable materials and back fill with certified engineered fill.

8.2 Pavement Subgrade CBR

For the design of road pavements founded on natural sandy and gravelly soils, we consider that a CBR of 5% can be assumed. If construction is undertaken in winter months, wet / loose lenses of soil may be encountered.

8.3 Building Foundations

It is our understanding that the subdivision will primarily provide for one and two-storey residential buildings.

A preliminary geotechnical ultimate bearing pressure of 300kPa should be available for shallow strip and pad foundations constructed in both the natural soils and engineered fill areas. Specific site investigation and foundation suitability assessment for bearing capacity and static settlement should be undertaken for any larger buildings (i.e. commercial) on the site.

Following the preliminary assessment, it is considered that the site is suitable for TC1 foundation types.

8.4 Stormwater Disposal

It is understood that stormwater disposal will be directly to ground through soak pits or infiltration basins across the site.

8.5 Deep Excavations

We understand that two sewer pump stations will likely be constructed within the development that will require deep excavations. Based on the ground conditions encountered to date, we do not expect the soils to present unusual conditions precluding construction.

8.6 Subdivision Suitability

Based on the above information, we consider that the site is suitable for the subdivision for residential and commercial use, subject to site specific geotechnical reports being undertaken as part of the building consent applications for each of the new residential and commercial sites.

9.0 CLOSURE

This report has been prepared for use by Carter Group Ltd in relation to the substantive application under the FTAA for the Westhaven Residential project in accordance with the scope, proposed uses, and limitations described in the report. Should you have further questions relating to the use of your report please do not hesitate to contact us.

USING YOUR CMW GEOTECHNICAL REPORT

Geotechnical reporting relies on interpretation of facts and collected information using experience, professional judgement, and opinion. As such it generally has a level of uncertainty attached to it, which is often far less exact than other engineering design disciplines. The notes below provide general advice on what can be reasonably expected from your report and the inherent limitations of a geotechnical report.

Preparation of your report

Your geotechnical report has been written for your use on your project. The contents of your report may not meet the needs of others who may have different objectives or requirements. The report has been prepared using generally accepted Geotechnical Engineering and Engineering Geology practices and procedures. The opinions and conclusions reached in your report are made in accordance with these accepted principles. Specific items of geotechnical or geological importance are highlighted in the report.

In producing your report, we have relied on the information which is referenced or summarised in the report. If further information becomes available or the nature of your project changes, then the findings in this report may no longer be appropriate. In such cases the report must be reviewed, and any necessary changes must be made by us.

Your geotechnical report is based on your project's requirements

Your geotechnical report has been developed based on your specific project requirements and only applies to the site in this report. Project requirements could include the type of works being undertaken; project locality, size and configuration; the location of any structures on or around the site; the presence of underground utilities; proposed design methodology; the duration or design life of the works; and construction method and/or sequencing.

The information or advice in your geotechnical report should not be applied to any other project given the intrinsic differences between different projects and site locations. Similarly geotechnical information, data and conclusions from other sites and projects may not be relevant or appropriate for your project.

Interpretation of geotechnical data

Site investigations identify subsurface conditions at discrete locations. Additional geotechnical information (e.g. literature and external data source review, laboratory testing etc) are interpreted by Geologists or Engineers to provide an opinion about a site specific ground models, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist due to the variability of geological environments. 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. Interpretation of factual data can be influenced by design and/or construction methods. Where these methods change review of the interpretation in the report may be required.

Subsurface conditions can change

Subsurface conditions are created by natural processes and then can be altered anthropically or over time. For example, groundwater levels can vary with time or activities adjacent to your site, fill may be placed on a site, or the consistency of near surface conditions might be susceptible to seasonal changes. The report is based on conditions which existed at the time of investigation. It is important to confirm whether conditions may have changed, particularly when large periods of time have elapsed since the investigations were performed.

Interpretation and use by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical report. To help avoid misinterpretations, it is important to retain the assistance of CMW to work with other project design professionals who are affected by the contents of your report. CMW staff can explain the report implications to design professionals and then review design plans and specifications to see that they have correctly incorporated the findings of this report.

Your report's recommendations require confirmation during construction

Your report is based on site conditions as revealed through selective point sampling. Engineering judgement is then applied to assess how indicative of actual conditions throughout an area the point sampling might be. Any assumptions made cannot be substantiated until construction is complete. For this reason, you should retain geotechnical services throughout the construction stage, to identify variances from previous assumption, conduct additional tests if required and recommend solutions to problems encountered on site.

A Geotechnical Engineer, who is fully familiar with the site and the background information, can assess whether the report's recommendations remain valid and whether changes should be considered as the project develops. An unfamiliar party using this report increases the risk that the report will be misinterpreted.

Environmental matters are not covered

Unless specifically discussed in your report environmental matters are not covered by a CMW Geotechnical Report. Environmental matters might include the level of contaminants present of the site covered by this report, potential uses or treatment of contaminated materials or the disposal of contaminated materials. These matters can be complex and are often governed by specific legislation.

The personnel, equipment, and techniques used to perform an environmental study can differ significantly from those used in this report. For that reason, our report does not provide environmental recommendations. Unanticipated subsurface environmental problems can have large consequences for your site. If you have not obtained your own environmental information about the project site, ask your CMW contact about how to find environmental risk-management guidance.

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APPENDIX A
Drawings

LEGEND:

Boundary

SITE BOUNDARY

CMW

CMW TP

CMW BH

CMW DCP

Fraser Thomas TP

Connell Wagner TP

ENGEO TP

Inovo Soakage TP

NZGD TP

ECan Well

NZGD BH

0 150 300 450 600 750 m

NOTES: 1. BASE MAP ADAPTED FROM LINZ OPEN DATA VIA QGIS

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CLIENT: WESTHAVEN ROLLESTON LTD	DRAWN: PN	PROJECT: CHC2026-0005	
PROJECT: WESTHAVEN RESIDENTIAL DEVELOPMENT	CHECKED: HG	DRAWING: 01	
	REVISION: 1	SCALE: 1:17500	
TITLE: SITE INVESTIGATION PLAN	DATE: 29/09/2026	SHEET: A3 L	



LEGEND:

- SITE BOUNDARY
- CMW TP
- Connell Wagner TP
- NZGD TP
- ECan Well
- NZGD BH

NOTES: 1. BASE MAP ADAPTED FROM LINZ OPEN DATA VIA QGIS

0 50 100 150 200 250 m

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CLIENT: WESTHAVEN ROLLESTON LTD		DRAWN: PN	PROJECT: CHC2026-0005
PROJECT: WESTHAVEN RESIDENTIAL DEVELOPMENT		CHECKED: HG	DRAWING: 02
		REVISION: 1	SCALE: 1:5000
TITLE: SITE INVESTIGATION PLAN		DATE: 29/09/2026	SHEET: A3 L



LEGEND:

- SITE BOUNDARY
- CMW DCP
- Fraser Thomas TP
- Inovo Soakage TP
- NZGD TP
- ECan Well

0 50 100 150 200 250 m

NOTES: 1. BASE MAP ADAPTED FROM LINZ OPEN DATA VIA QGIS

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CLIENT: WESTHAVEN ROLLESTON LTD	DRAWN: PN	PROJECT: CHC2026-0005
PROJECT: WESTHAVEN RESIDENTIAL DEVELOPMENT	CHECKED: HG	DRAWING: 03
	REVISION: 1	SCALE: 1:5000
TITLE: SITE INVESTIGATION PLAN	DATE: 29/09/2026	SHEET: A3 L



LEGEND:

- SITE BOUNDARY
- CMW TP
- CMW BH
- CMW DCP
- Fraser Thomas TP
- Connell Wagner TP
- ENGEO TP
- Inovo Soakage TP
- NZGD TP
- ECan Well

0 50 100 150 200 250 m

NOTES: 1. BASE MAP ADAPTED FROM LINZ OPEN DATA VIA QGIS

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CLIENT: WESTHAVEN ROLLESTON LTD		DRAWN: PN	PROJECT: CHC2026-0005
PROJECT: WESTHAVEN RESIDENTIAL DEVELOPMENT		CHECKED: HG	DRAWING: 04
		REVISION: 1	SCALE: 1:5000
TITLE: SITE INVESTIGATION PLAN		DATE: 29/09/2026	SHEET: A3 L



LEGEND:

- SITE BOUNDARY
- CMW TP
- CMW BH
- CMW DCP
- Connell Wagner TP
- ENGEO TP
- Inovo Soakage TP
- ECan Well

0 50 100 150 200 250 m

NOTES: 1. BASE MAP ADAPTED FROM LINZ OPEN DATA VIA QGIS

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CLIENT: WESTHAVEN ROLLESTON LTD	DRAWN: PN	PROJECT: CHC2026-0005
PROJECT: WESTHAVEN RESIDENTIAL DEVELOPMENT	CHECKED: HG	DRAWING: 05
	REVISION: 1	SCALE: 1:5000
TITLE: SITE INVESTIGATION PLAN	DATE: 29/09/2026	SHEET: A3 L

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APPENDIX B
Investigation Data

Table B1: Summary of test investigations across the site

Test ID	Source	Type	Depth range (m)	Comments
BH-01	CMW	Machine Borehole	10.94	
BH-02	CMW	Machine Borehole	11.05	
BH-03	CMW	Machine Borehole	10.87	
BH-04	CMW	Machine Borehole	15.34	
TP-01	CMW	Test Pit	2.6	
TP-02	CMW	Test Pit	2.5	
TP-04	CMW	Test Pit	3.5	
TP-07	CMW	Test Pit	3.5	
TP-08	CMW	Test Pit	2.9	
TP-09	CMW	Test Pit	2.6	
TP-101	CMW	Test Pit	4.7	
TP-102	CMW	Test Pit	4.7	
TP-103	CMW	Test Pit	4.5	
TP-104	CMW	Test Pit	4.7	
TP-105	CMW	Test Pit	4.6	
TP-106	CMW	Test Pit	3.4	
DCP-1003 to 1801 (43 Total)	CMW	Dynamic Cone Penetrometer	0.3 to 1.8mbgl	
TP1	Fraser Thomas	Test pit	4.4	
TP2	Fraser Thomas	Test pit	2.3	
TP3	Fraser Thomas	Test pit	2.2	
TP4	Fraser Thomas	Test pit	2.7	
TP5	Fraser Thomas	Test pit	2.1	
TP6	Fraser Thomas	Test pit	4.4	
TP7	Fraser Thomas	Test pit	2.0	
TP8	Fraser Thomas	Test pit	2.0	

TP9	Fraser Thomas	Test pit	2.3	
TP10	Fraser Thomas	Test pit	2.5	
TP11	Fraser Thomas	Test pit	1.9	
TP12	Fraser Thomas	Test pit	3.4	
TP13	Fraser Thomas	Test pit	1.5	
TP14	Fraser Thomas	Test pit	1.7	
TP15	Fraser Thomas	Test pit	2.3	
TP16	Fraser Thomas	Test pit	3.2	
TP17	Fraser Thomas	Test pit	2.3	
TP18	Fraser Thomas	Test pit	2.1	
TP19	Fraser Thomas	Test pit	3.2	
TP20	Fraser Thomas	Test pit	2.3	
TP21	Fraser Thomas	Test pit	4.0	
TP22	Fraser Thomas	Test pit	3.2	
TP23	Fraser Thomas	Test pit	3.2	
TP24	Fraser Thomas	Test pit	2.1	
TP25	Fraser Thomas	Test pit	3.8	
TP26	Fraser Thomas	Test pit	1.9	
TP27	Fraser Thomas	Test pit	2.1	
TP28	Fraser Thomas	Test pit	5.0	
TP29	Fraser Thomas	Test pit	2.0	
TP30	Fraser Thomas	Test pit	2.0	
TP01	ENGEO	Test Pit	2.4	130 Dunns Crossing Road
TP13	ENGEO	Test Pit	2	108 Dunns Crossing Road
TP14	ENGEO	Test Pit	2	108 Dunns Crossing Road
TP03	ENGEO	Test pit	1.9	92 Dunns Crossing Rd
TP04	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP12	ENGEO	Test pit	2	92 Dunns Crossing Rd

TP13	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP14	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP15	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP22	ENGEO	Test pit	1.9	92 Dunns Crossing Rd
TP24	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP25	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP26	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP27	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP28	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP29	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP36	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP37	ENGEO	Test pit	2	92 Dunns Crossing Rd
TP H-1	Connell Wagner	Test pit	1.5	From Tetra Tech Coffey Report No. 773-CHCGE281253
TP H-2	Connell Wagner	Test pit	1.4	From Tetra Tech Coffey Report No. 773-CHCGE281253
TP H-3	Connell Wagner	Test pit	1.4	From Tetra Tech Coffey Report No. 773-CHCGE281253
TP S-1	Connell Wagner	Test Pit	1.4	From Tetra Tech Coffey Report No. 773-CHCGE281253
TP S-2	Connell Wagner	Test pit	1.5	From Tetra Tech Coffey Report No. 773-CHCGE281253
TP S-3	Connell Wagner	Test pit	1.4	From Tetra Tech Coffey Report No. 773-CHCGE281253
BX23/0735	ECAN	Well	48	
BX23/0895	ECAN	Well	53.3	
M36/0015	ECAN	Well	36.3	
M36/4387	ECAN	Well	35.6	
M36/4449	ECAN	Well	24.2	
M36/5022	ECAN	Well	25.2	

M36/7416	ECAN	Well	47.7	
M36/8063	ECAN	Well	97.85	
M36/8581	ECAN	Well	60	
NZGD:230508 BH01	NZGD	Machine Borehole	15.08	
NZGD:100580 TP15	NZGD	Test Pit	2.10	
NZGD: 230864 IP01	NZGD	Test Pit	2.20	
NZGD: 230877 PP02	NZGD	Test Pit	0.8	
NZGD: 230900 TP03	NZGD	Test Pit	2.0	
NZGD: 230902 TP06	NZGD	Test Pit	4.0	
NZGD: 230904 TP08	NZGD	Test Pit	2.0	

BOREHOLE LOG - BH-01

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 01/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 1 of 3
Position: 1549459.0mE; 5169821.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS	CW	HW	MW	SW	UW	Recovery	RQD	Estimated Strength: EW	VW	W	MS	S	VS	ES	Defect Spacing (mm): <20	20-60	60-200	200-600	600-2000	>2000	Drilling Method/ Support	Structure & Other Observations
					0		GM: Silty GRAVEL: Fine to coarse grained subangular to subrounded with trace fine to coarse grained sand, dark orange brown. (Topsoil)										100															
							GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, brownish grey. Sand is fine to coarse grained. (Alluvium)																							
					1		*... from 1.00m to 1.50m, becoming greyish brown; sand is fine grained.*																							
		1.5	SPT: N* = 50+ (10, 17 / 16, 20, 14 for 55mm)					D to M																							
					2		*... from 1.86m to 3.00m, becoming grey; sand is fine grained.*										100														
		3.0	SPT: N* = 50+ (11, 17 / 20, 30 for 75mm)		3		*... from 3.30m to 3.90m, becoming greyish brown.*	M									100														
					4		*... from 3.90m to 4.10m, becoming light grey.*	D																							
		4.5	SPT: N* = 50+ (5, 18 / 15, 20, 15 for 70mm)					M to W																							
					5		*... from 4.87m to 5.35m, becoming yellowish brown with some silt.*																								

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:

Remarks: Groundwater dipped by drillers at 6.7mblg. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

BOREHOLE LOG - BH-01

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 01/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 2 of 3
Position: 1549459.0mE; 5169821.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
		6.1	SPT: N* = 50+ (8, 10 / 12, 11, 16, 11 for 35mm)		6		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, brownish grey. Sand is fine to coarse grained. (Alluvium)	W to S			100				SNC	Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
							... from 6.51m to 7.35m, becoming yellowish brown with some silt.									
					7						100					
							... from 7.35m to 7.60m, becoming light grey.									
		7.6	SPT: N* = 50+ (14, 14 / 13, 12, 20, 5 for 5mm)													
					8		... from 7.98m to 9.10m, becoming greyish brown.	W to S								
											100					
					9											
		9.1	SPT: N* = 50+ (10, 21 / 22, 28 for 75mm)													
							... from 9.40m to 10.60m, becoming light brownish grey.	D to M								
					10						100					

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:

Remarks: Groundwater dipped by drillers at 6.7mblg. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

BOREHOLE LOG - BH-01

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 01/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 3 of 3
Position: 1549459.0mE; 5169821.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
		10.6	SPT: N* = 50+ (7, 14 / 15, 20, 15 for 40mm)		11		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, brownish grey. Sand is fine to coarse grained. (Alluvium)				100					
							Borehole terminated at 10.94 m									
					12											
					13											
					14											
					15											

Material Description: Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)

Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater dipped by drillers at 6.7mblg. Piezometer installed.

BOREHOLE CORE PHOTOGRAPHS: BH-01

Client:	Rolleston West Residential Ltd	**Project:**	Rolleston West Residential Subdivision	**Project No:**	CHC2026-0005
Location:	Rolleston, Christchurch	**Contractor:**	Pro-Drill	**Date:**	01/04/2026
Position:	1549459 E, 5169821 N	**Logged by:**	AD	**Checked by:**	CT



BH-01: 0.00m to 2.50m



BH-01:2.50m to 5.35m



BH-01: 5.35m to 8.48m



BH-01: 8.48m to 10.94m

BOREHOLE LOG - BH-02

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 02/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 1 of 3
Position: 1548838.0mE; 5169062.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
					0		ML: SILT: Dark brown, low plasticity. (Topsoil)									
							GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, light brown. Sand is fine to coarse grained. (Alluvium)									
							... from 0.65m to 1.95m, becoming light grey.	D to M			100					
		1.5	SPT: N* = 22 (4, 4 / 6, 5, 6, 5)		1											
					2		*... from 1.95m to 2.30m, becoming light brown.*				100					
							... from 2.30m to 2.60m, becoming light grey.									
							... from 2.60m to 3.65m, becoming light brown.	M								
		3.0	SPT: N* = 43 (5, 6 / 5, 10, 15, 13)		3											
							... from 3.65m to 4.92m, becoming light greyish brown, with minor silt.				100					
					4			M to W								
		4.5	SPT: N* = 48 (10, 12 / 14, 14, 12, 8 for 45mm)													
					5		*... from 4.92m to 5.55m, becoming greyish brown, with some silt.*									

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:

Remarks: Groundwater dipped by drillers at 5.9mblg. Piezometer installed.

BOREHOLE LOG - BH-02

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 02/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 2 of 3
Position: 1548838.0mE; 5169062.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
					6		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, light brown. Sand is fine to coarse grained. (Alluvium)	W			100					Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
		6.1	SPT: N* = 50+ (7, 12 / 11, 14, 25 for 45mm)				... at 5.55m, becoming light greyish brown, with minor silt.	M								
					7		... at 6.44m, becoming light greyish brown, with minor silt.	W to S			100					
		7.6	SPT: N* = 50+ (20, 20 / 20, 17, 13 for 75mm)				... at 7.94m, becoming light yellowish brown, with minor silt.	S			100				SNC	
		9.1	SPT: N* = 50+ (8, 12 / 15, 15, 20 for 75mm)		9						100					
					10											

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:

Remarks: Groundwater dipped by drillers at 5.9mblg. Piezometer installed.

BOREHOLE LOG - BH-02

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 02/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 3 of 3
Position: 1548838.0mE; 5169062.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS	CW	HW	MW	SW	UW	Recovery	RQD	Estimated Strength: EW	VW	W	MS	S	VS	ES	Defect Spacing (mm): <20	20-60	60-200	200-600	600-2000	>2000	Drilling Method/ Support	Structure & Other Observations
		10.6	SPT: N* = 34 (8, 8 / 7, 6, 11, 10)		11		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, light brown. Sand is fine to coarse grained. (Alluvium)										100															
							Borehole terminated at 11.05 m																									
					12																										
					13																										
					14																										
					15																										

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater dipped by drillers at 5.9mblg. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

BOREHOLE CORE PHOTOGRAPHS: BH-02

Client:	Rolleston West Residential Ltd	**Project:**	Rolleston West Residential Subdivision	**Project No:**	CHC2026-0005
Location:	Rolleston, Christchurch	**Contractor:**	Pro-Drill	**Date:**	02/04/2026
Position:	1548838 E, 5169062 N	**Logged by:**	AD	**Checked by:**	CT



BH-02: 0.00m to 2.60m



BH-02: 2.60m to 5.55m



BH-02: 5.55m to 8.30m



BH-02: 8.30m to 11.05m

BOREHOLE LOG - BH-03

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 07/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 1 of 3
Position: 1549451.0mE; 5169267.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
					0		ML: SILT: Dark brown, low plasticity. (Topsoil)									
							GM: Silty GRAVEL: Fine to coarse grained subangular to subrounded with trace fine to coarse grained sand, orange brown. (Alluvium)				100					Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks
							... at 0.80m, becoming dark brownish grey, with minor silt.									
					1		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, light brown. Sand is fine to coarse grained. (Alluvium)									
		1.5	SPT: N* = 47 (4, 12 / 10, 11, 12, 14)				*... from 1.10m to 1.95m, becoming grey.*	M								
					2		*... at 1.95m, becoming light greyish brown, with minor silt.*				100					
							... at 2.30m, becoming light grey.									
		3.0	SPT: N* = 41 (6, 10 / 8, 12, 10, 11)		3											
							... at 3.45m, becoming light yellowish brown, with minor silt.				100					
					4			M to W								
		4.5	SPT: N* = 39 (15, 12 / 12, 10, 9, 8)													
					5											

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:

Remarks: Groundwater dipped by drillers at 3.2mblg. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

BOREHOLE LOG - BH-03

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 07/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 2 of 3
Position: 1549451.0mE; 5169267.0mN Projection:
Datum: Survey Source: Handheld GPS

CMW Geosciences
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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
		6.1	SPT: N* = 50+ (13, 17 / 20, 15, 15 for 75mm)		6		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, light brown. Sand is fine to coarse grained. (Alluvium)				72					
		7.6	SPT: N* = 50+ (15, 14 / 15, 12, 23 for 75mm)		7						100				SNC	
		9.1	SPT: N* = 50+ (16, 17 / 22, 19, 9 for 40mm)		8						100					
					9						100					
					10											

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater dipped by drillers at 3.2mblg. Piezometer installed.

BOREHOLE LOG - BH-03

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 07/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 3 of 3
Position: 1549451.0mE; 5169267.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
		10.6	SPT: N* = 50+ (17, 20 / 29, 21 for 45mm)		11		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, light brown. Sand is fine to coarse grained. (Alluvium)				100					
							Borehole terminated at 10.87 m									
					12											
					13											
					14											
					15											

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater dipped by drillers at 3.2mblg. Piezometer installed.

BOREHOLE CORE PHOTOGRAPHS: BH-03

Client:	Rolleston West Residential Ltd	**Project:**	Rolleston West Residential Subdivision	**Project No:**	CHC2026-0005
Location:	Rolleston, Christchurch	**Contractor:**	Pro-Drill	**Date:**	07/04/2026
Position:	1549451 E, 5169267 N	**Logged by:**	AD	**Checked by:**	CT

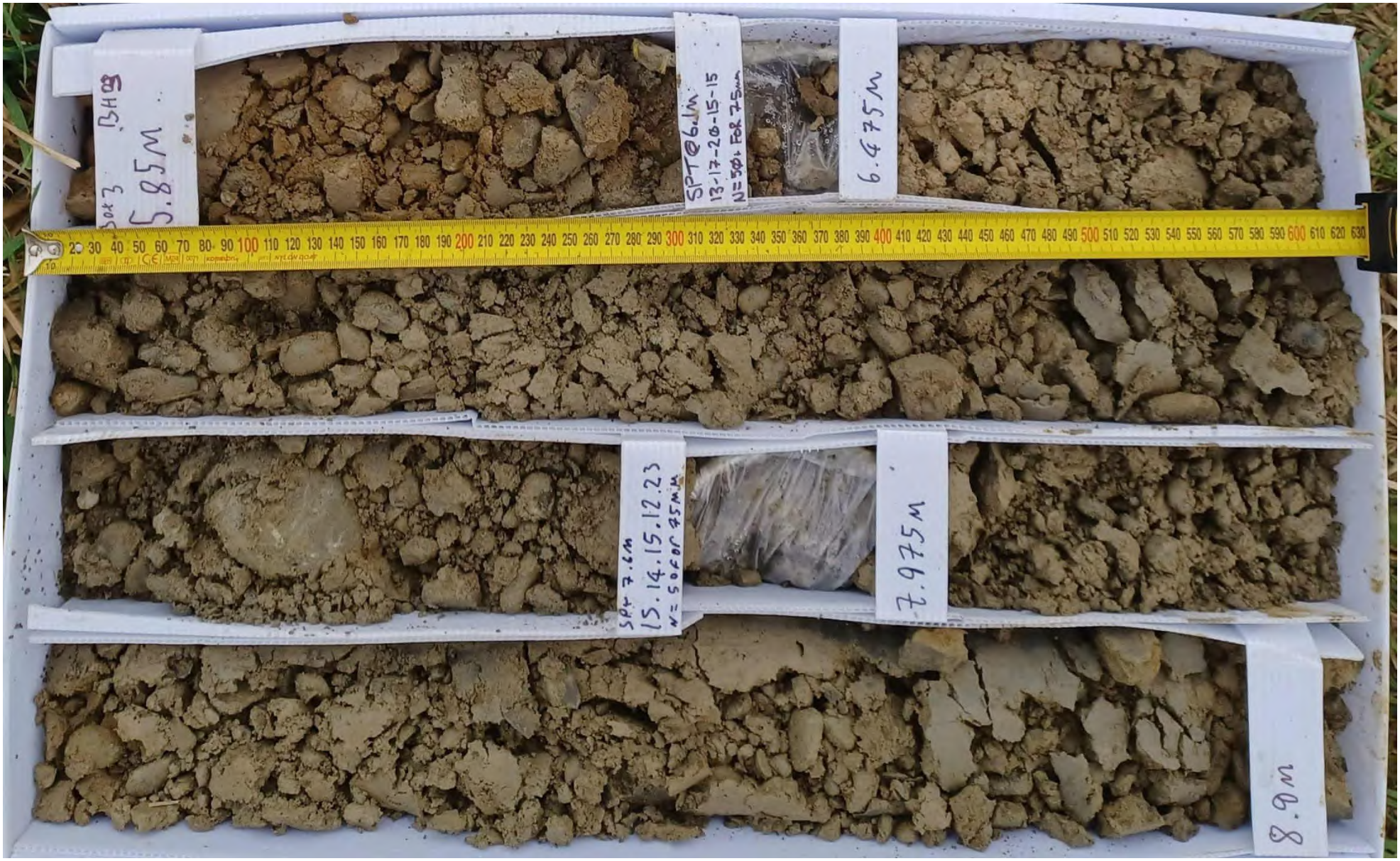


BH-03: 0.00m to 2.70m

This report of boreholes must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination



BH-03: 2.70m to 5.85m



BH-03: 5.85m to 8.90m



BH-03: 8.90m to 10.87m

BOREHOLE LOG - BH-04

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 08/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 1 of 4
Position: 1549436.0mE; 5168461.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
					0		ML: SILT: Dark brown, low plasticity. (Topsoil)									
							GM: Silty GRAVEL : Fine to coarse grained subangular to subrounded with trace fine to coarse grained sand, orange brown. Sand is fine grained. (Alluvium)				100					
					1		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, light grey. Sand is fine to coarse grained. (Alluvium)									
		1.5	SPT: N* = 50+ (12, 20 / 20, 26, 4 for 5mm)					M								
					2						100					
		3.0	SPT: N* = 42 (11, 7 / 10, 10, 15, 7)		3											
							... from 3.45m to 4.50m, becoming light greyish brown.									
					4			W			100					
		4.5	SPT: N* = 27 (6, 5 / 6, 7, 7, 7)													
					5		*... from 4.95m to 6.10m, becoming greyish brown, contains minor silt.*									

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:

Remarks: Groundwater dipped by drillers at 5.6mblg. Piezometer installed.

BOREHOLE LOG - BH-04

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 08/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 2 of 4
Position: 1549436.0mE; 5168461.0mN Projection:
Datum: Survey Source: Handheld GPS

Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
		6.1	SPT: N* = 50+ (20, 15 / 15, 16, 15, 4 for 10mm)		6		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, light grey. Sand is fine to coarse grained. (Alluvium)				100					
		7.6	SPT: N* = 50+ (10, 13 / 17, 18, 15 for 45mm)		7		SW: Gravelly SAND: Fine to coarse grained with trace silt, light brownish grey. Gravel is medium to coarse grained subangular subrounded. (Alluvium)				100				SNC	
					8		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, light brownish grey. Sand is fine to coarse grained. (Alluvium)	S			100					
		9.1	SPT: N* = 50+ (12, 18 / 20, 20, 10 for 10mm)		9		... at 9.41m, becoming light yellowish brown, with some silt.				100					
					10											

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:

Remarks: Groundwater dipped by drillers at 5.6mblg. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

BOREHOLE LOG - BH-04

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 08/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 3 of 4
Position: 1549436.0mE; 5168461.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
		10.6	SPT: N* = 50+ (25 ,25 for 70mm /)		11		GW: Sandy GRAVEL: Fine to coarse grained subangular to subrounded with trace silt, light brownish grey. Sand is fine to coarse grained. (Alluvium)									
							GM: Silty GRAVEL : Fine to coarse grained subangular to subrounded with some sand, light greyish brown. Sand is fine to coarse grained. (Alluvium)	D			100					
		12.2	SPT: N* = 50+ (24 ,26 for 70mm /)		12											
								S			100					
					13											
		13.7	SPT: N* = 50+ (8, 12 / 25, 25 for 65mm)					D								
					14											
								S			100					
					15											

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:

Remarks: Groundwater dipped by drillers at 5.6mblg. Piezometer installed.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

BOREHOLE LOG - BH-04

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 08/04/2026
Borehole Location: Refer to Site Plan Logged by: AD Checked by: CT Scale: 1:25 Sheet 4 of 4
Position: 1549436.0mE; 5168461.0mN Projection:
Datum: Survey Source: Handheld GPS

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Well	Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Weathering: RS CW HW MW SW UW	Recovery	RQD	Estimated Strength: EW VW W MS S VS ES	Defect Spacing (mm): <20 20-60 60-200 200-600 600-2000 >2000	Drilling Method/ Support	Structure & Other Observations
		15.2	SPT: N* = 50+ (28 ,22 for 70mm /)		16		GM: Silty GRAVEL : Fine to coarse grained subangular to subrounded with some sand, light greyish brown. Sand is fine to coarse grained. (Alluvium)				100					
							Borehole terminated at 15.34 m									
					17											
					18											
					19											
					20											

Material Description: Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit)

Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Target Depth Reached.
Shear Vane No: DCP No:
Remarks: Groundwater dipped by drillers at 5.6mblg. Piezometer installed.

BOREHOLE CORE PHOTOGRAPHS: BH-04

Client:	Rolleston West Residential Ltd	**Project:**	Rolleston West Residential Subdivision	**Project No:**	CHC2026-0005
Location:	Rolleston, Christchurch	**Contractor:**	Pro-Drill	**Date:**	02/04/2026
Position:	1548838 E, 5169062 N	**Logged by:**	AD	**Checked by:**	CT



BH-04: 0.00m to 2.60m



BH-04: 2.60m to 5.60m



BH-04: 5.60m to 8.60m



BH-04: 8.60m to 11.35m



BH-04: 11.35m to 13.99m



BH-04: 13.99m to 15.35m

TEST PIT LOG - TP-01

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 11/06/2026

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Test Pit Location: Refer to Site Plan | Logged by: HG | Checked by: CT | Scale: 1:25 | Sheet 1 of 1

Position: 1549594.6mE; 5168657.9mN Projection: NZTM2000 | Pit Dimensions: 2.5m by 1.0m

Elevation: m | Datum: NZVD2016 | Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
				0		ML: Sandy SILT: with some fine to medium grained, sub-rounded gravel and trace of rootlets, dark brown, low plasticity, sand is fine grained. (Topsoil)	D		4	
						GW: sandy GRAVEL: fine to coarse grained, sub-rounded to sub-angular with some silt and trace of cobbles and rootlets, brown grey. (Alluvium)			10	
									2	
						... *at 0.50m, rootlets absent.*			0	
				1			M			
				2						
						Test pit terminated at 2.60 m				
				3						
				4						
				5						

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15 20

Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Target depth reached.

Shear Vane No: DCP No: 38

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-02

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 11/06/2026
Test Pit Location: Refer to Site Plan Logged by: HG Checked by: CT Scale: 1:25 Sheet 1 of 1
Position: 1549439.5mE; 5168972.2mN Projection: NZTM2000 Pit Dimensions: 2.5m by 1.0m
Elevation: m Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
				0		ML: Sandy SILT: with some fine to medium grained, sub-rounded gravel and trace of rootlets, dark brown, low plasticity, sand is fine grained. (Topsoil)			4	
						ML: Sandy SILT: with some fine to medium grained, sub-rounded gravel and trace of rootlets, light brown, low plasticity, sand is fine grained. (Alluvium)	D		8	
									8	
									12	
									1	
									9	
						GW: sandy GRAVEL: fine to coarse grained, sub-rounded to sub-angular with some silt and trace of cobbles and rootlets, brown grey. (Alluvium)			2	
									0	
									27	
						... at 0.70m, rootlets absent.				
				1						
							M			
				2						
						Test pit terminated at 2.50 m				
				3						
				4						
				5						

Termination Reason: Target depth reached.
Shear Vane No: DCP No: 38
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-04

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 11/06/2026
Test Pit Location: Refer to Site Plan Logged by: HG Checked by: CT Scale: 1:25 Sheet 1 of 1
Position: 1547933.4mE; 5169910.2mN Projection: NZTM2000 Pit Dimensions: 2.5m by 1.0m
Elevation: m Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
				0		ML: Sandy SILT: with some fine to medium grained, sub-rounded gravel and trace of rootlets, dark brown, low plasticity, sand is fine grained. (Topsoil)			4	
						GW: sandy GRAVEL: with some fine to medium grained, sub-rounded gravel and trace of rootlets, light brown, low plasticity, sand is fine grained. (Alluvium)			7	
									6	
									12	
						... at 0.80m, rootlets absent.			2	
				1					0	
						... from 1.55m to 1.85m, gravel becoming fine grained rounded.				
				2		GW: Silty Gravel: fine to coarse grained, sub-rounded with some fine to medium grained sand, brown grey. (Alluvium)				
				3		Test pit terminated at 3.50 m				
				4						
				5						

Dynamic Cone Penetrometer (Blows/100mm) scale: 5 10 15 20

Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Target depth reached.
Shear Vane No: DCP No: 38
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-07

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 11/06/2026
Test Pit Location: Refer to Site Plan Logged by: HG Checked by: CT Scale: 1:25 Sheet 1 of 1
Position: 1547226.6mE; 5171365.4mN Projection: NZTM2000 Pit Dimensions: 2.5m by 1.0m
Elevation: m Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
				0		ML: Sandy SILT: with some fine to medium grained, sub-rounded gravel and trace of rootlets, dark brown, low plasticity, sand is fine grained. (Topsoil)			4	
						GW: sandy GRAVEL: fine to coarse grained, sub-rounded to sub-angular with some silt and trace of cobbles and rootlets, light brown. (Alluvium)	D		6	
									6	
									10	
									2	
									0	
				1		... at 1.00m, becoming brown grey, rootlets absent.				
				2			M			
				3						
						Test pit terminated at 3.50 m				
				4						
				5						

Termination Reason: Target depth reached.
Shear Vane No: DCP No: 38
Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-08

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 11/06/2026
Test Pit Location: Refer to Site Plan Logged by: HG Checked by: CT Scale: 1:25 Sheet 1 of 1
Position: 1547699.2mE; 5171573.5mN Projection: NZTM2000 Pit Dimensions: 2.5m by 1.0m
Elevation: m Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
				0		ML: Sandy SILT: with some fine to medium grained, sub-rounded gravel and trace of rootlets, dark brown, low plasticity, sand is fine grained. (Topsoil)			5	
						GW: sandy GRAVEL: fine to coarse grained, sub-rounded to sub-angular with some silt and trace of cobbles and rootlets, brown grey. (Alluvium)	D		8	
						... at 0.60m, rootlets absent.			17	
				1					2	
							M		0	
				2						
						Test pit terminated at 2.90 m				
				3						
				4						
				5						

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15 20

Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Target depth reached.
Shear Vane No: DCP No: 38

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-09

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 11/06/2026

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Test Pit Location: Refer to Site Plan | Logged by: HG | Checked by: CT | Scale: 1:25 | Sheet 1 of 1

Position: 1547281.3mE; 5171760.5mN Projection: NZTM2000 | Pit Dimensions: 2.5m by 1.0m

Elevation: m | Datum: NZVD2016 | Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
				0		ML: Sandy SILT: with some fine to medium grained, sub-rounded gravel and trace of rootlets, dark brown, low plasticity, sand is fine grained. (Topsoil)	D		4	
						GW: sandy GRAVEL: fine to coarse grained, sub-rounded to sub-angular with some silt and trace of cobbles and rootlets, brown grey. (Alluvium)			7	
									9	
									12	
									18	
							M		2	
									0	
				1						
				2		Test pit terminated at 2.60 m				
				3						
				4						
				5						

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15 20

Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Target depth reached.

Shear Vane No: DCP No: 38

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-101

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/09/2026
Test Pit Location: Refer to Site Plan Logged by: NC Checked by: HG Scale: 1:25 Sheet 1 of 1
Position: 1549547.3mE; 5168545.1mN Projection: NZTM2000 Pit Dimensions: 2.3m by 1.8m
Elevation: m Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description (Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit))	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations (Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks)
				0		ML: Gravelly SILT: with trace of fine to coarse grained sand and rootlets, dark brown, non plastic to low plasticity, gravel is fine to coarse grained. (Topsoil)	D		2 6 8 14	
						GW: Sandy GRAVEL: fine to coarse grained, greyish brown with trace of silt and rootlets, sand is fine to coarse grained. (Alluvium)		D to VD	12 9 2 1	
				1						
						... at 1.50m, sand and rootlets absent.	M			
				2						
				3						
				4			W			
Inflow						Test pit terminated at 4.70 m				
				5						

Termination Reason: Target depth reached.
Shear Vane No: DCP No: 41
Remarks: Groundwater encountered at 4.7mbgl.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-102

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/09/2026
Test Pit Location: Refer to Site Plan Logged by: NC Checked by: HG Scale: 1:25 Sheet 1 of 1
Position: 1549652.4mE; 5168600.9mN Projection: NZTM2000 Pit Dimensions: 2.6m by 1.8m
Elevation: m Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description (Soil: Soil symbol; soil type; colour; structure; bedding; plasticity; sensitivity; additional comments. (origin/geological unit) Rock: Colour; fabric; rock name; additional comments. (origin/geological unit))	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations (Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks)
				0		ML: SILT: with trace of fine grained gravel, sand, and rootlets, dark brown, low plasticity. (Topsoil)	D			
						GW: Sandy GRAVEL: fine to coarse grained with trace of cobbles and silt, greyish brown, sand is fine to coarse grained. (Alluvium)	M			
				1						
				2						
				3		... at 2.90m, Cobbles absent.				
				4			W			
Inflow						Test pit terminated at 4.70 m				
				5						

Termination Reason: Target depth reached.
Shear Vane No: DCP No:
Remarks: Groundwater encountered at 4.7mbgl.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-103

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/09/2026

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Test Pit Location: Refer to Site Plan | Logged by: NC | Checked by: HG | Scale: 1:25 | Sheet 1 of 1

Position: 1549762.4mE; 5168659.5mN Projection: NZTM2000 | Pit Dimensions: 2.8m by 1.4m

Elevation: m | Datum: NZVD2016 | Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
				0		ML: SILT: with minor fine to medium grained gravel and trace of fine to medium grained sand and rootlets, dark brown, non plastic to low plasticity. (Topsoil)	D		2, 8	
						GW: Sandy GRAVEL: fine to coarse grained with minor silt, greyish brown, sand is fine to coarse grained. (Alluvium)			2, 3	
				1						
				2			M			
						... at 2.70m, with trace of cobbles and silt.				
				3						
Inflow				4			W			
						Test pit terminated at 4.50 m				
				5						

Termination Reason: Target depth reached.

Shear Vane No: DCP No: 41

Remarks: Groundwater encountered at 4.5mbgl.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-104

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/09/2026
Test Pit Location: Refer to Site Plan Logged by: NC Checked by: HG Scale: 1:25 Sheet 1 of 1
Position: 1549764.2mE; 5168696.6mN Projection: NZTM2000 Pit Dimensions: 2.6m by 1.7m
Elevation: m Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
						ML: SILT: with trace of fine to medium grained sand, gravel and rootlets, dark brown, non plastic to low plasticity. (Topsoil)	D		2 2 2	
	0.5-0.6	DCP: blows for 50mm				GW: Sandy GRAVEL: fine to coarse grained, brown, sand is fine to coarse grained. (Alluvium)		L	2	
								D to VD	9 13	
				1						
				2			M			
				3						
				4		Test pit terminated at 4.70 m				
				5						

Dynamic Cone Penetrometer (Blows/100mm): 5 10 15 20

Structure & Other Observations: Discontinuities: Depth; Defect Number; Defect Type; Dip; Defect Shape; Roughness; Aperture; Infill; Seepage; Spacing; Block Size; Block Shape; Remarks

Termination Reason: Machine limit.
Shear Vane No: DCP No: 41

Remarks: Groundwater is assumed to be 4.8m bgl.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-105

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/09/2026
Test Pit Location: Refer to Site Plan Logged by: NC Checked by: HG Scale: 1:25 Sheet 1 of 1
Position: 1549729.6mE; 5168753.7mN Projection: NZTM2000 Pit Dimensions: 2.7m by 1.7m
Elevation: m Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
						ML: SILT: with trace of fine to medium grained sand, gravel and rootlets, dark brown, non plastic to low plasticity. (Topsoil)	D		1	
									2	
									3	
									2	
						GW: Sandy GRAVEL: fine to coarse grained, light greyish brown, sand is fine to coarse grained. (Alluvium)		L	2	
	0.6-0.7	DCP: blows for 50mm						D to VD	3	
									13	
				1						
				2			M			
				3						
Inflow				4			W			
						Test pit terminated at 4.60 m				
				5						

Termination Reason: Target depth reached.
Shear Vane No: DCP No: 41

Remarks: Groundwater encountered at 4.6mbgl.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

TEST PIT LOG - TP-106

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/09/2026
Test Pit Location: Refer to Site Plan Logged by: NC Checked by: HG Scale: 1:25 Sheet 1 of 1
Position: 1549439.6mE; 5168474.5mN Projection: NZTM2000 Pit Dimensions: 3.5m by 1.8m
Elevation: m Datum: NZVD2016 Survey Source: Hand-held GPS

Groundwater	Samples & Insitu Tests: Depth	Samples & Insitu Tests: Type & Results	RL (m)	Depth (m)	Graphic Log	Material Description	Moisture Condition	Consistency/ Relative Density	Dynamic Cone Penetrometer (Blows/100mm)	Structure & Other Observations
						ML: Gravelly SILT: with trace of fine to medium grained sand and rootlets, dark brown, non plastic to low plasticity, gravel is fine to medium grained. (Topsoil)	D		2 3 5 12	
	0.3-0.4	DCP: blows for 50mm								
				1		GW: Sandy GRAVEL: fine to coarse grained with trace of cobbles, greyish brown with interbedded silty sand lenses, sand is fine to coarse grained. (Alluvium)	M			
				2						
Inflow				3			W			
						Test pit terminated at 3.40 m				
				4						
				5						

Dynamic Cone Penetrometer (Blows/100mm) scale: 5 10 15 20

Termination Reason: Target depth reached.
Shear Vane No: DCP No: 41
Remarks: Groundwater encountered at 3.4mbgl.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1003

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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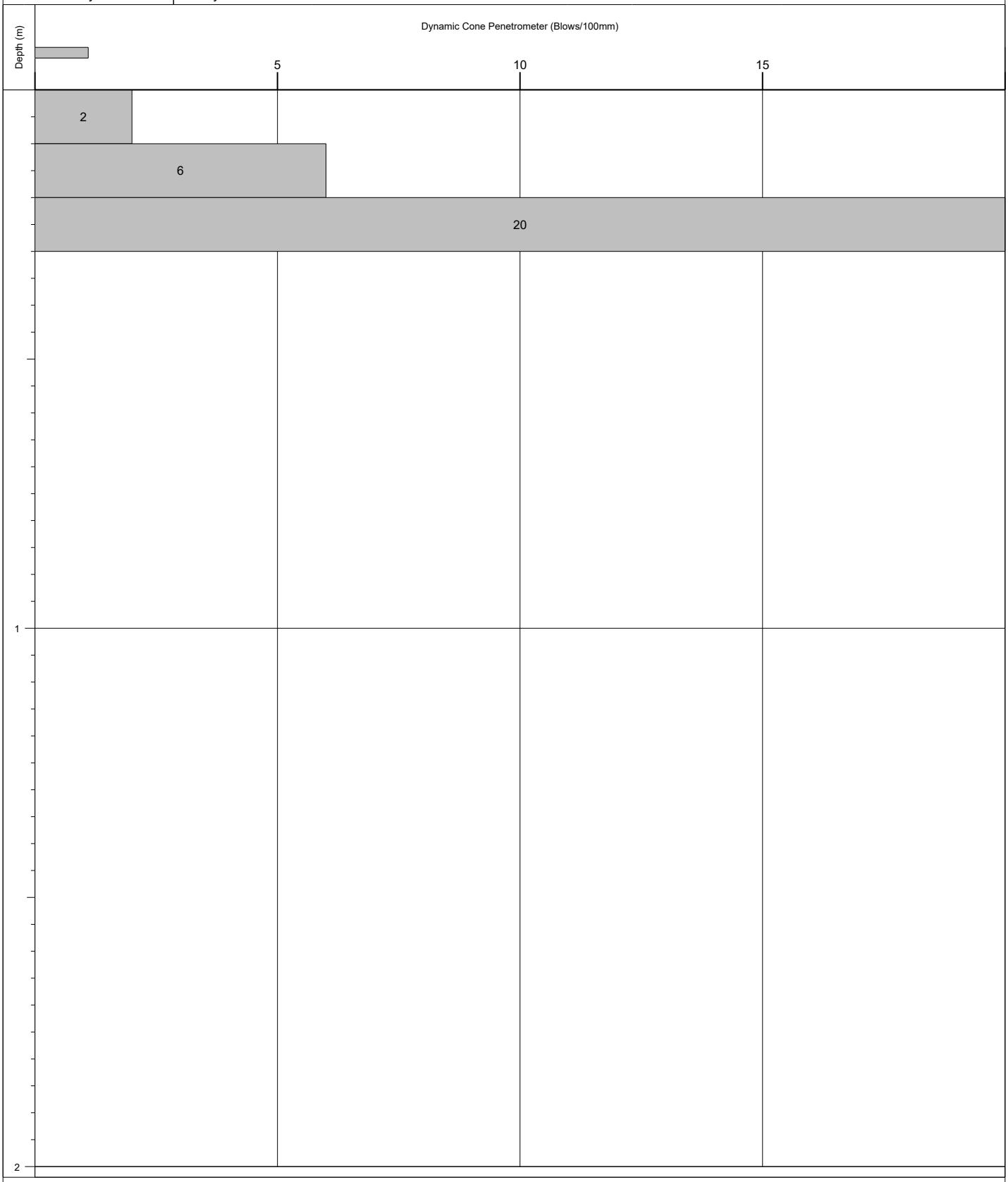
Checked by: CT

Position: E.1549406.2m N.5169248.6m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1010

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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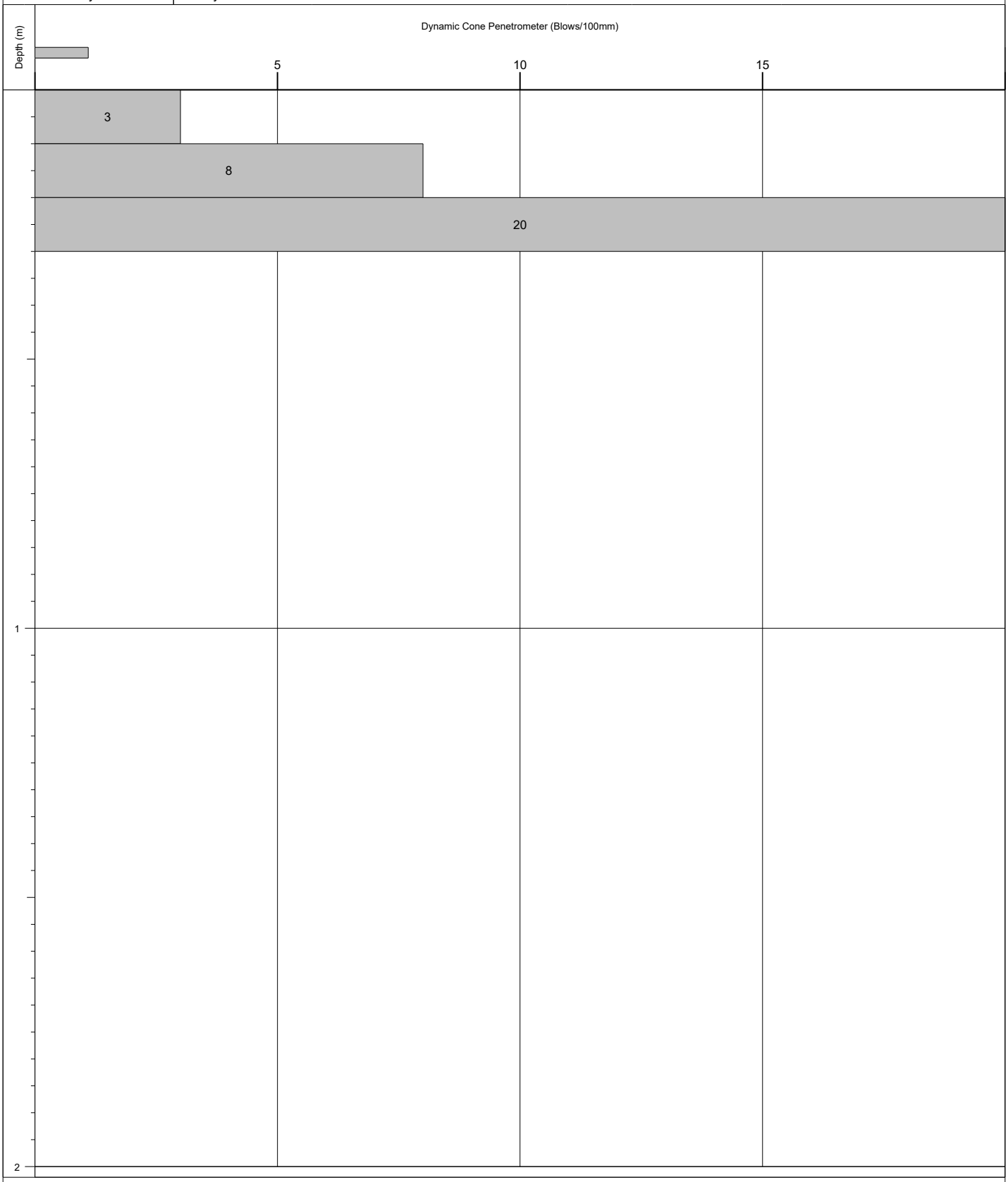
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549361.0m N.5169331.8m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1021

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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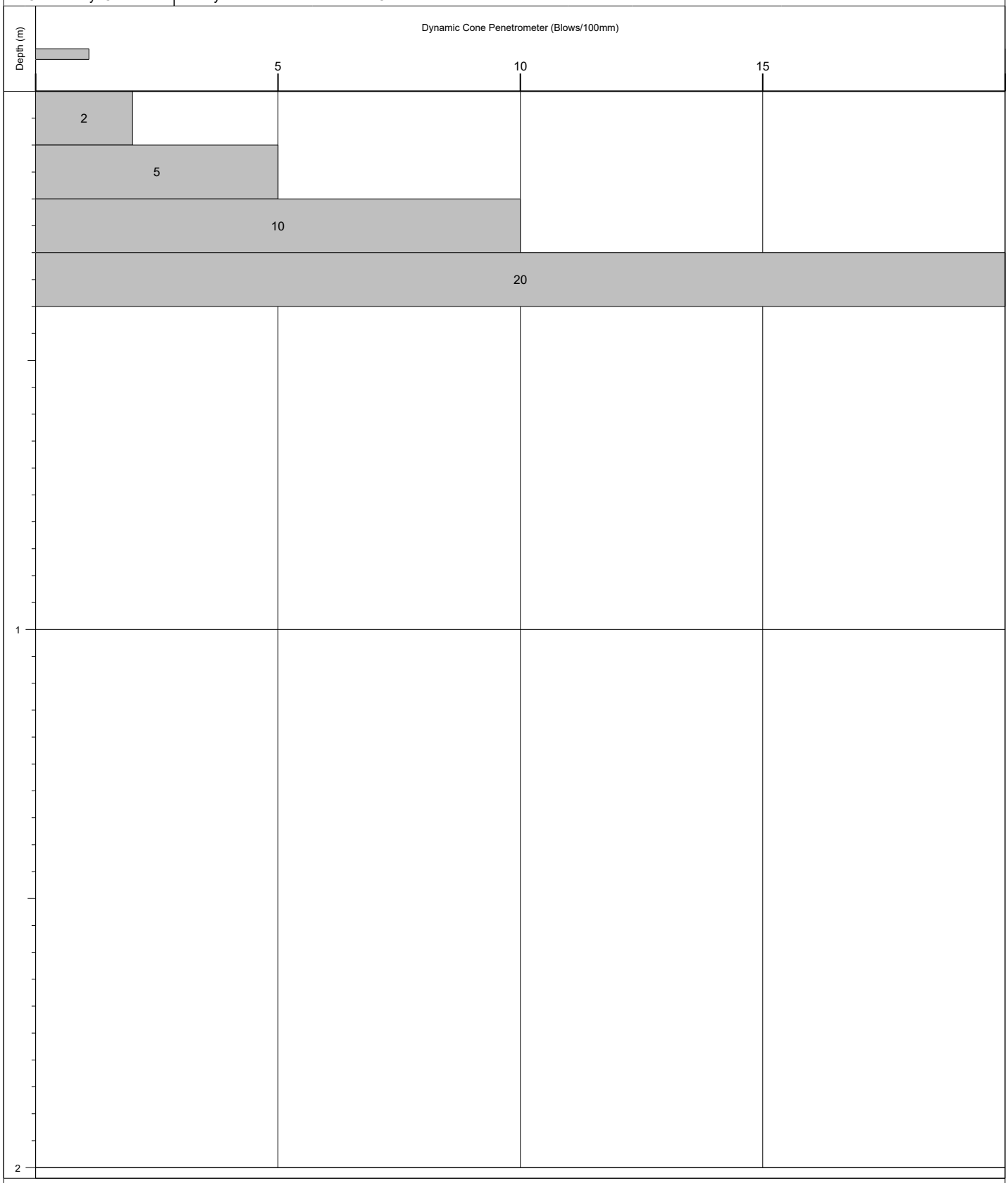
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549352.9m N.5169218.8m
Survey Source: Hand-held GPS

Elevation:
Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1027

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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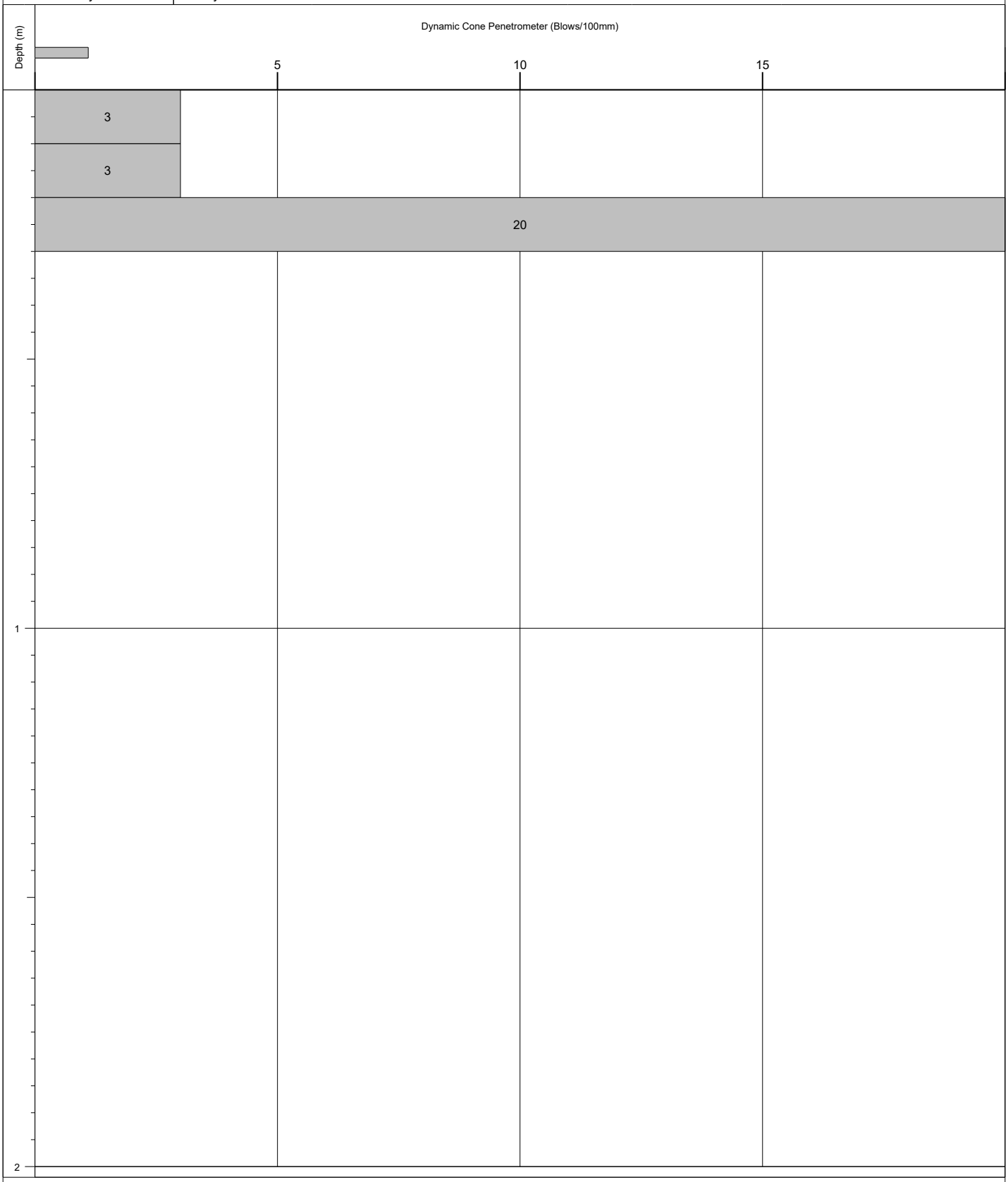
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549299.6m N.5169287.5m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1069

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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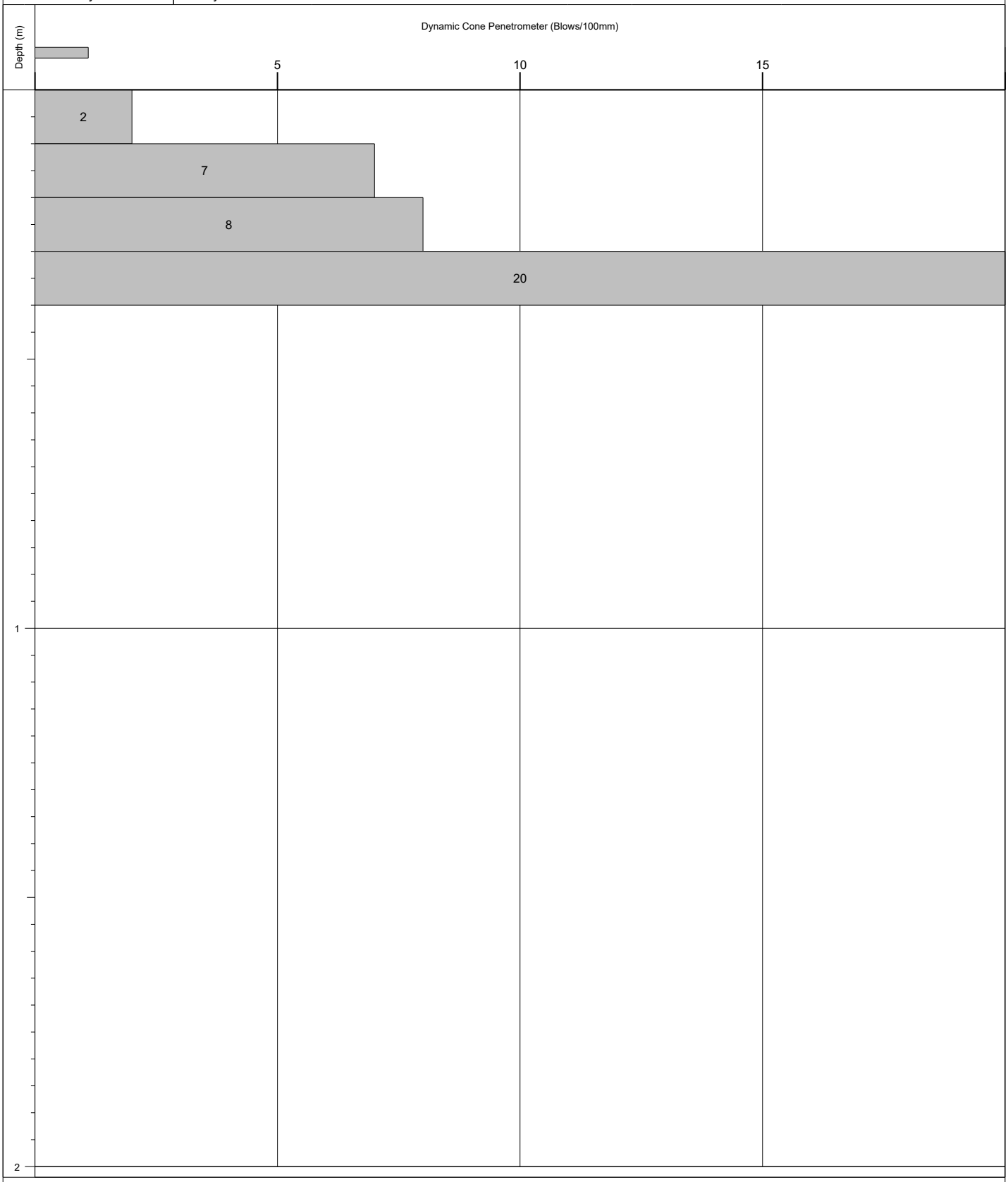
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549259.3m N.5169514.7m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1077

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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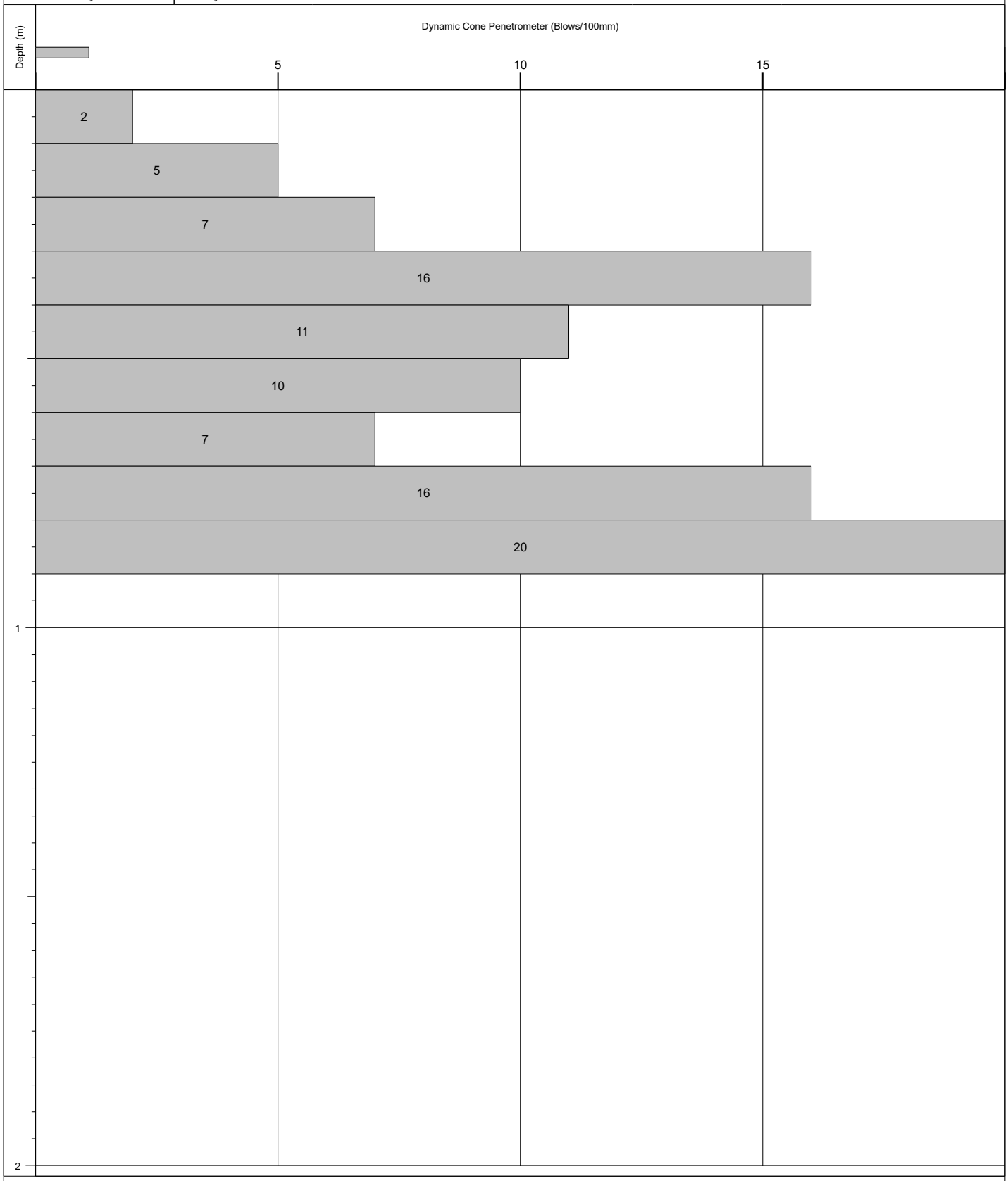
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549312.0m N.5169418.6m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1096

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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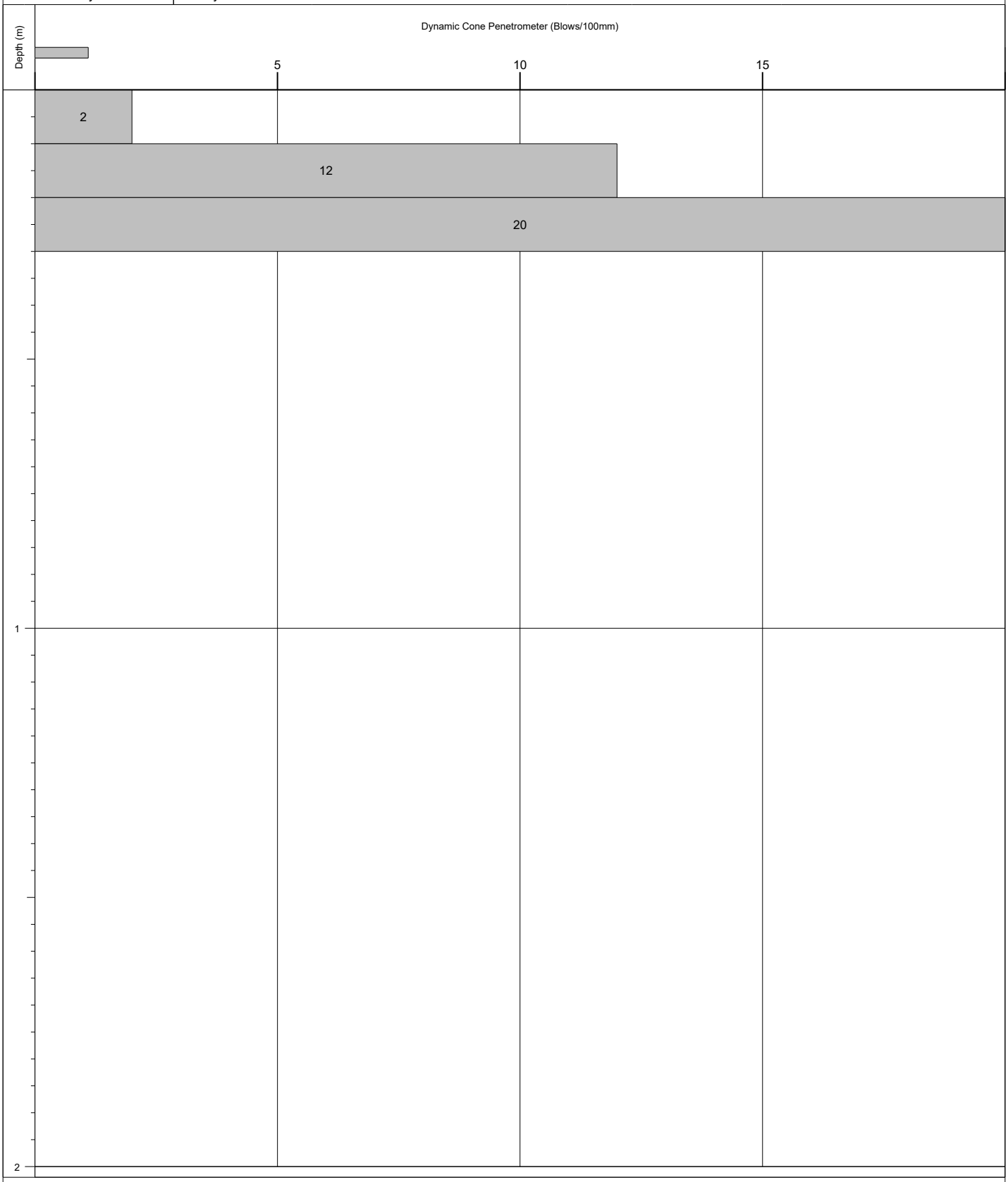
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549200.1m N.5169479.6m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1104

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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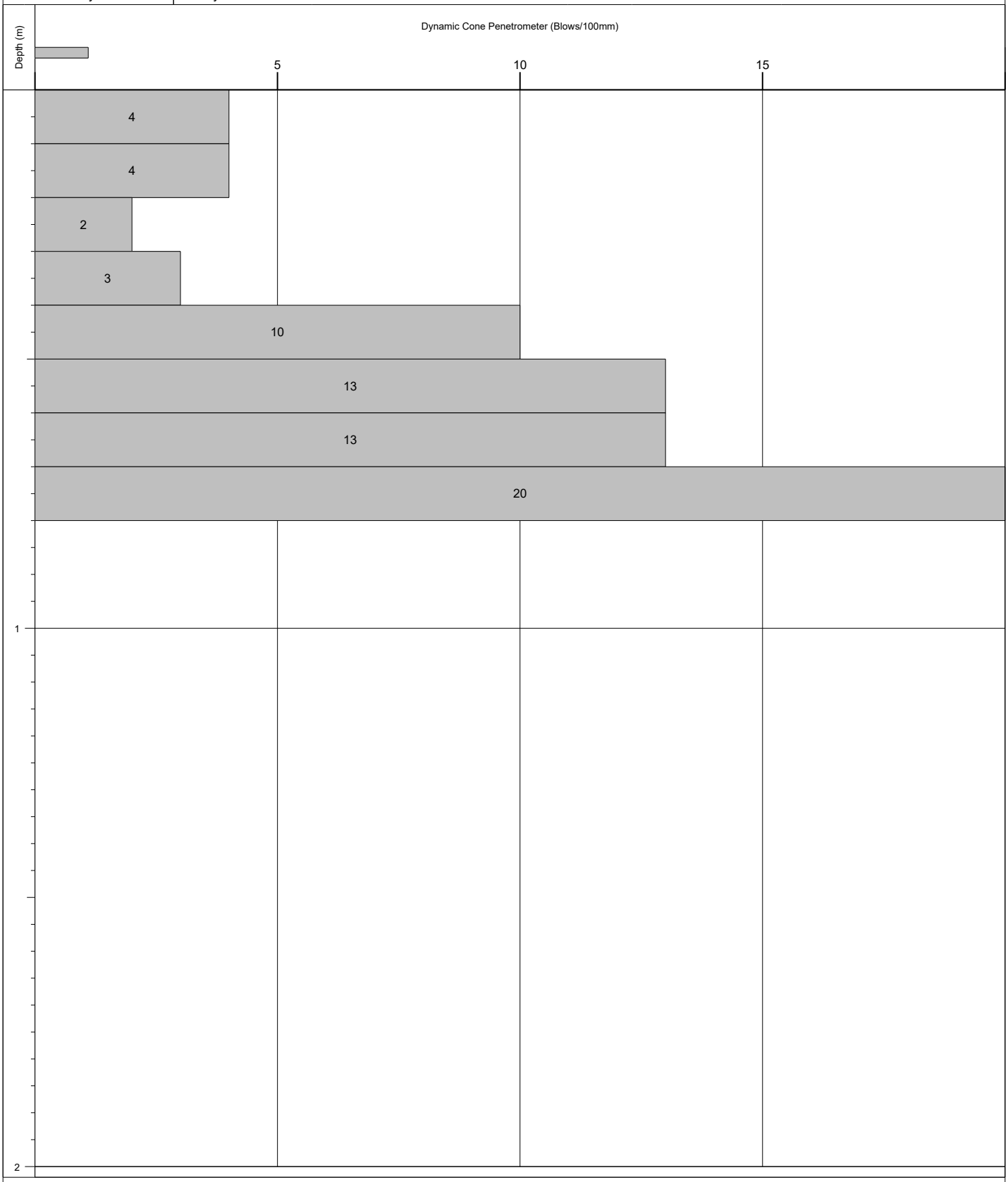
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549249.9m N.5169380.0m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1121

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 16/02/2026
Borehole Location: Refer to Site Plan

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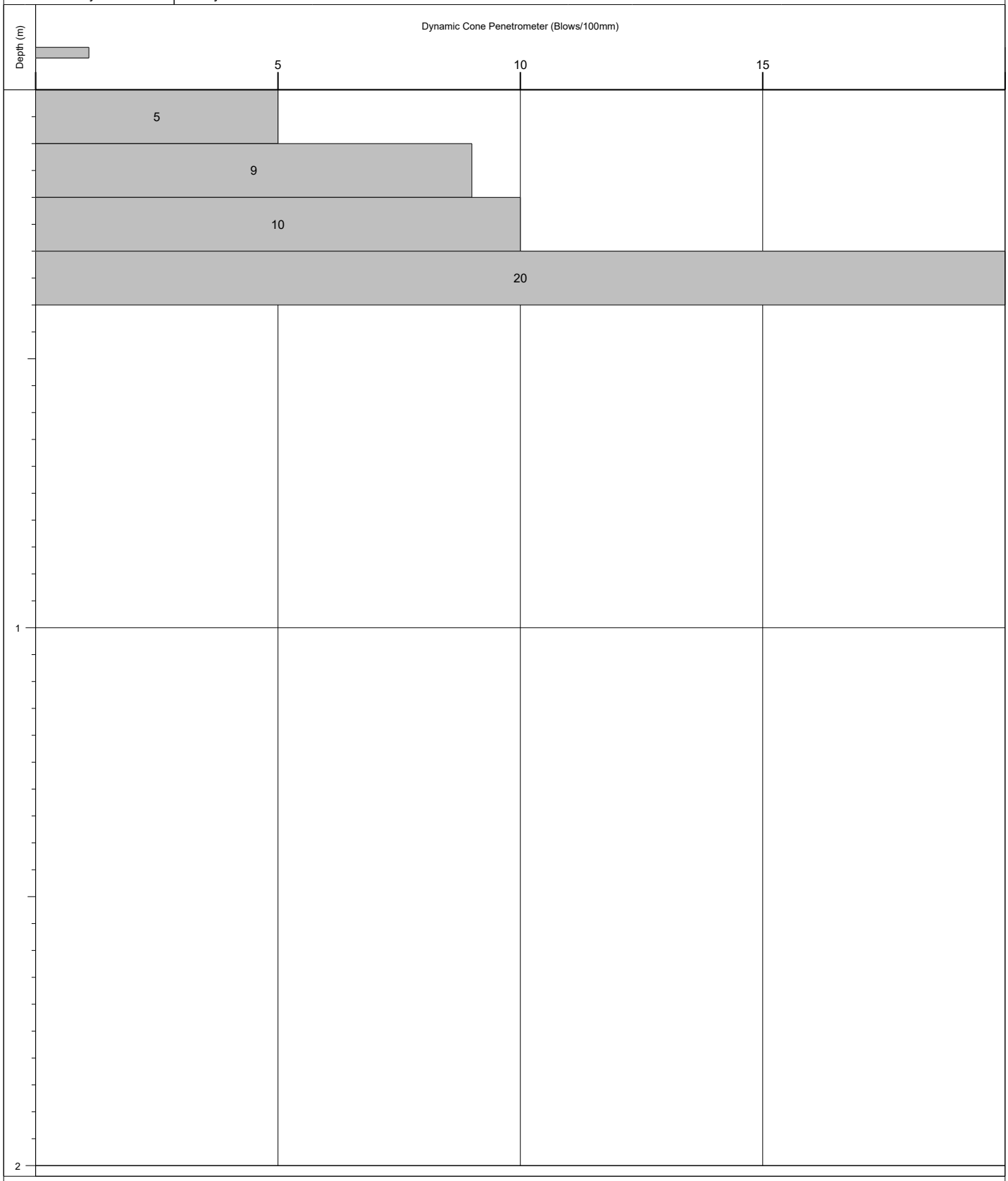
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548959.3m N.5169691.9m Elevation:
Survey Source: Hand Held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1123

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 16/02/2026
Borehole Location: Refer to Site Plan

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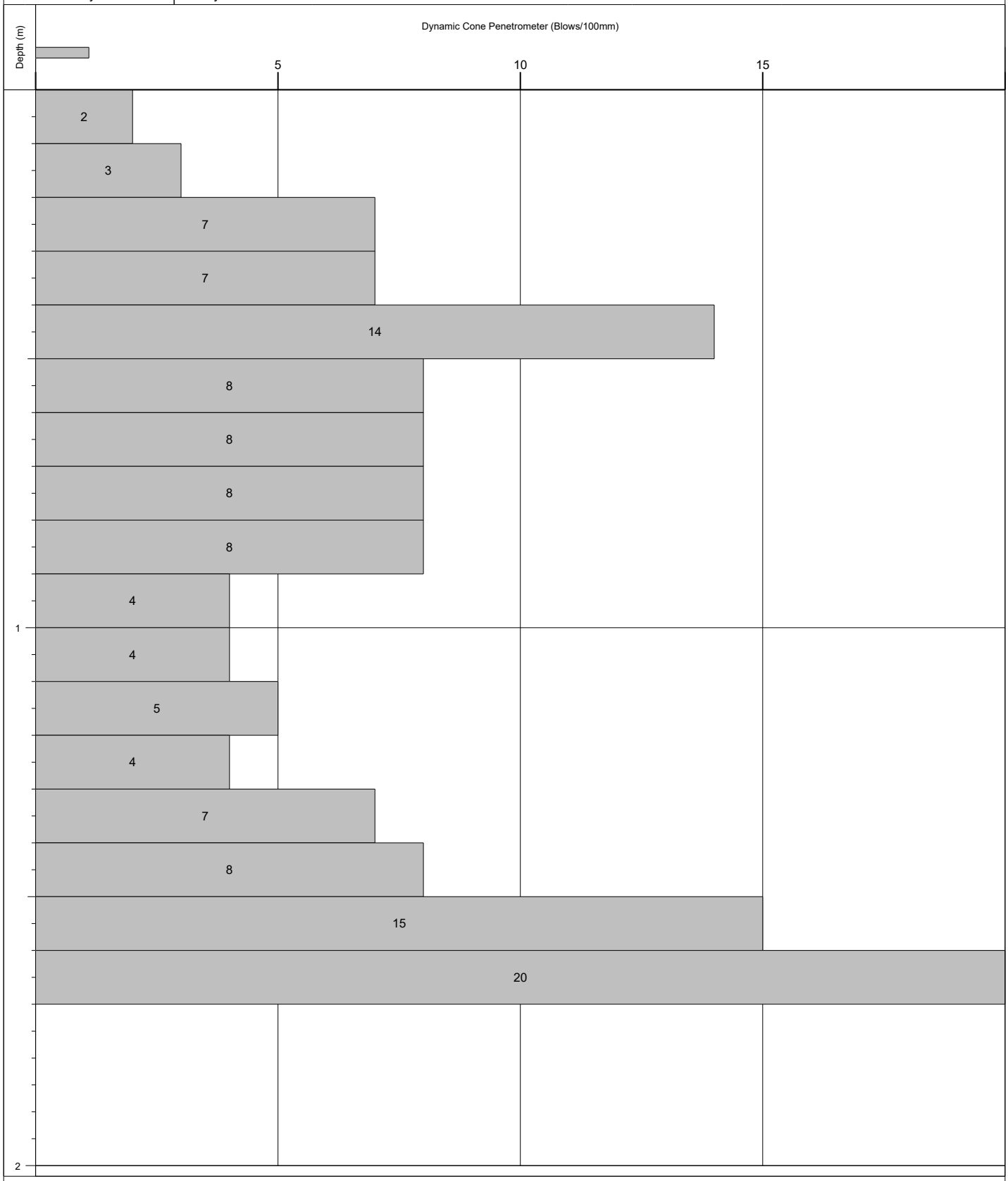
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549013.6m N.5169720.0m
Survey Source: Hand Held GPS

Elevation:
Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1127

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 16/02/2026
Borehole Location: Refer to Site Plan

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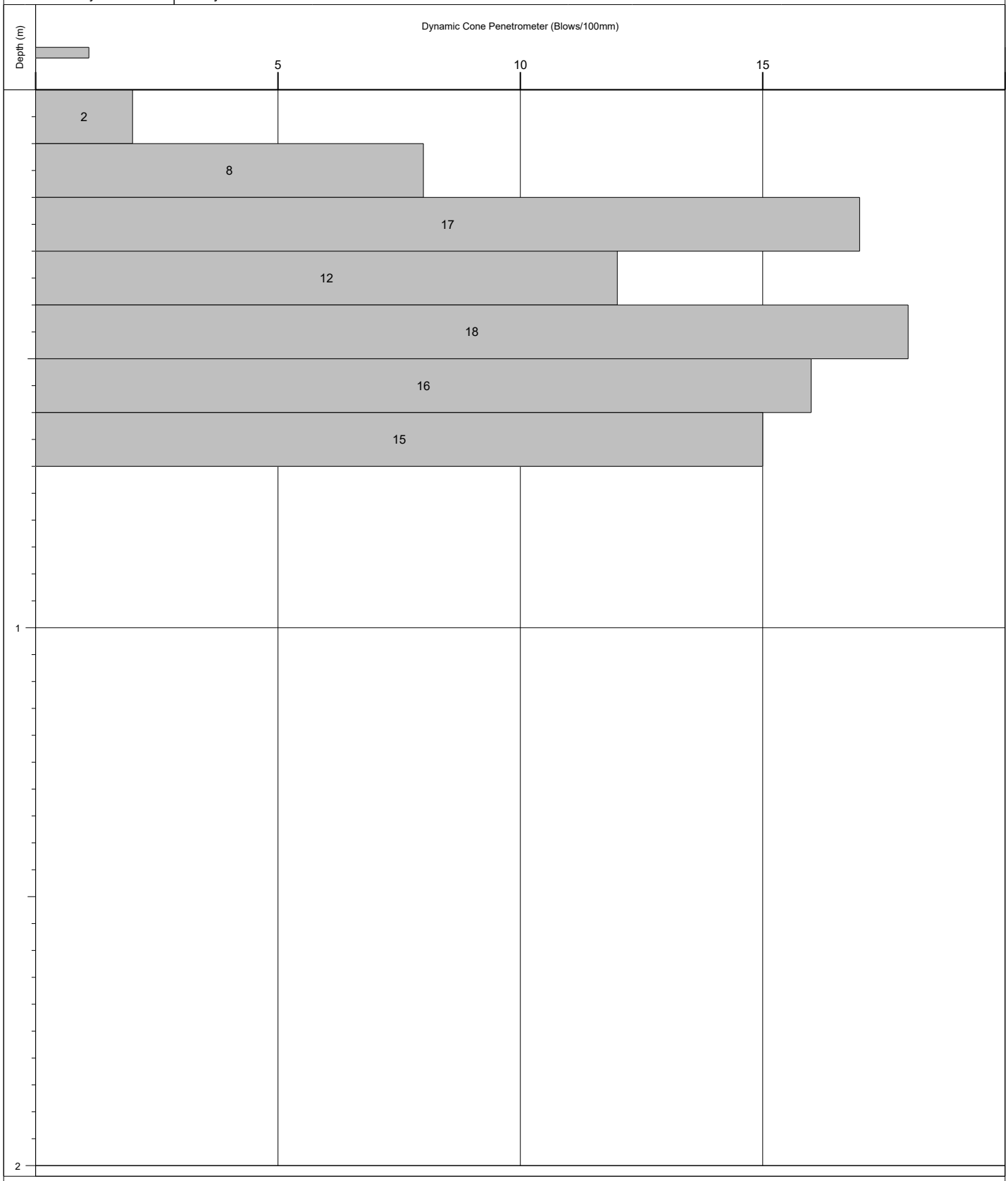
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549095.5m N.5169768.0m Elevation:
Survey Source: Hand Held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1141

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 16/02/2026
Borehole Location: Refer to Site Plan

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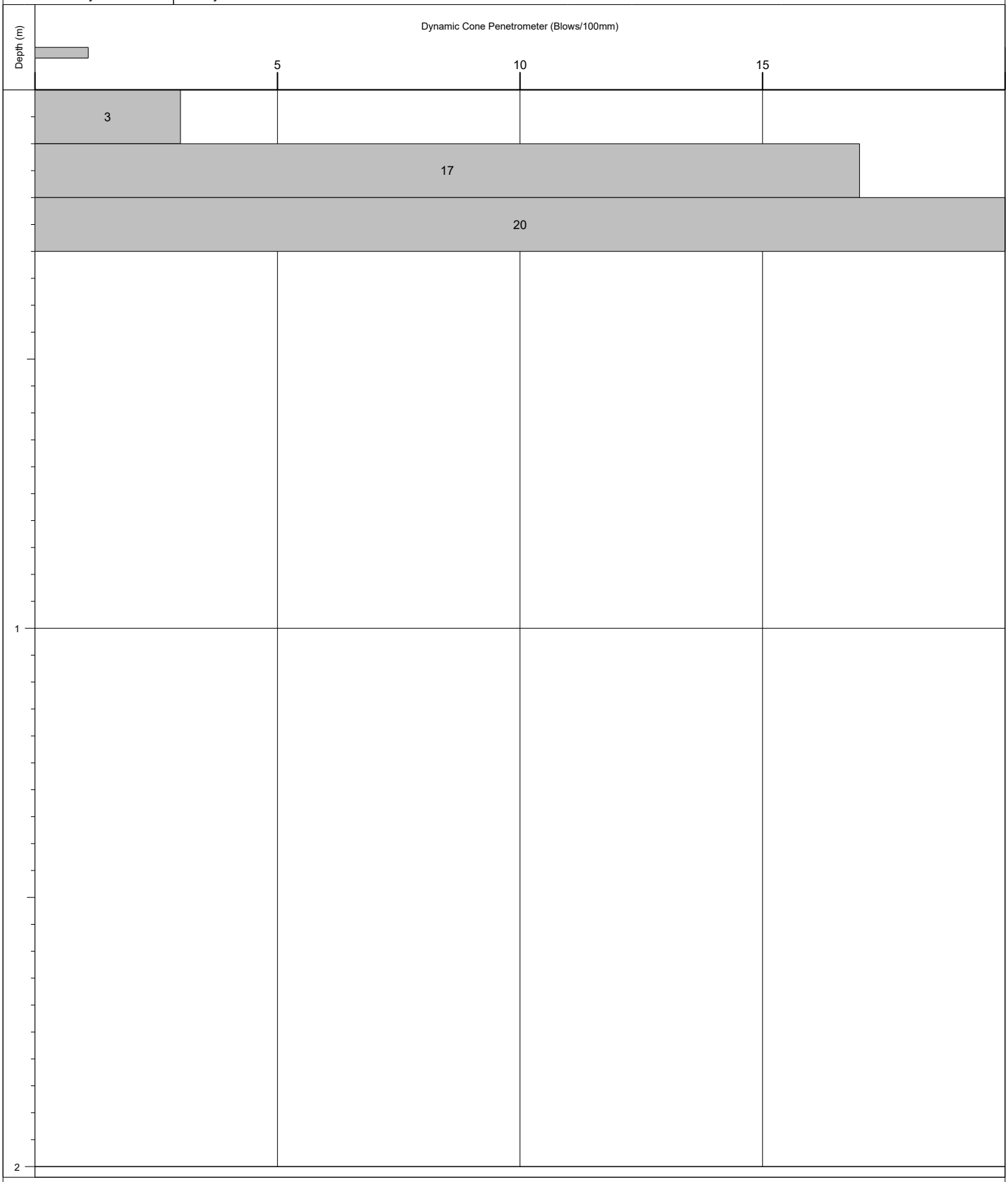
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549058.6m N.5169845.4m Elevation:
Survey Source: Hand Held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1174

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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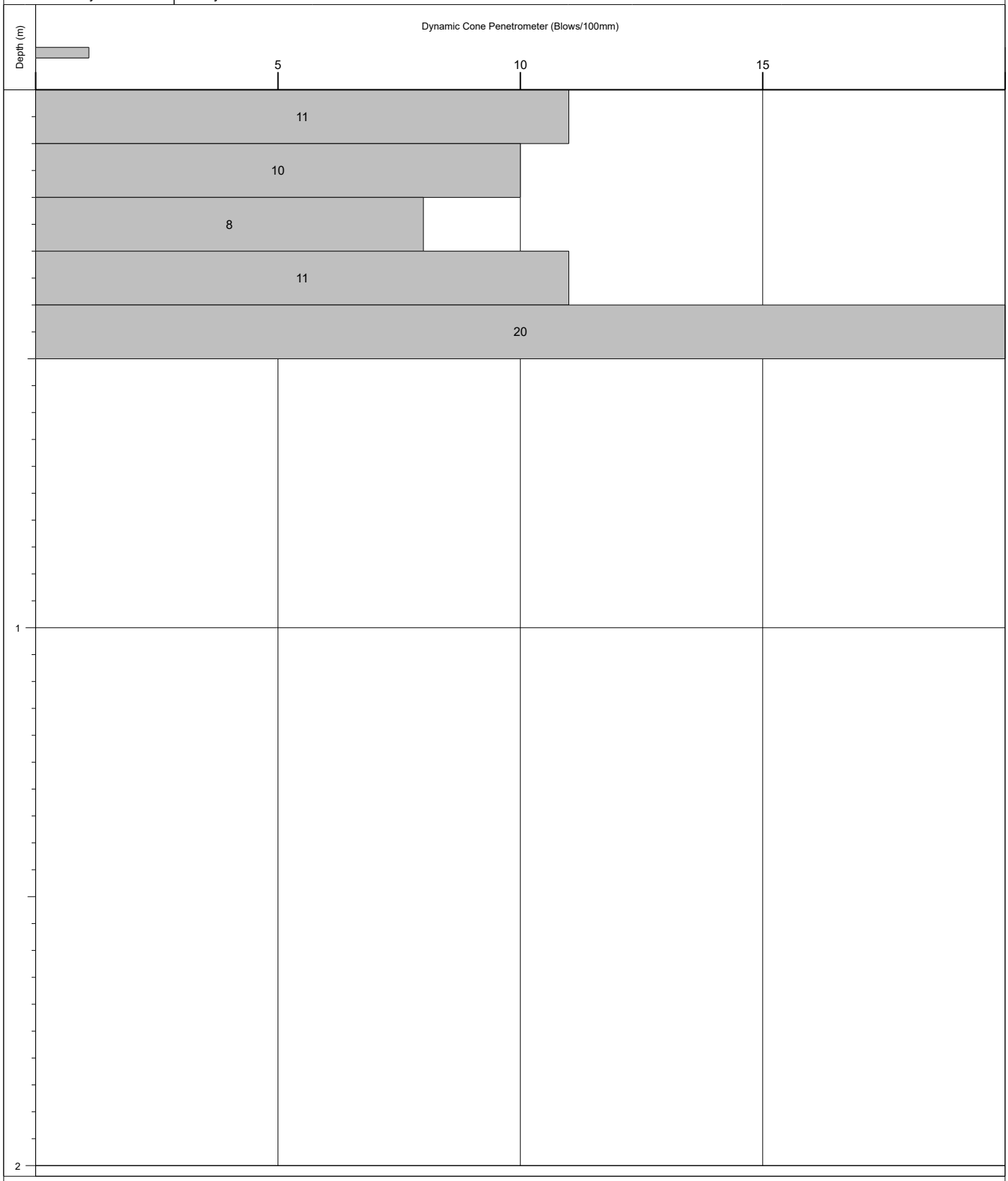
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548908.5m N.5170116.8m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1195

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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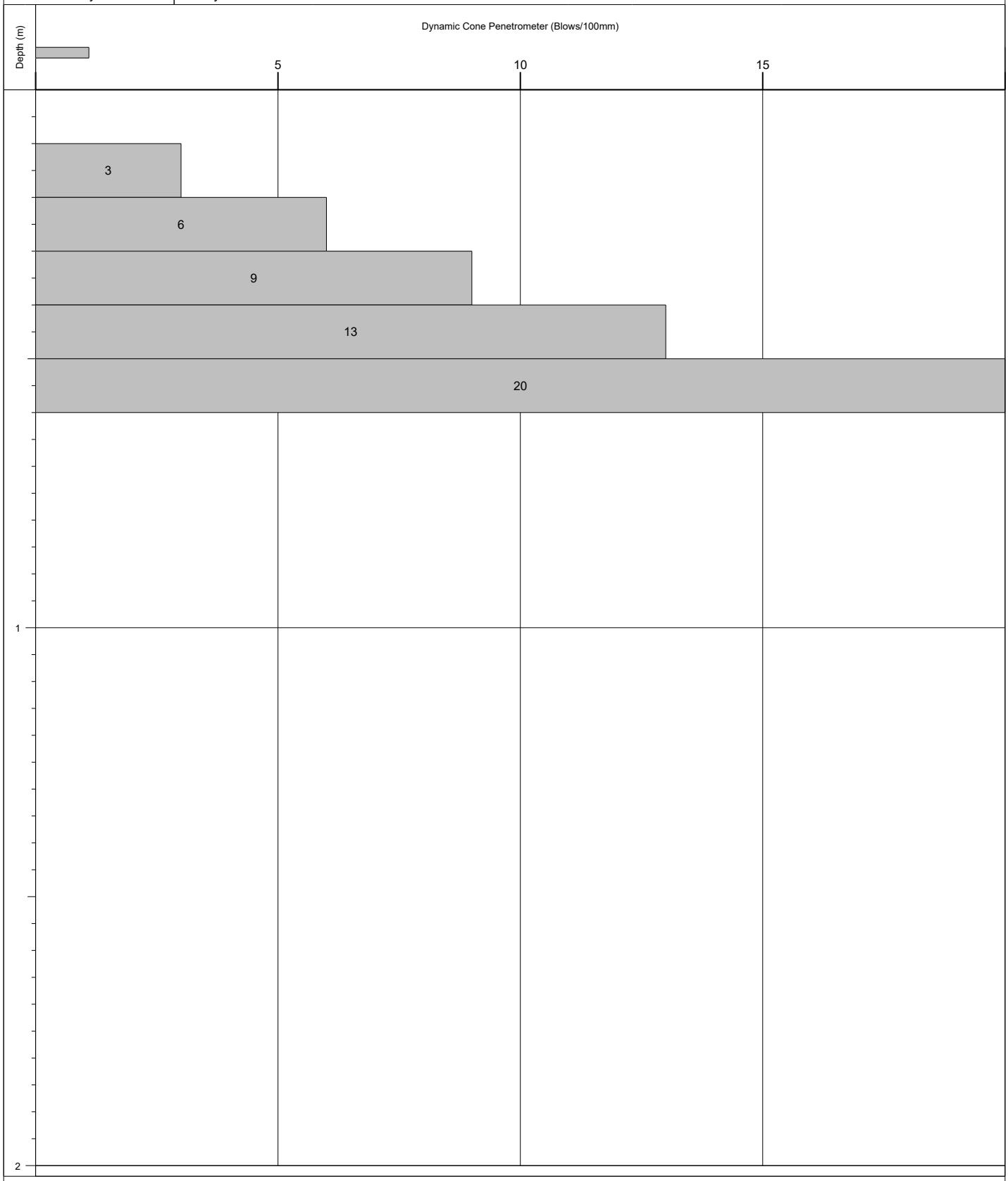
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549009.1m N.5169948.9m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1204

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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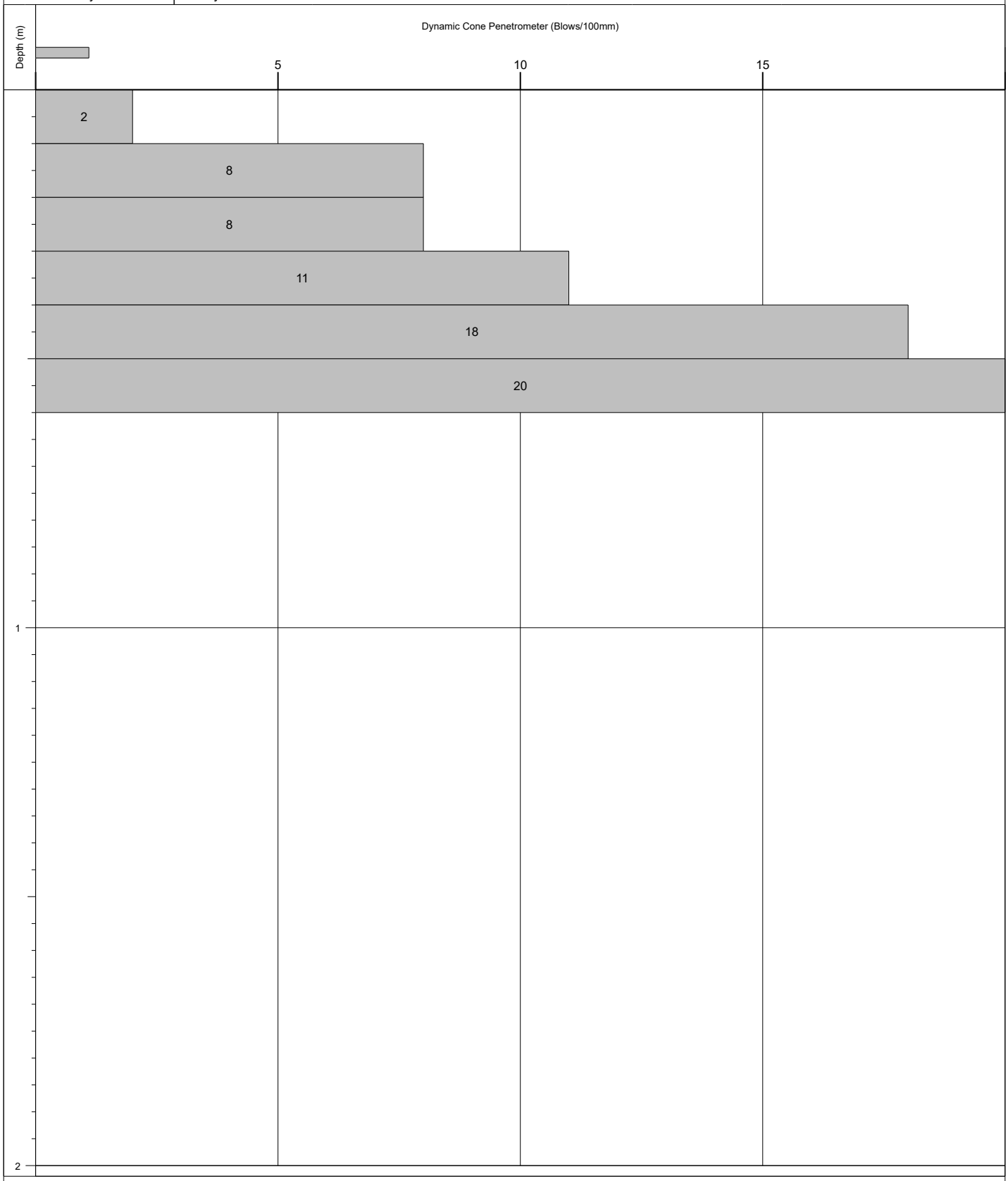
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548958.5m N.5170019.7m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1214E

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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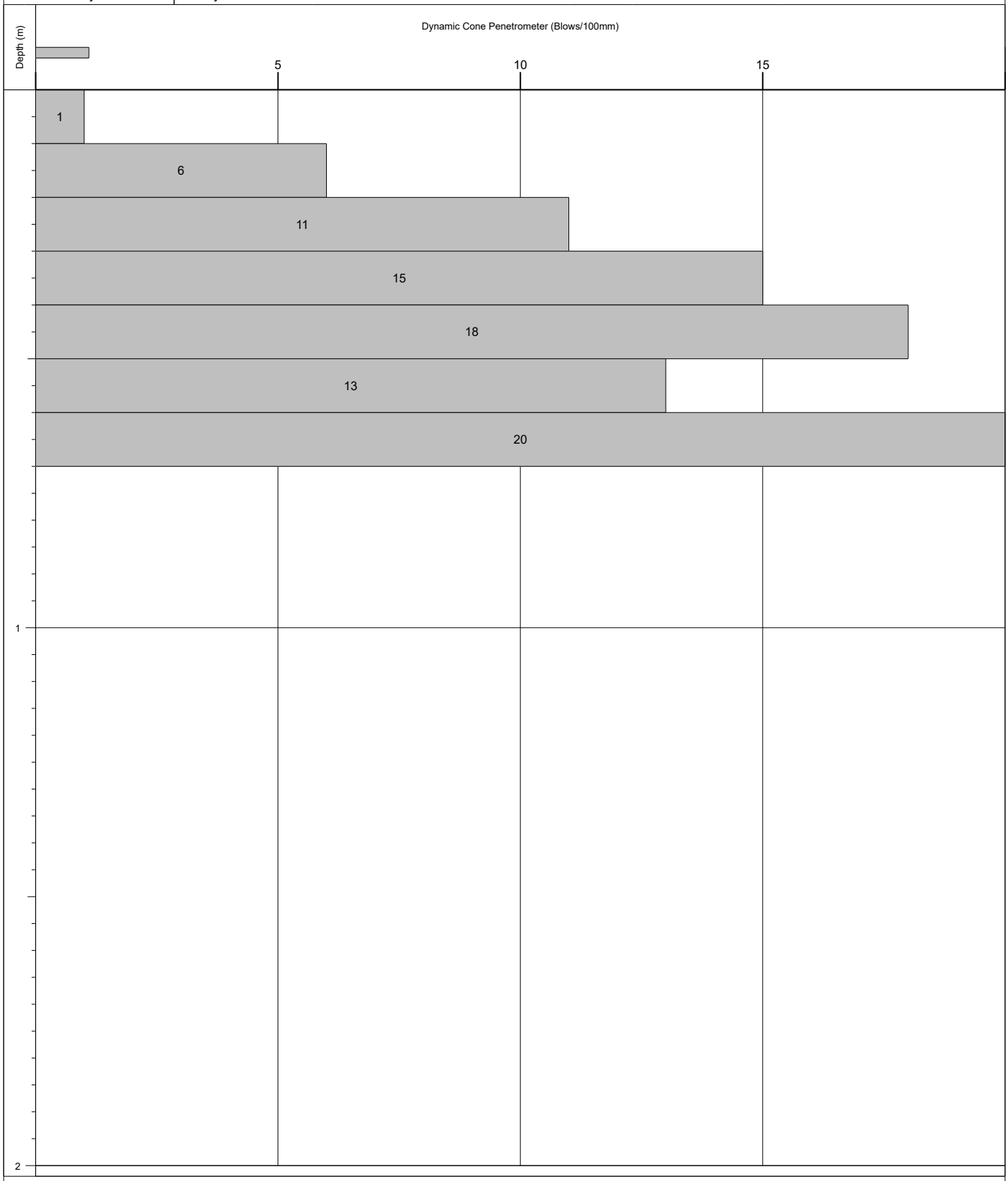
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549037.6m N.5169728.4m Elevation:
Survey Source: Hand Held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1214N

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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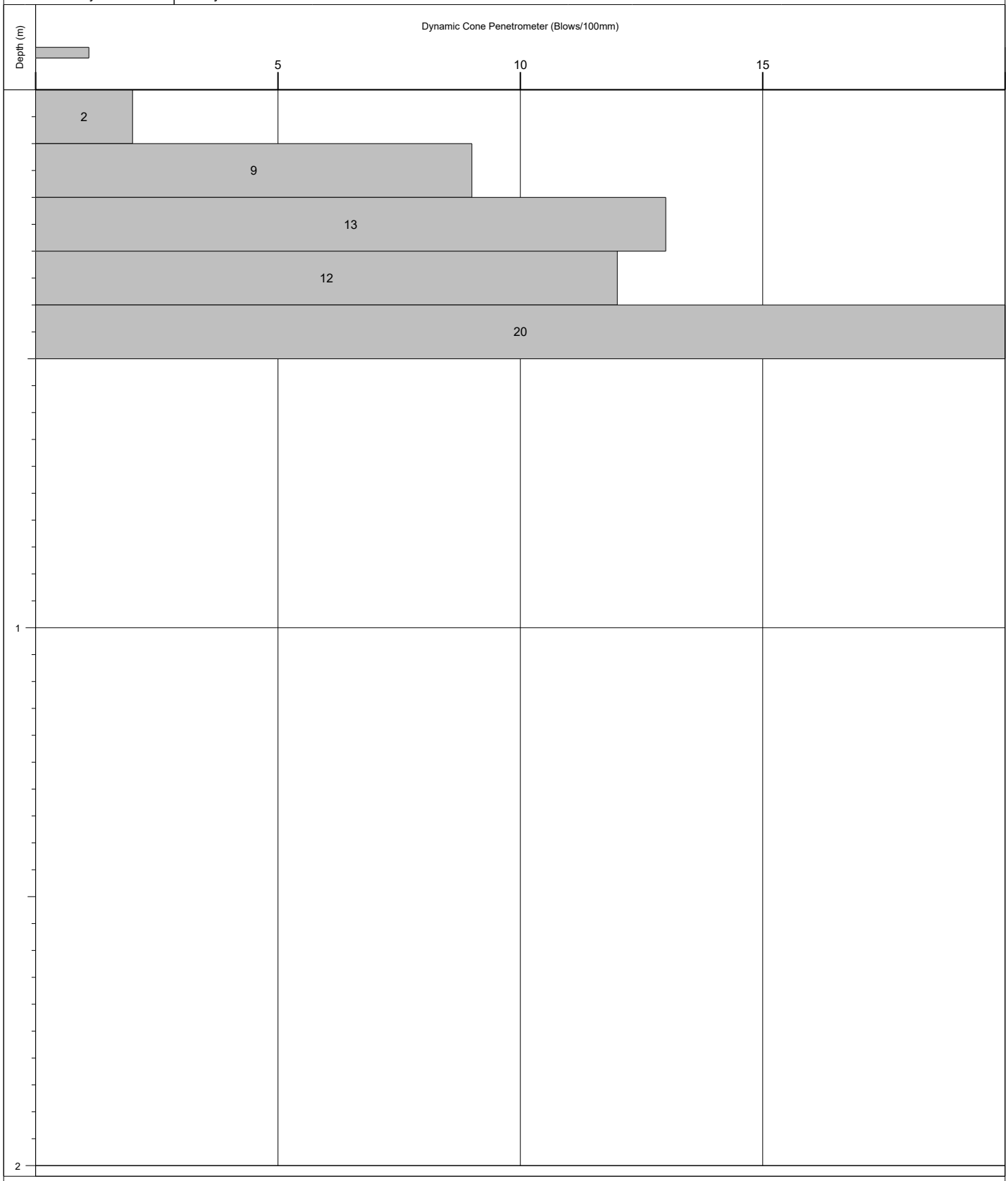
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549026.3m N.5169738.9m Elevation:
Survey Source: Hand Held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1214S

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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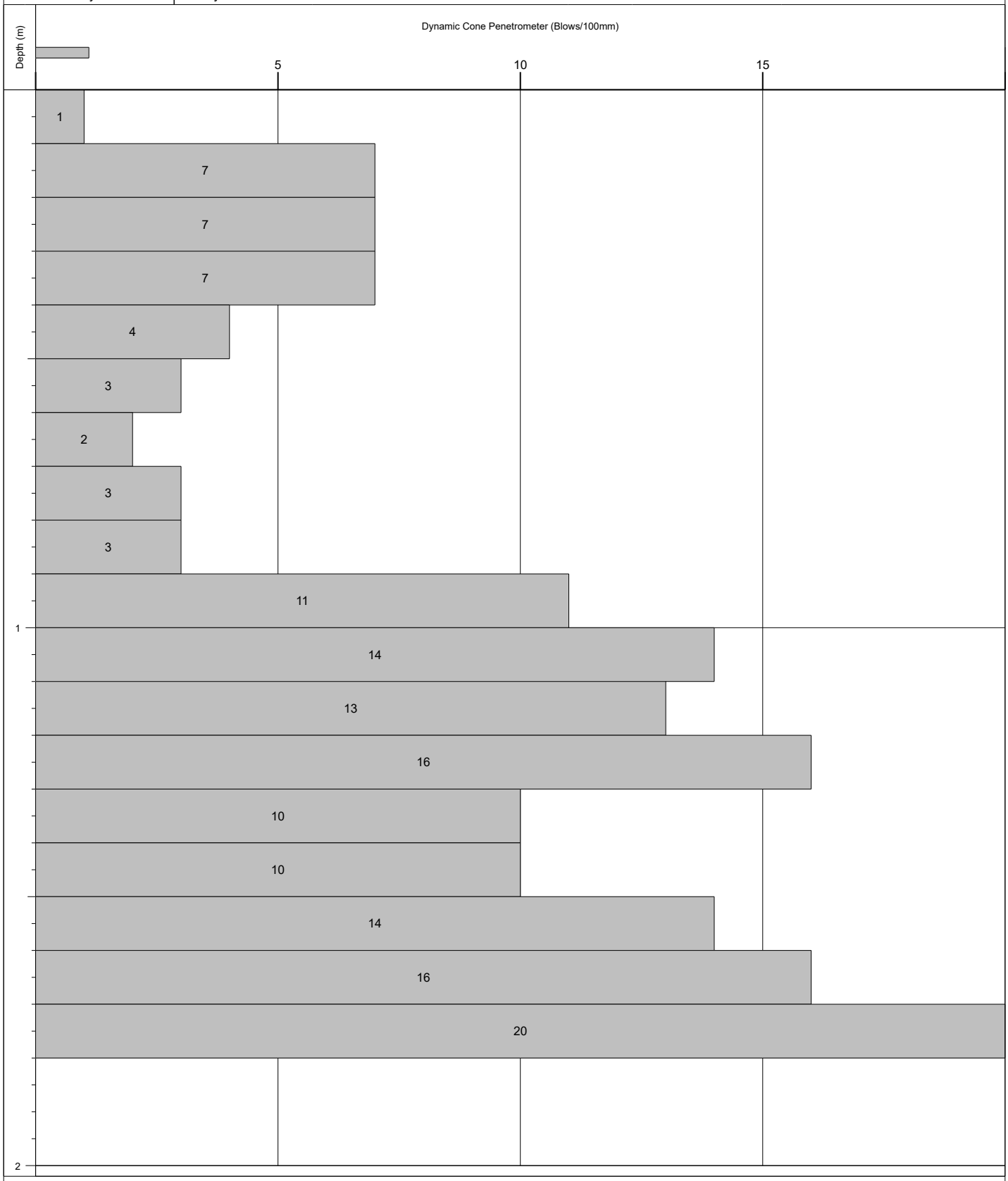
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549026.4m N.5169717.1m
Survey Source: Hand Held GPS

Elevation:
Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1214W

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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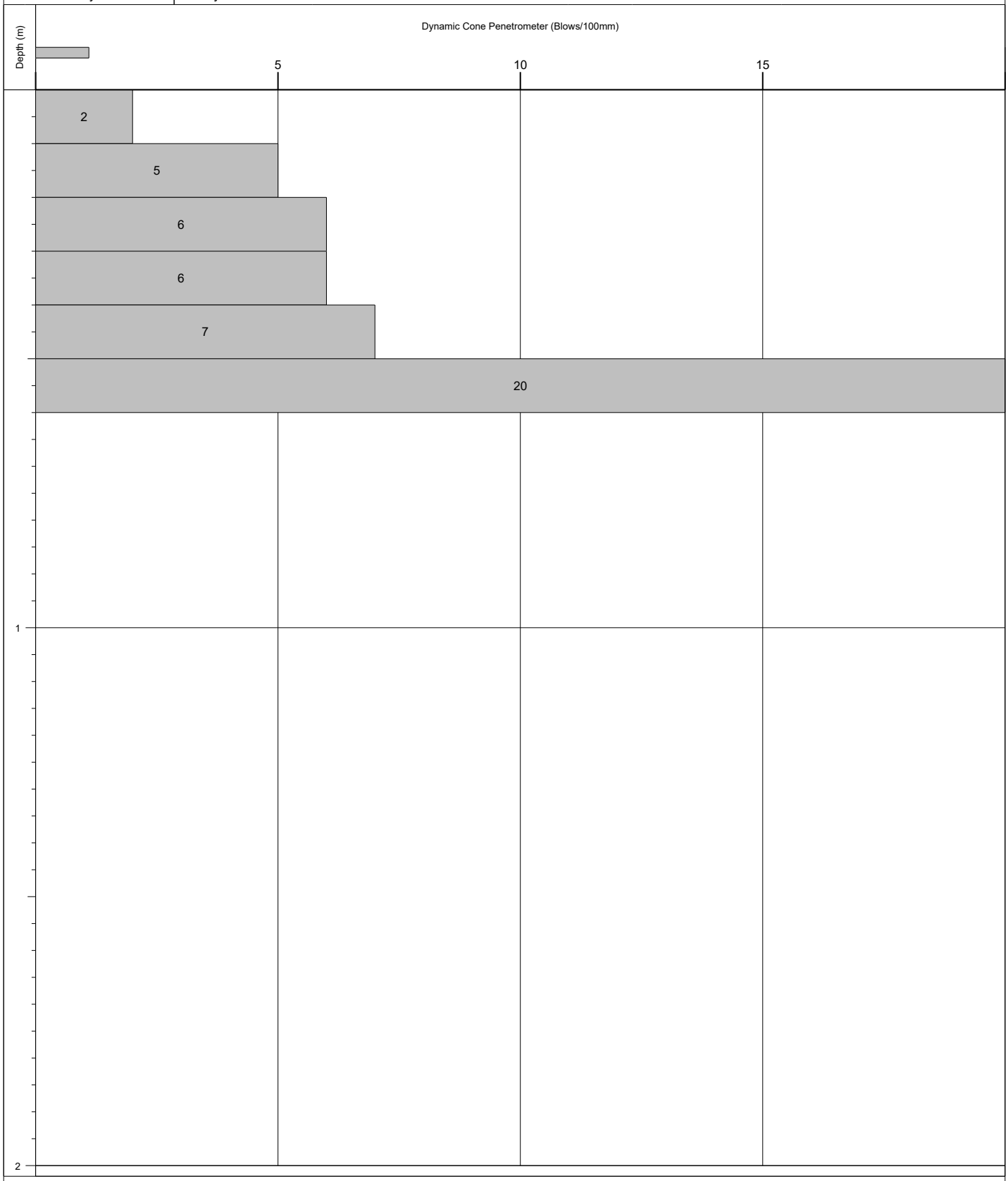
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549015.5m N.5169729.3m
Survey Source: Hand-held GPS

Elevation:
Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1218

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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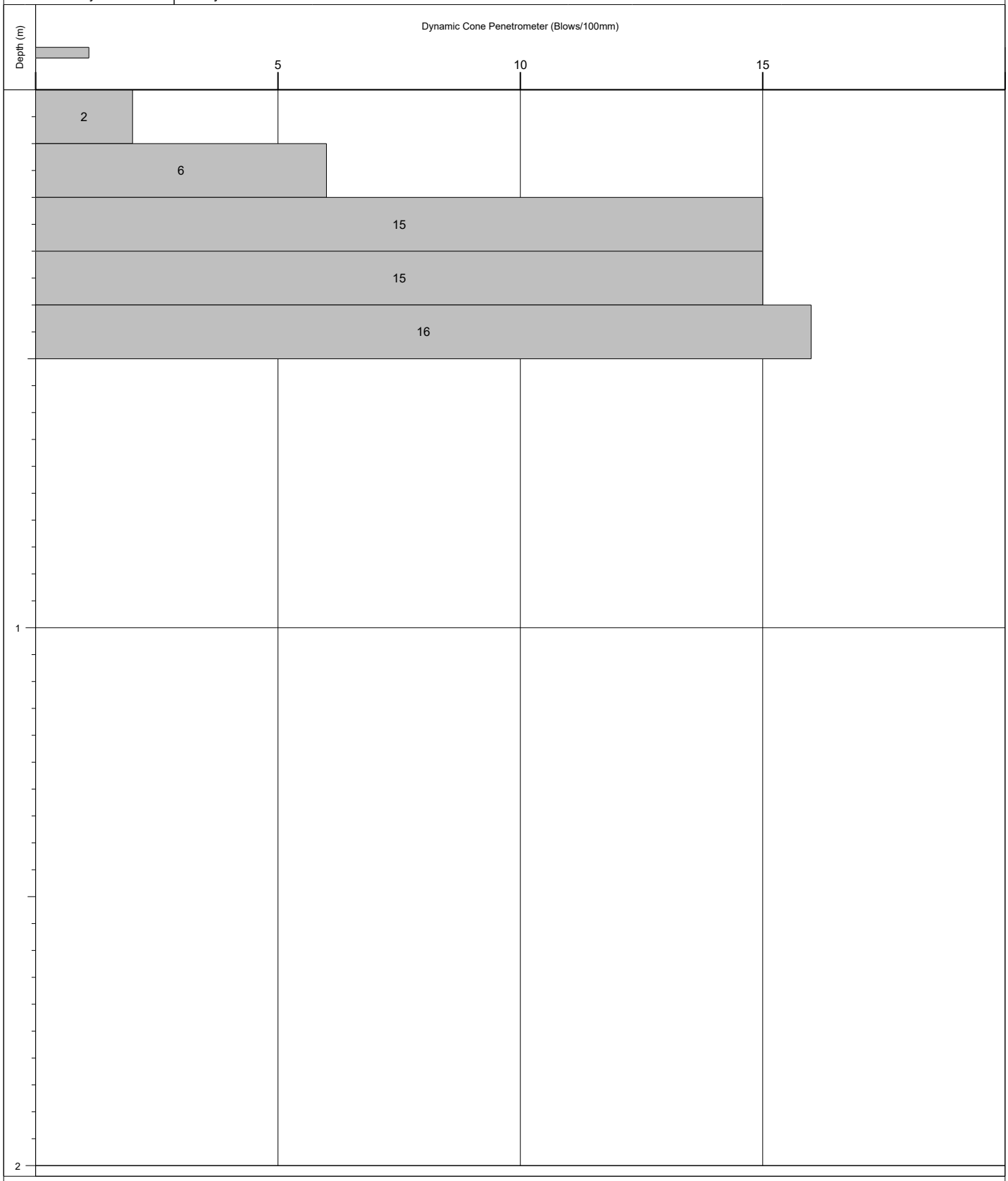
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548852.8m N.5170192.6m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1243

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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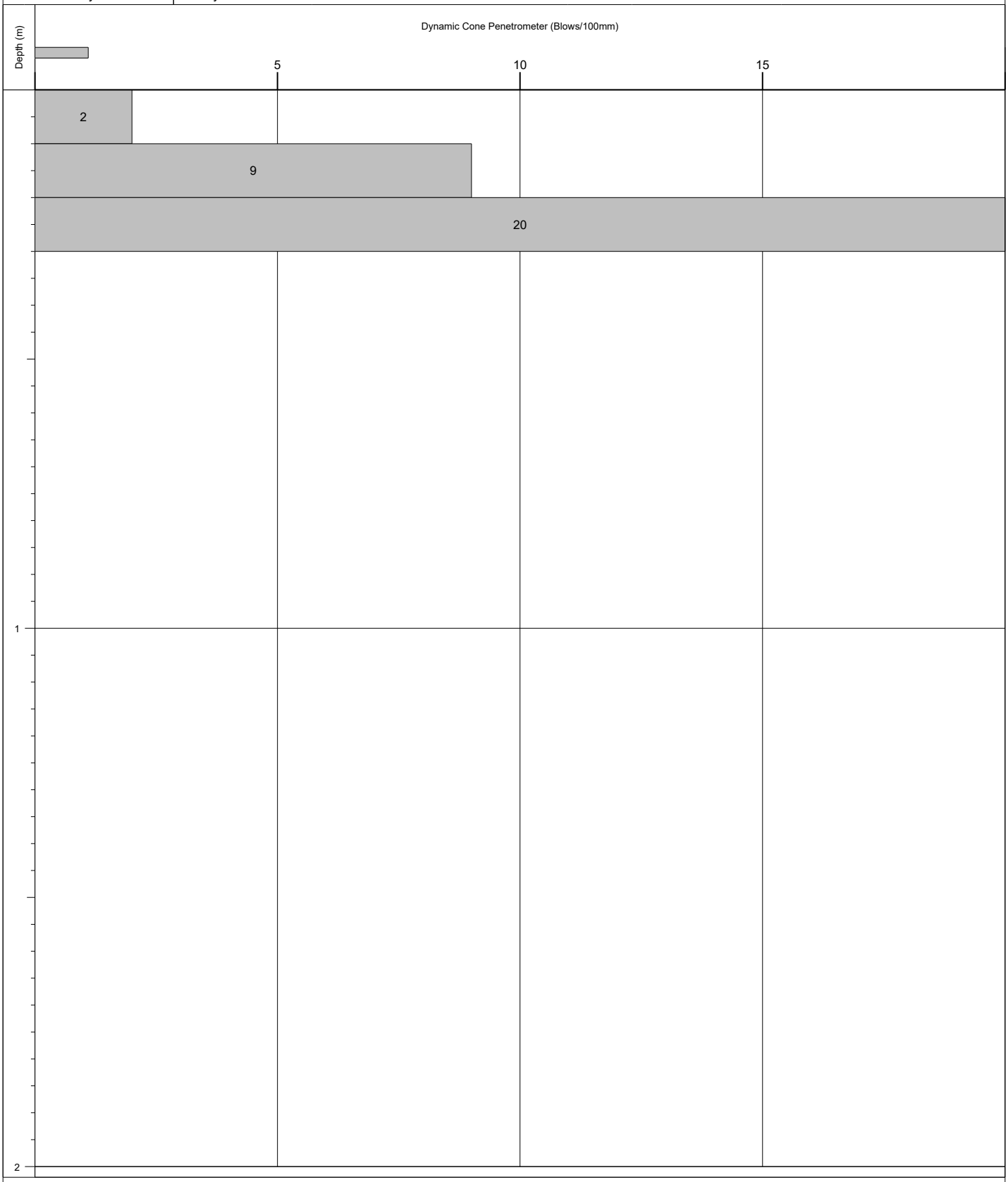
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549230.1m N.5169250.8m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1249

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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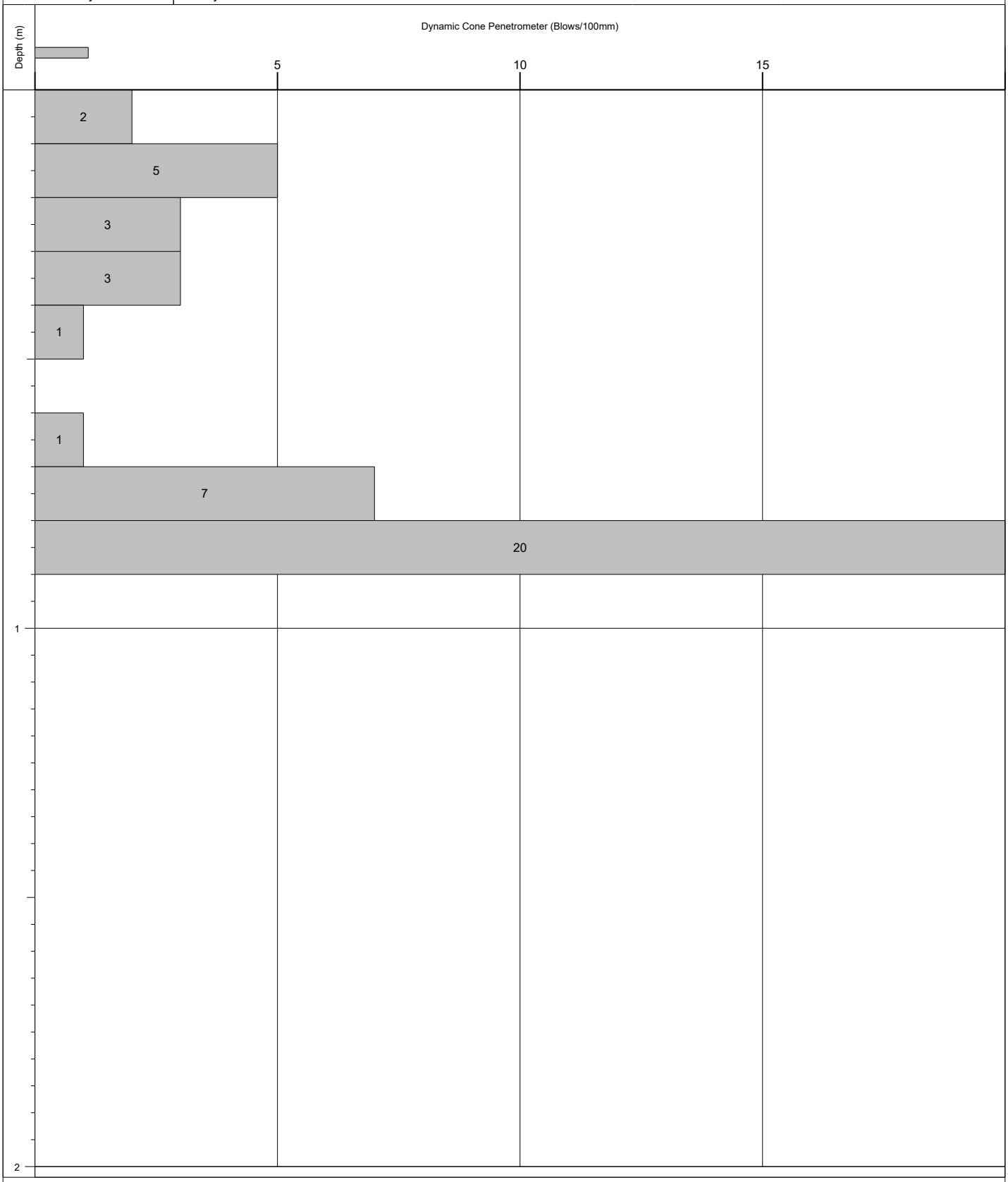
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549264.9m N.5169180.7m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1262

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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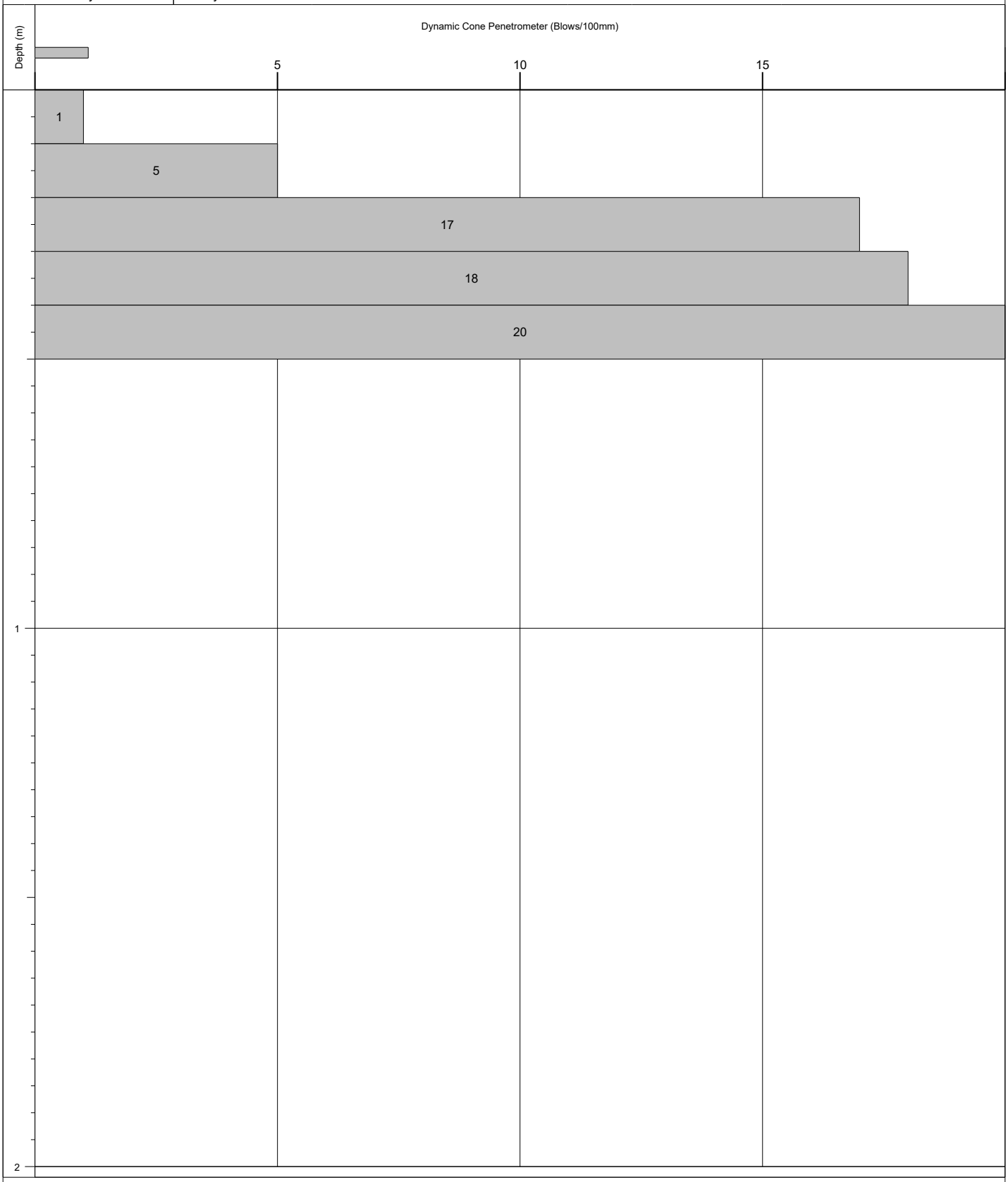
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549125.4m N.5169427.7m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1277

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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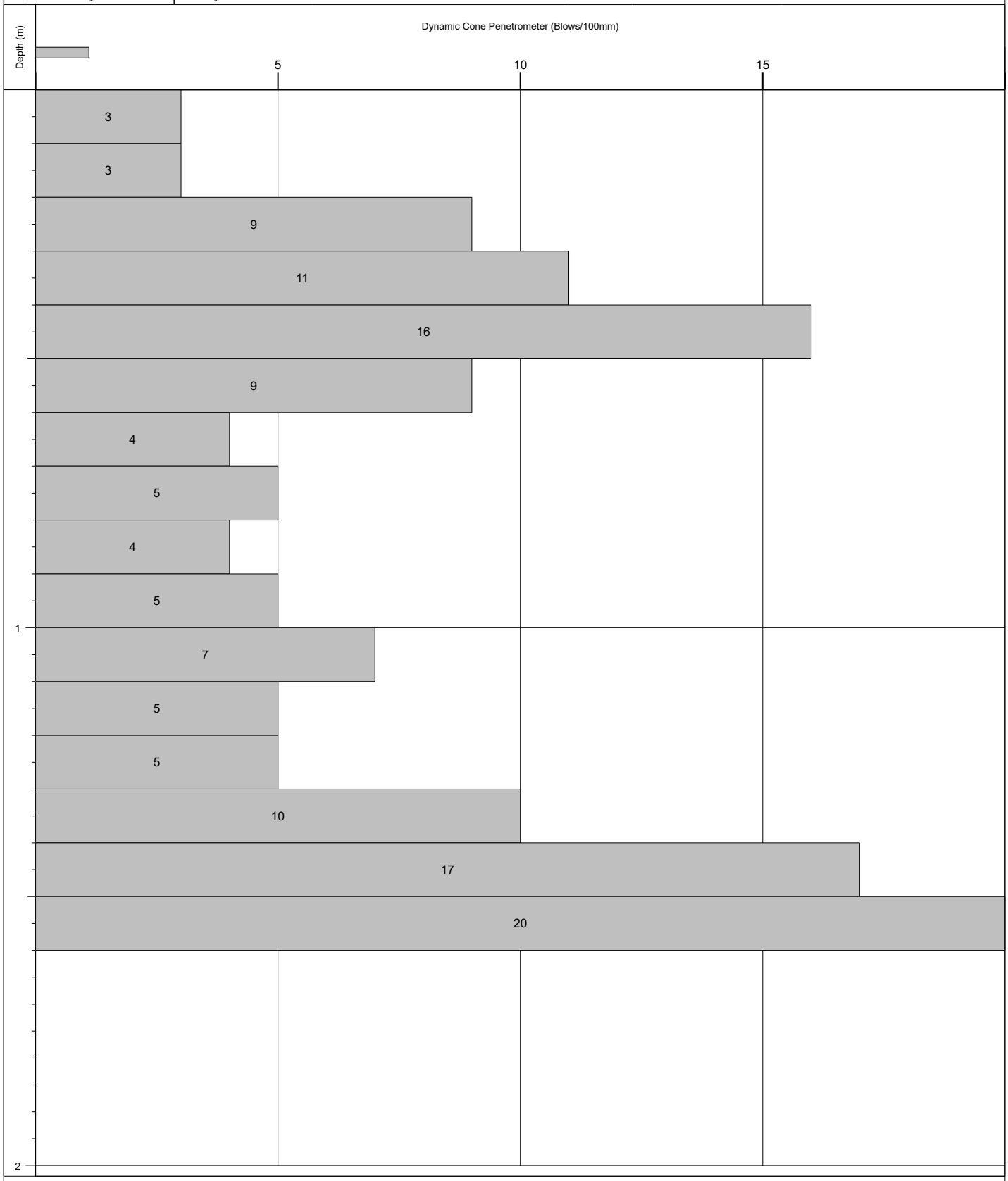
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549188.7m N.5169344.0m
Survey Source: Hand-held GPS

Elevation:
Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1298

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 16/02/2026
Borehole Location: Refer to Site Plan

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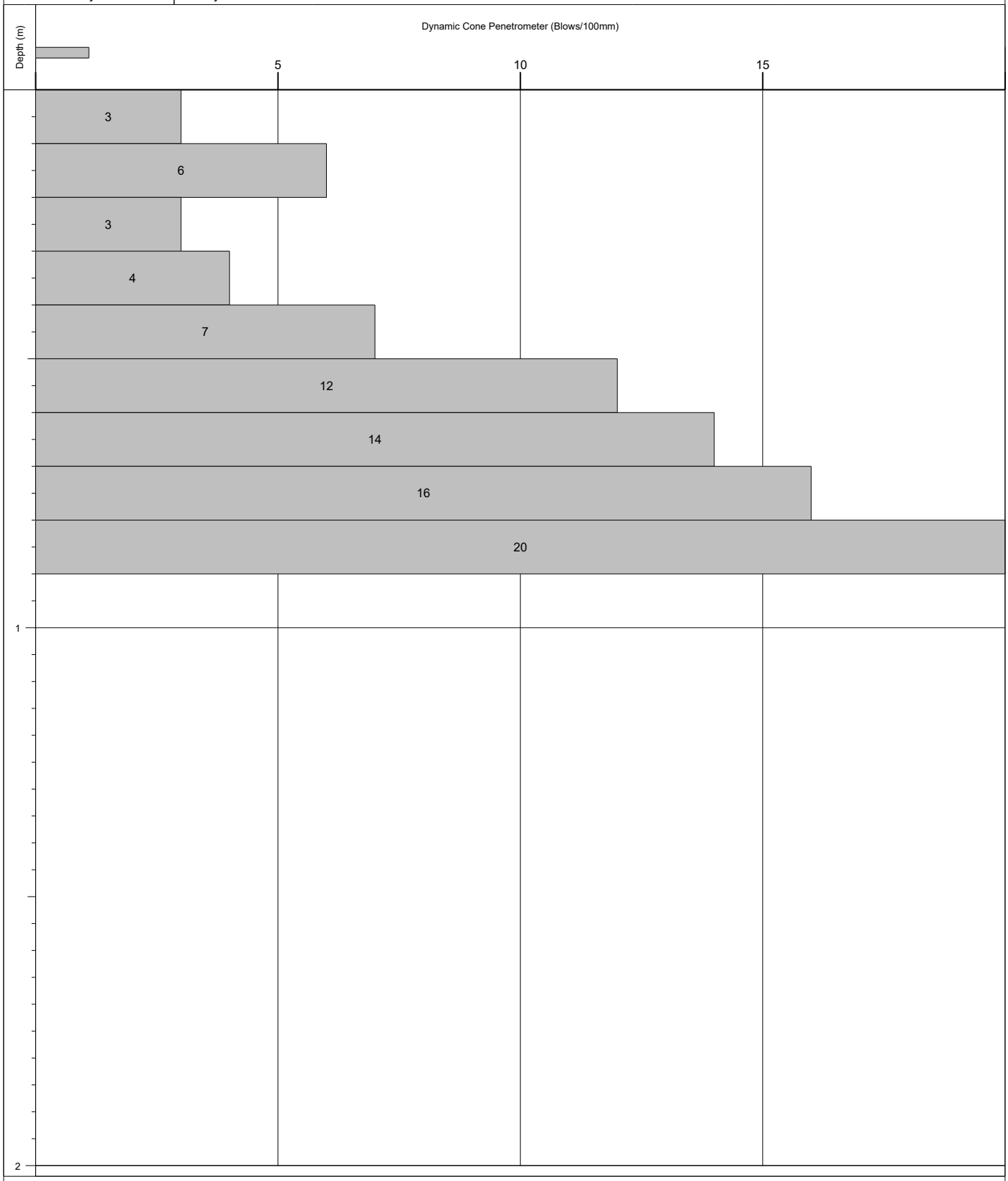
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548982.6m N.5169811.2m Elevation:
Survey Source: Hand Held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1317

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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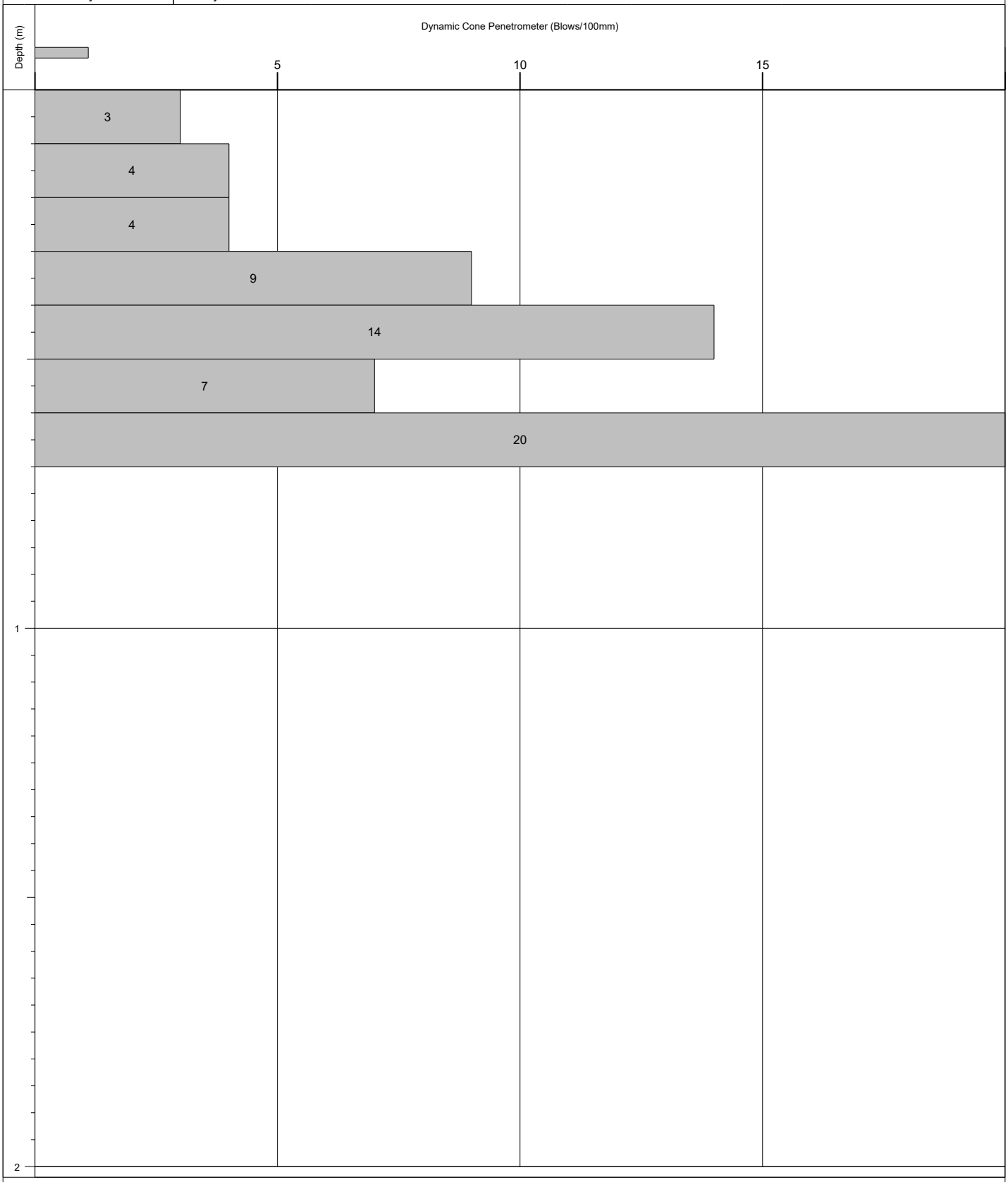
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548955.8m N.5169876.8m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1324

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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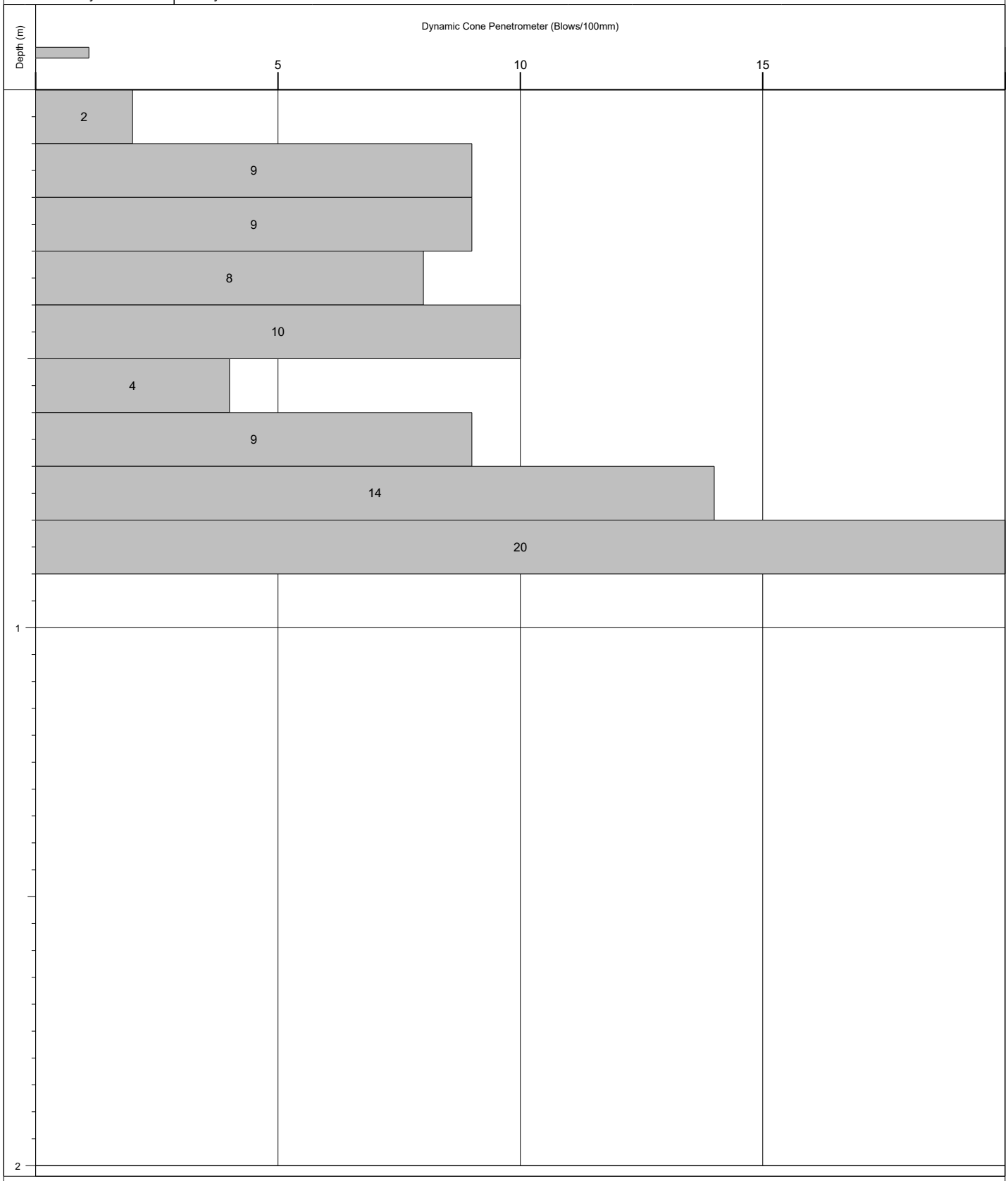
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548884.4m N.5169981.2m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1330

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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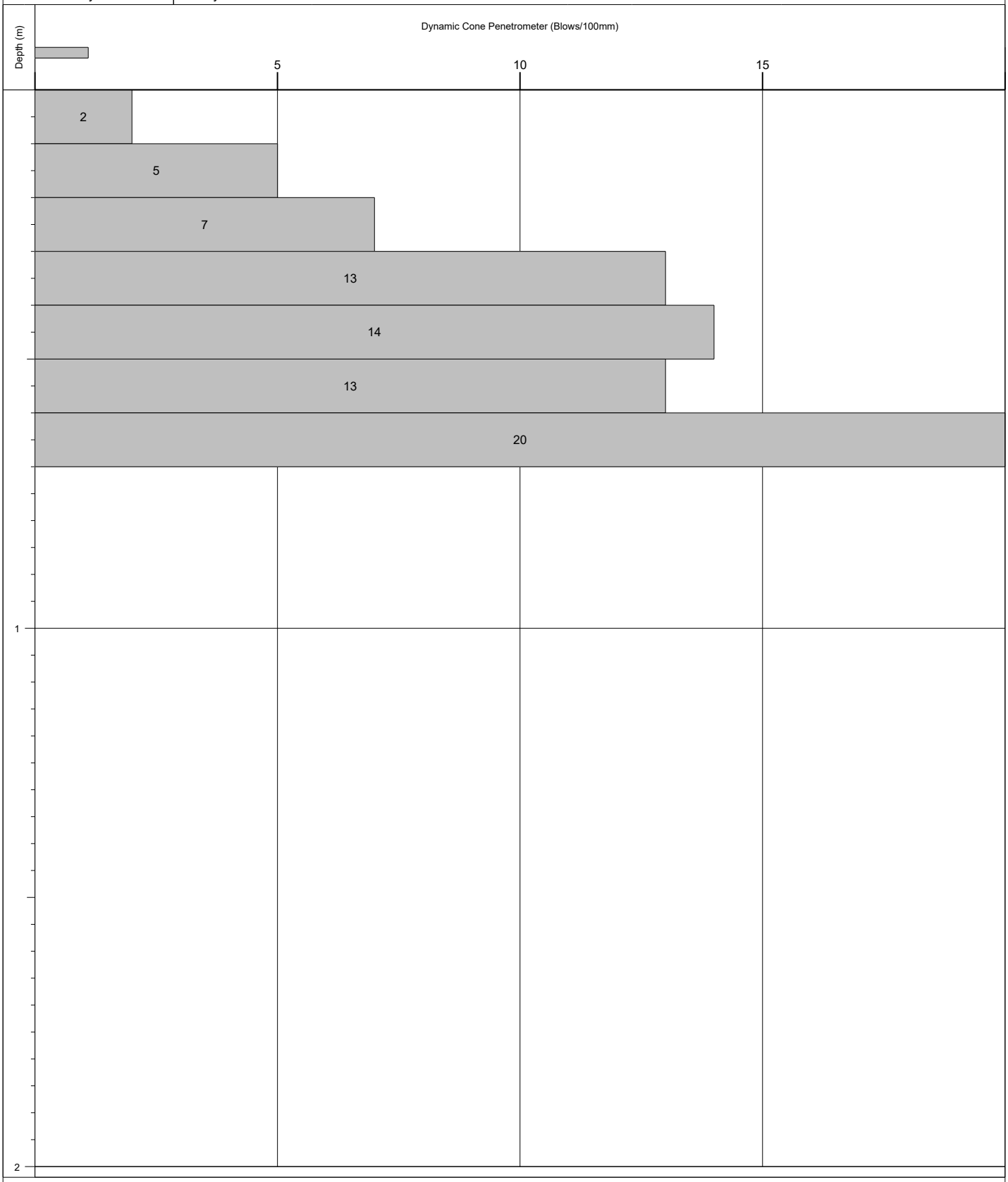
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548836.1m N.5170073.1m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1351

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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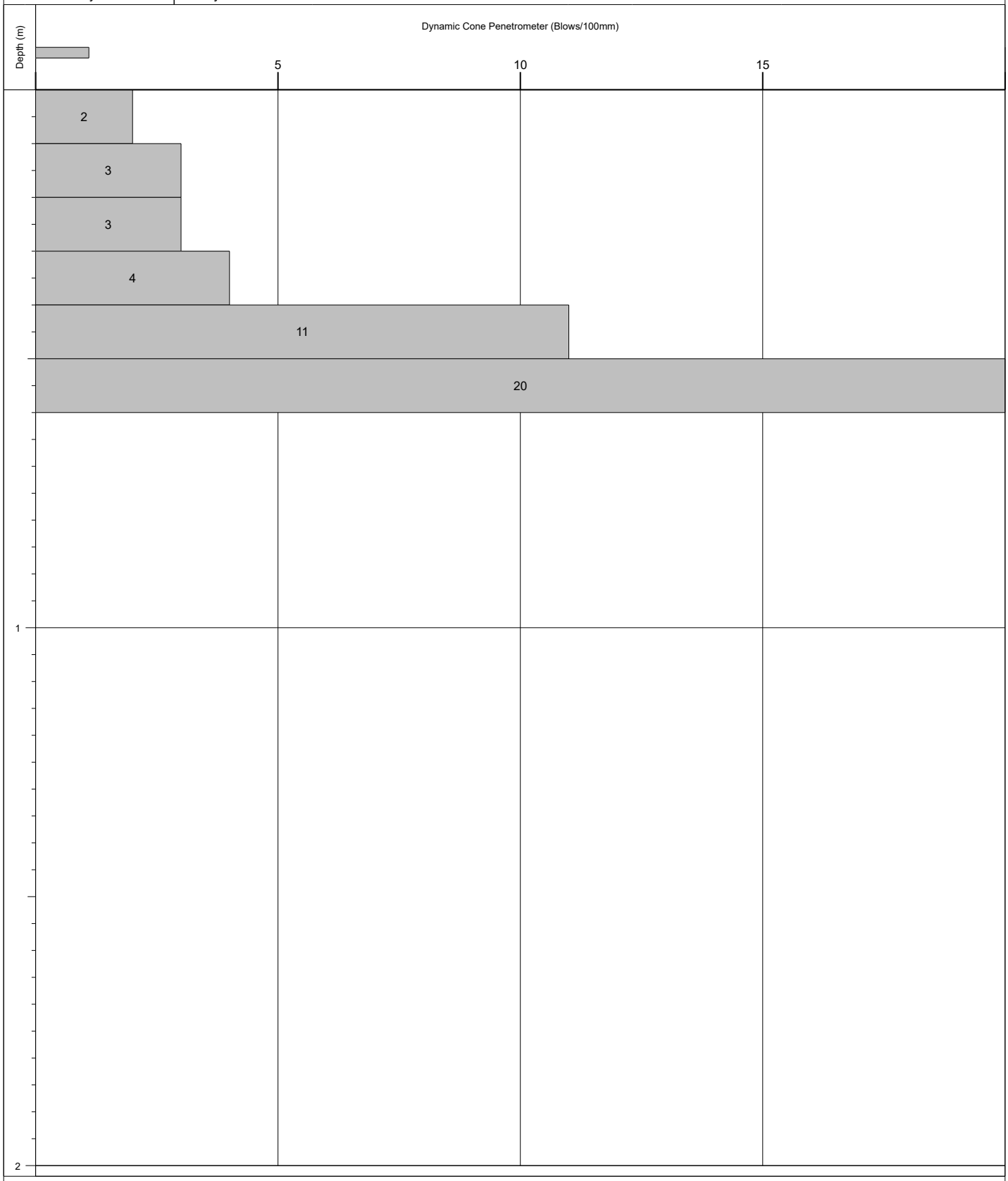
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548788.7m N.5170154.7m
Survey Source: Hand-held GPS

Elevation:
Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1369

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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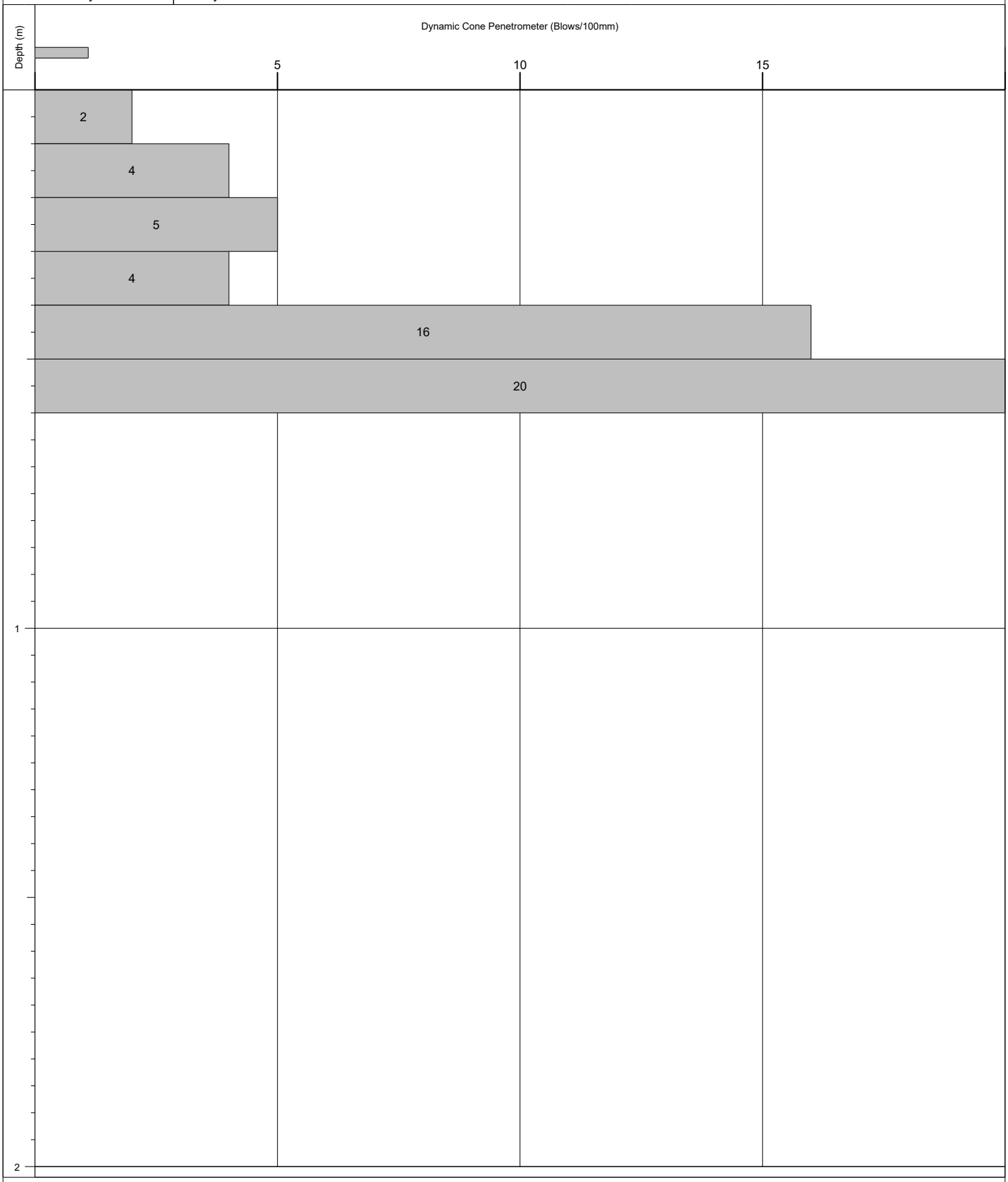
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548707.6m N.5170105.8m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1375

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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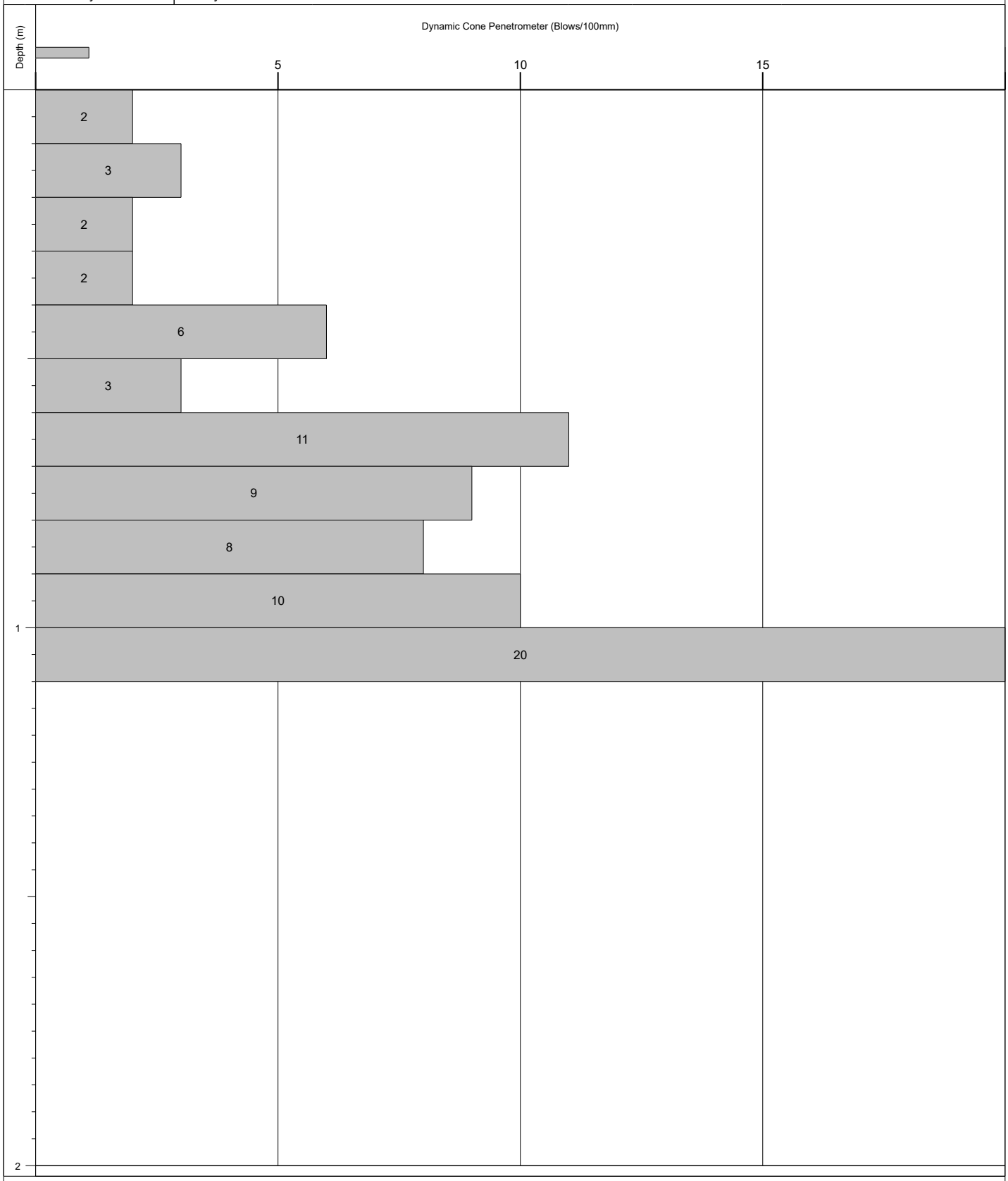
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548756.3m N.5170024.1m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1381

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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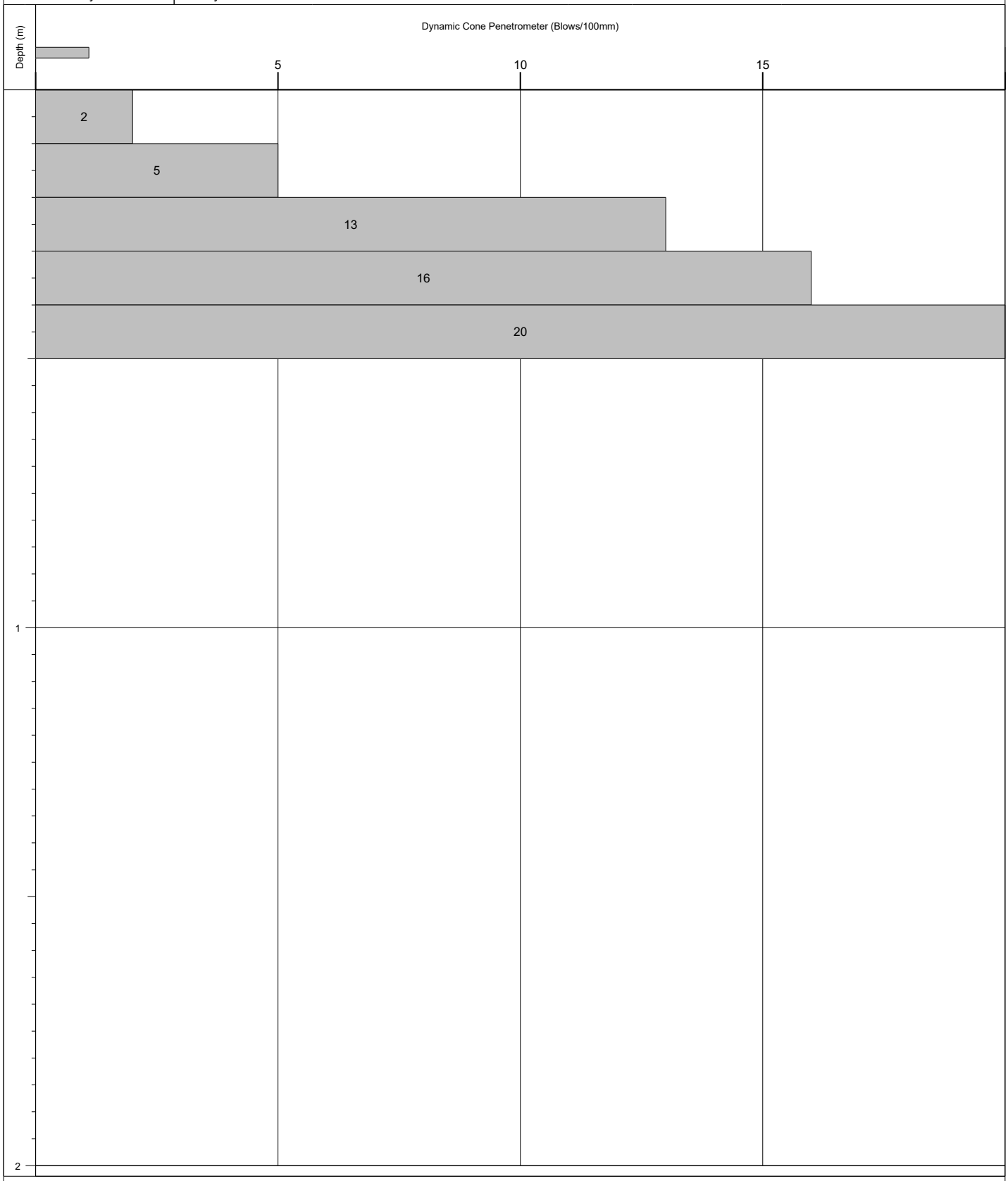
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548809.8m N.5169939.4m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1389

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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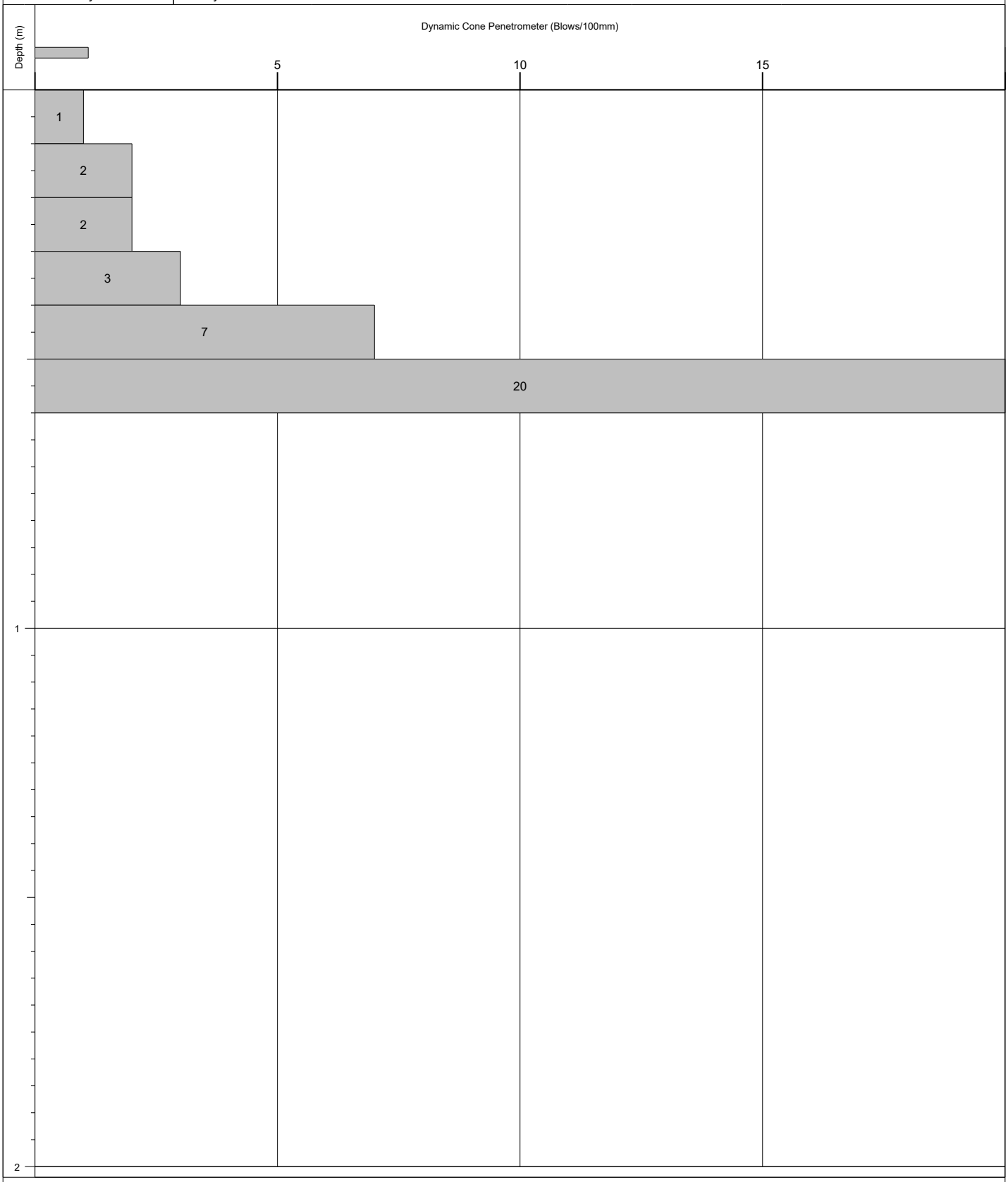
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548863.7m N.5169840.4m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1412

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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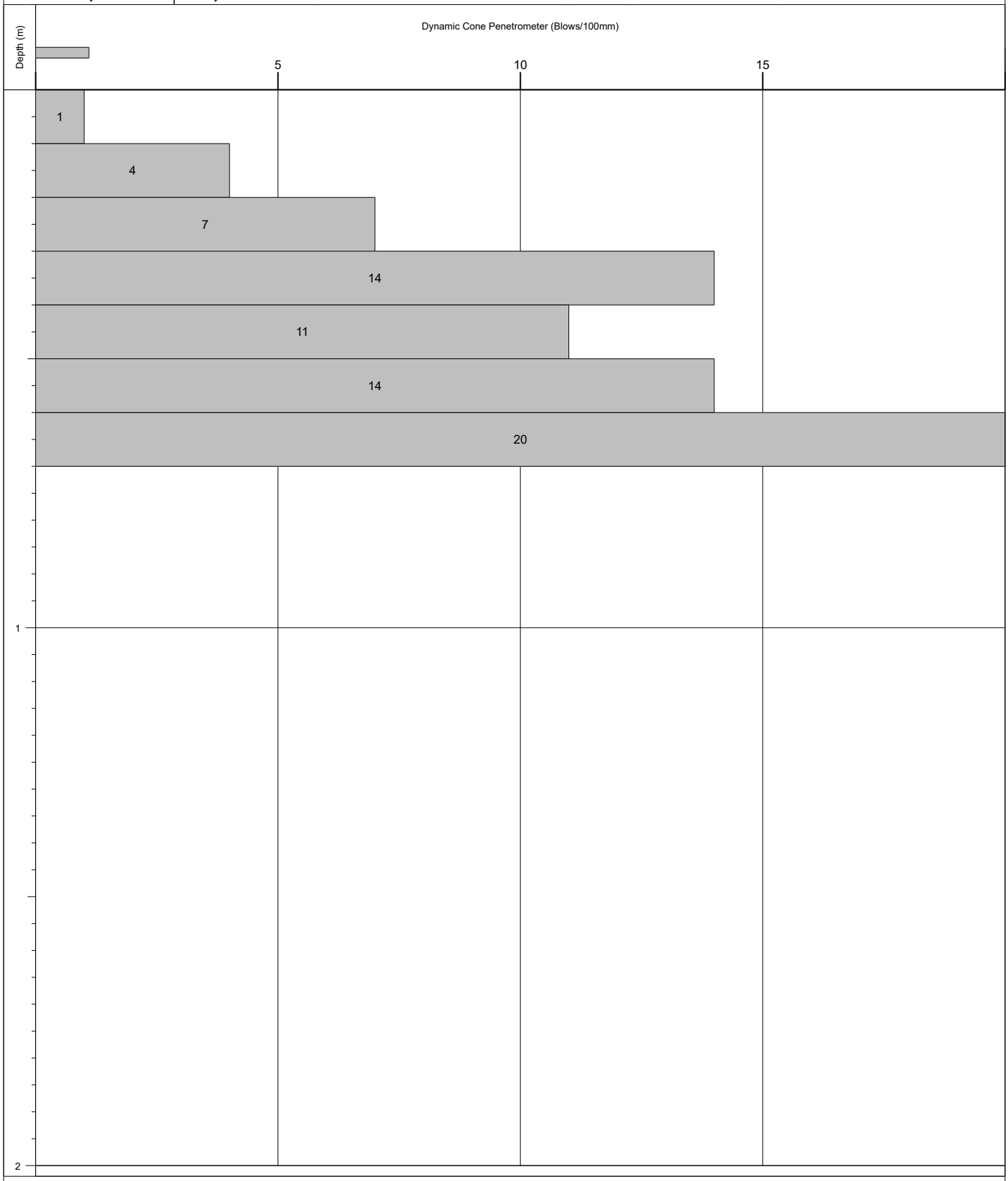
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548597.2m N.5169998.5m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1418

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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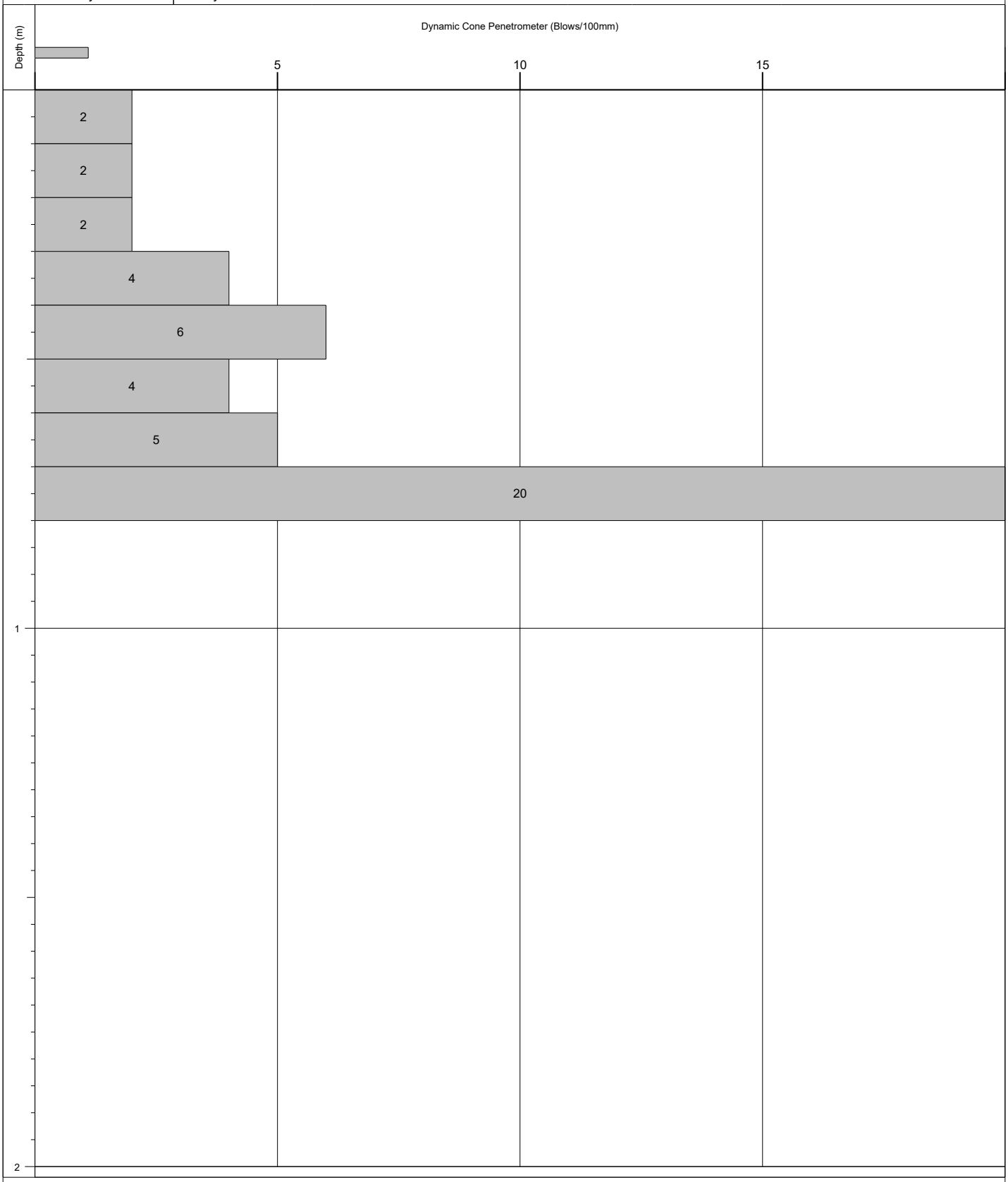
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548690.0m N.5169928.5m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1448

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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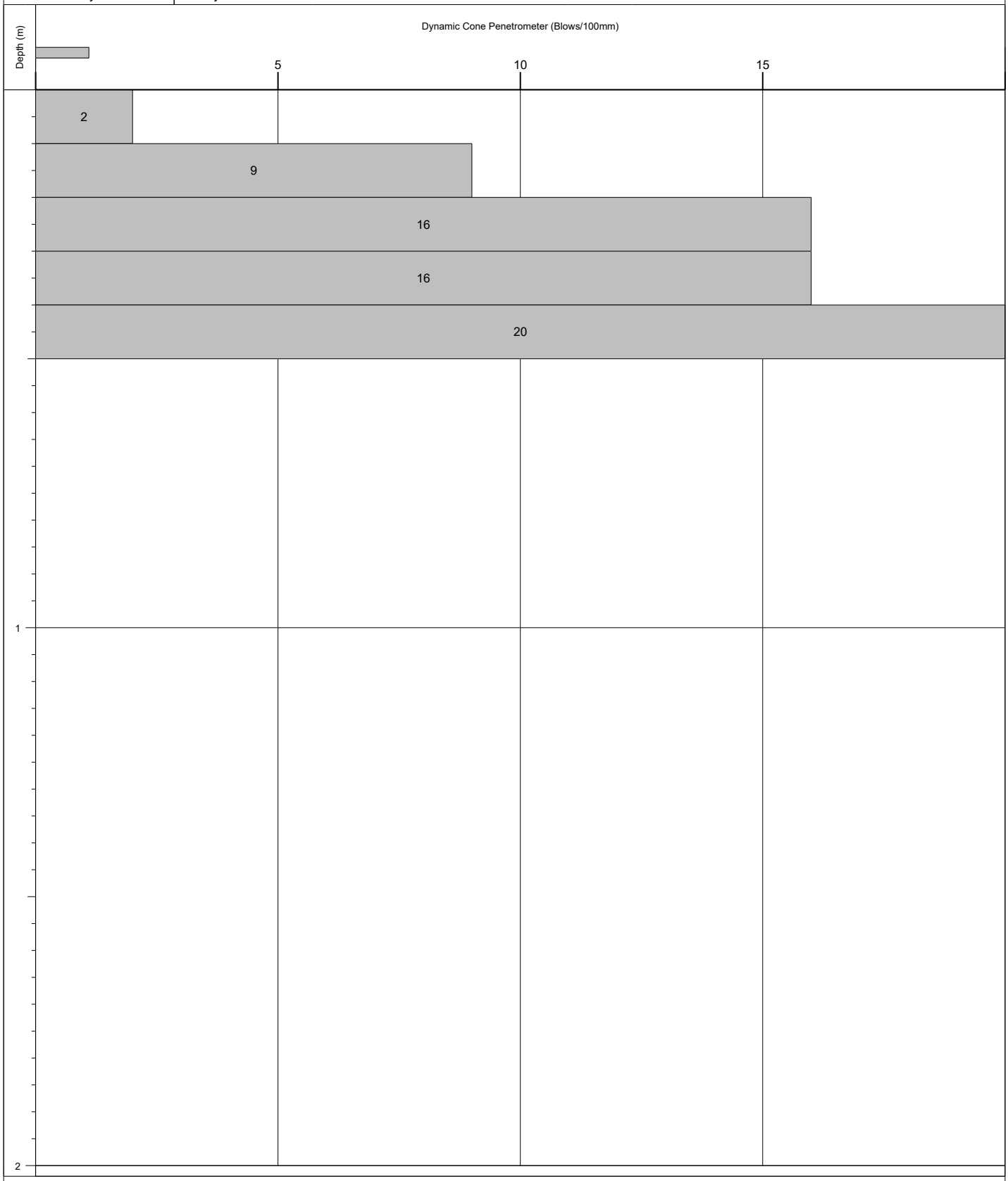
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548767.4m N.5169863.9m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1465

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 16/02/2026
Borehole Location: Refer to Site Plan

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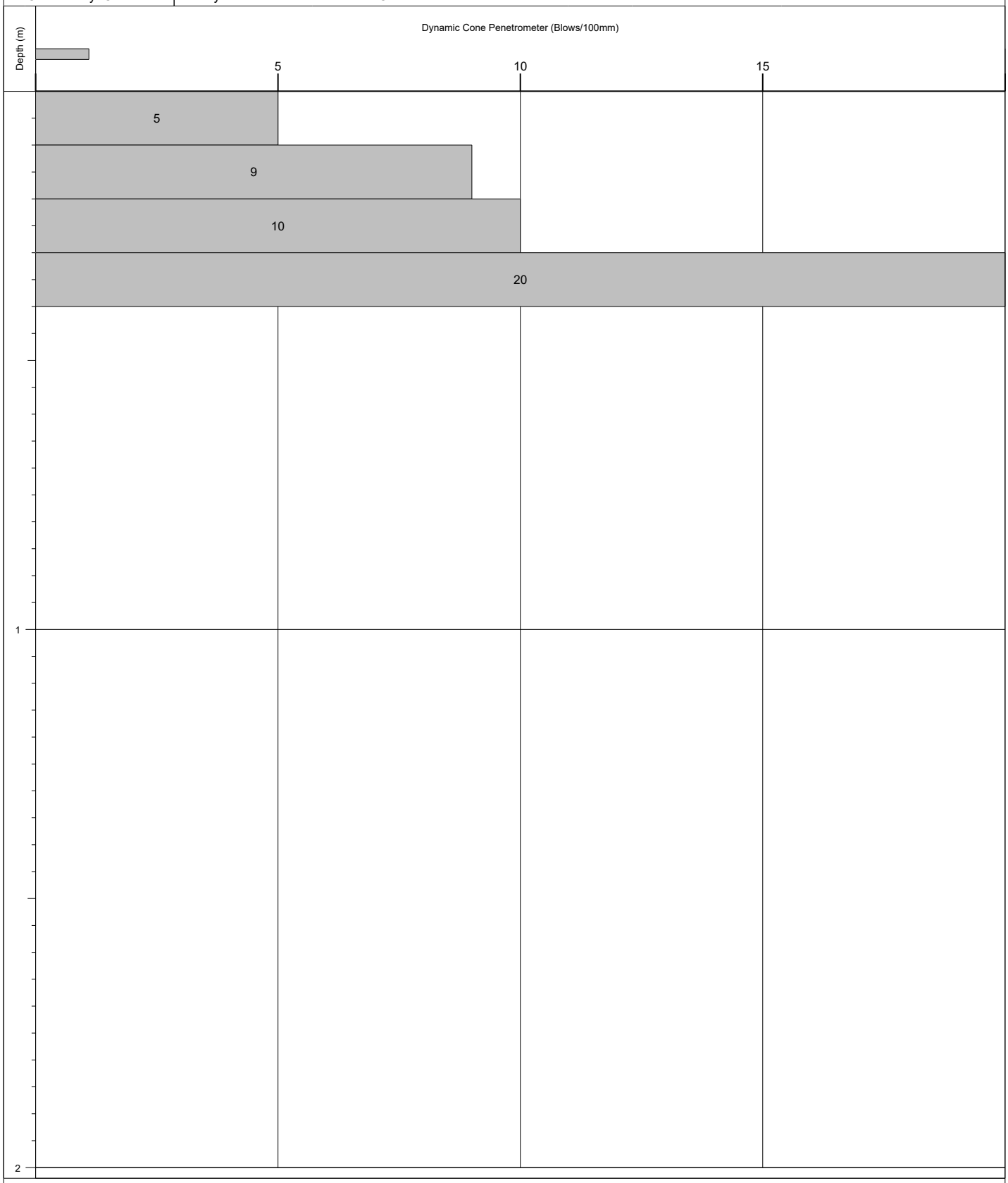
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1548891.2m N.5169765.6m Elevation:
Survey Source: Hand Held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1501

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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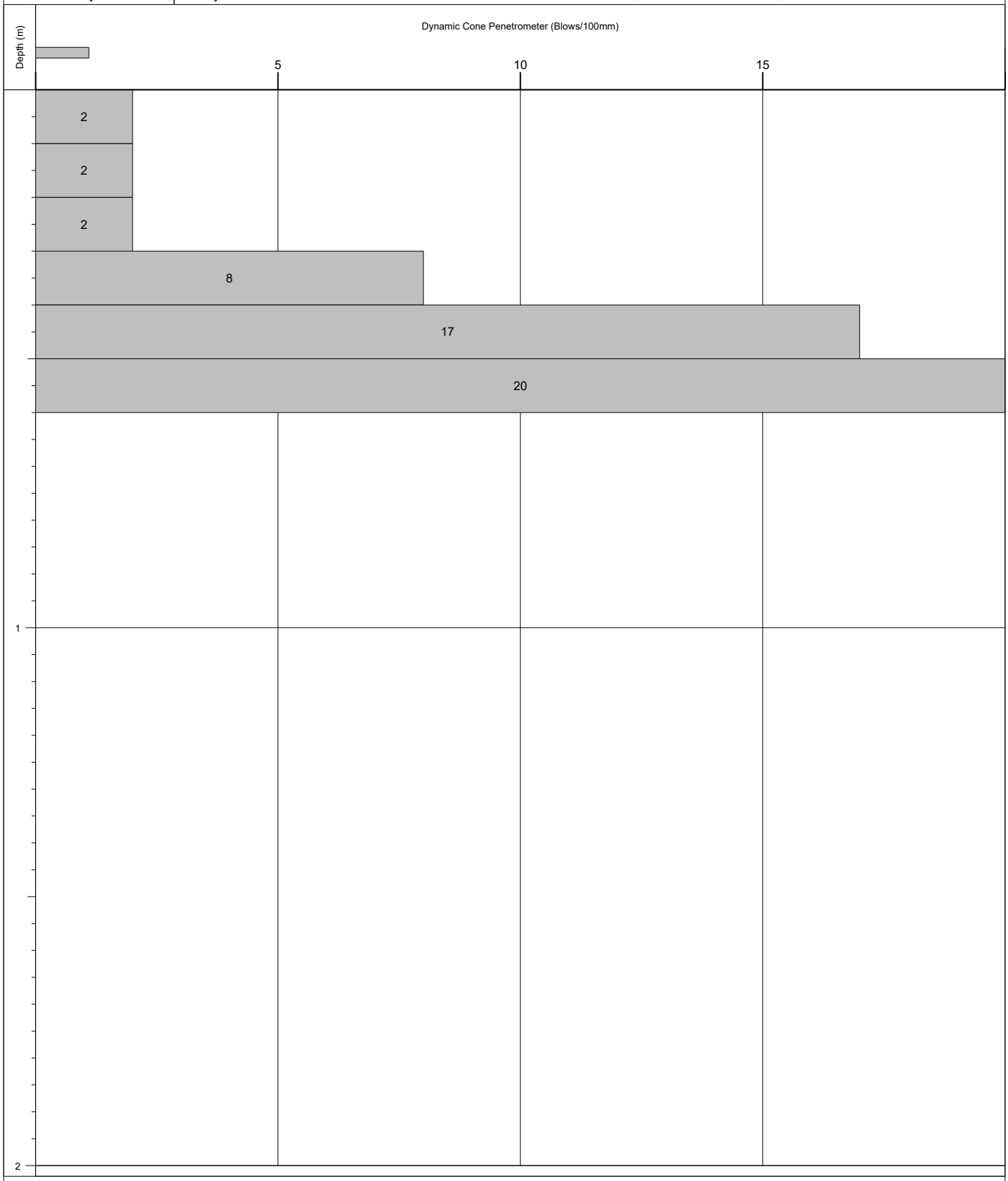
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549068.6m N.5169533.2m
Survey Source: Hand-held GPS

Elevation:
Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1502

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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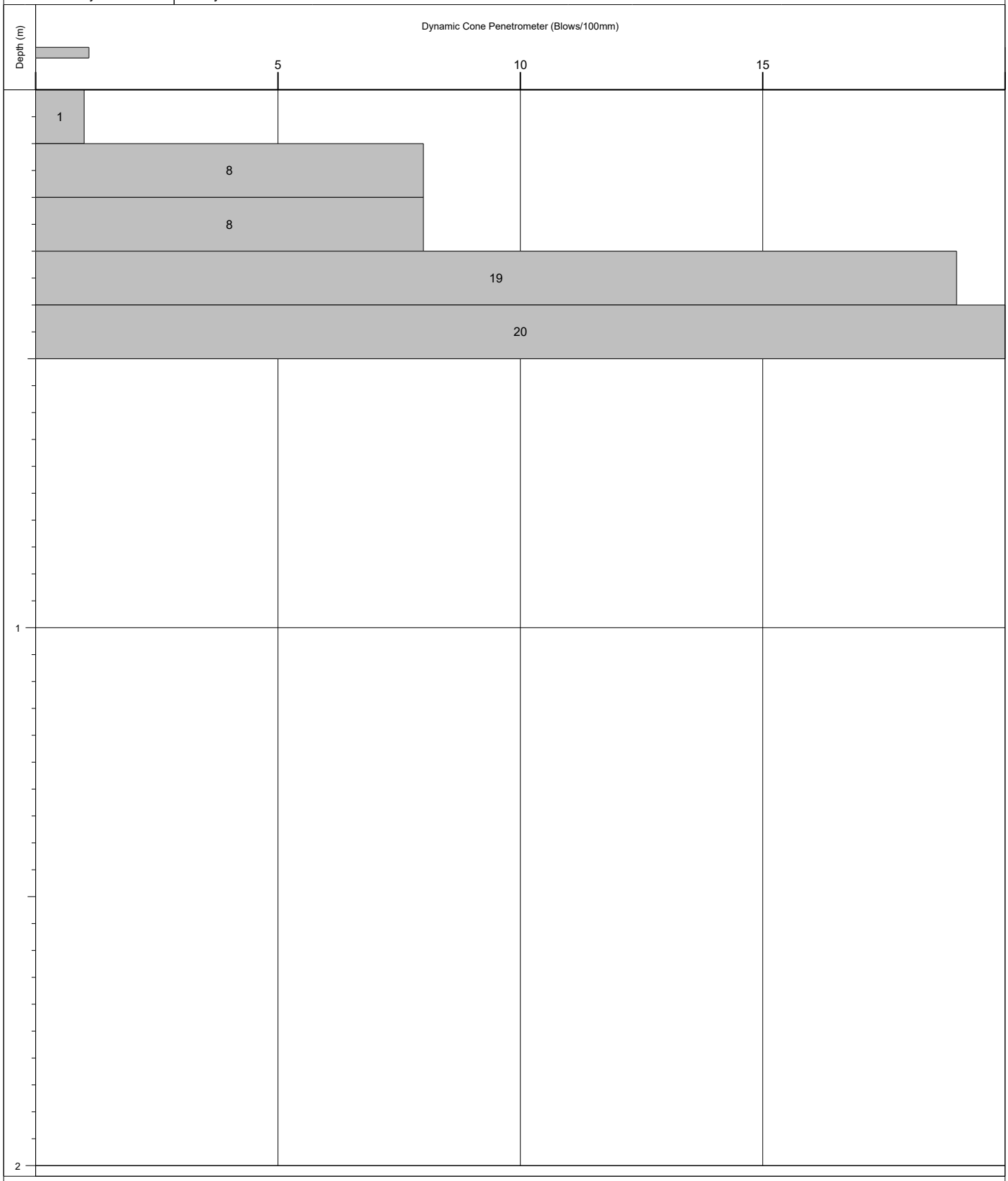
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549113.7m N.5169560.9m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1503

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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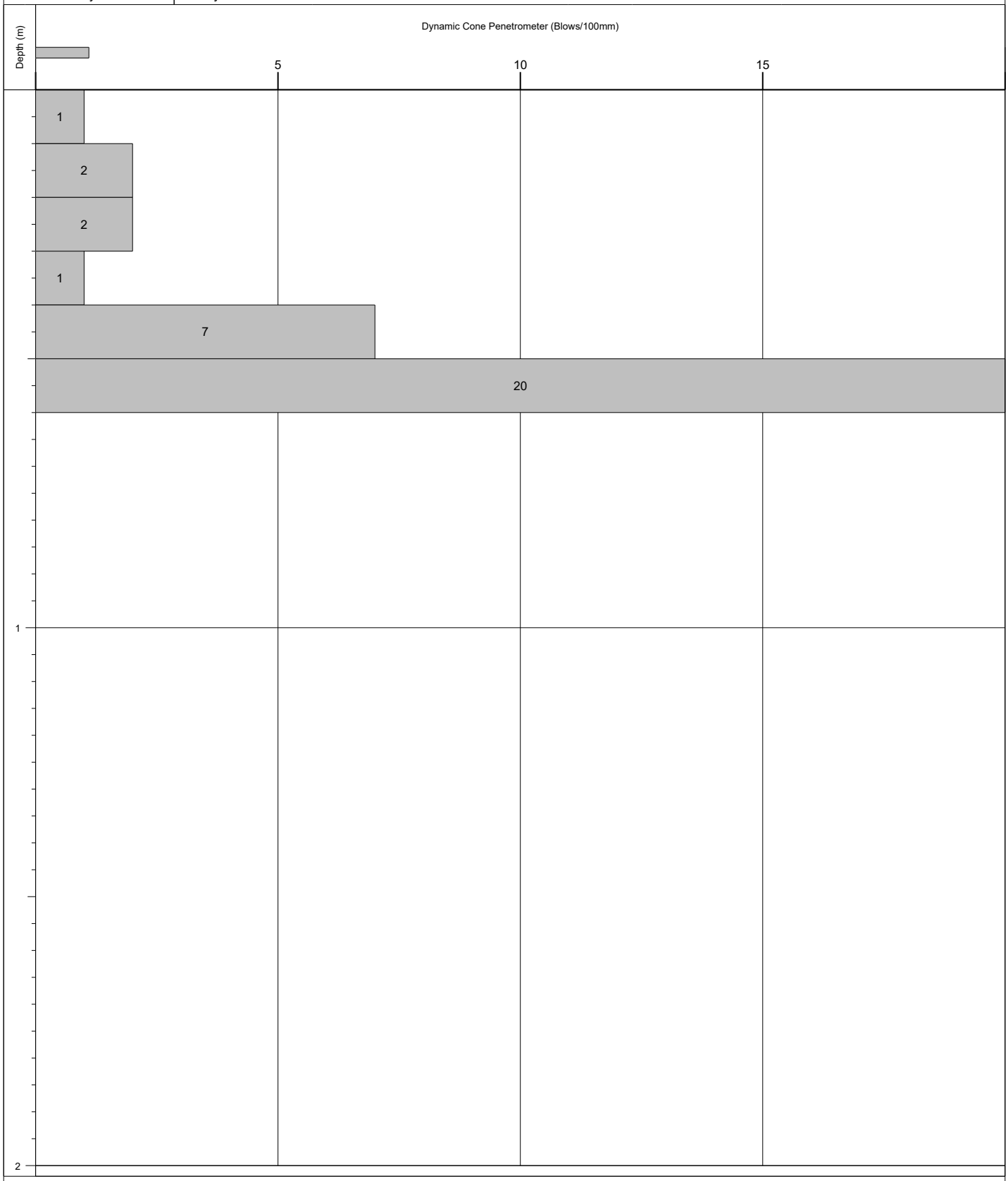
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549068.3m N.5169668.0m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1601

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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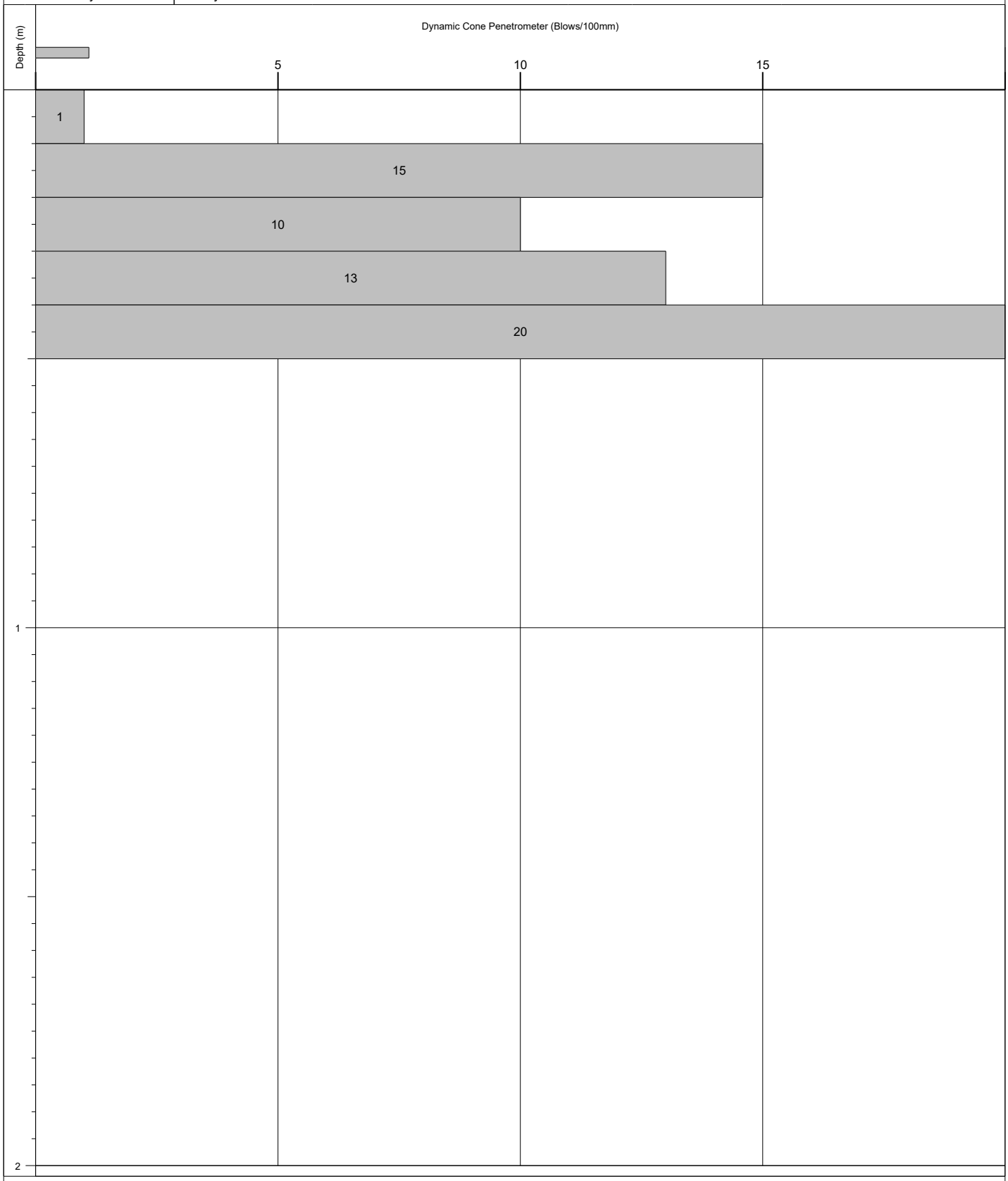
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549196.6m N.5169608.9m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1602

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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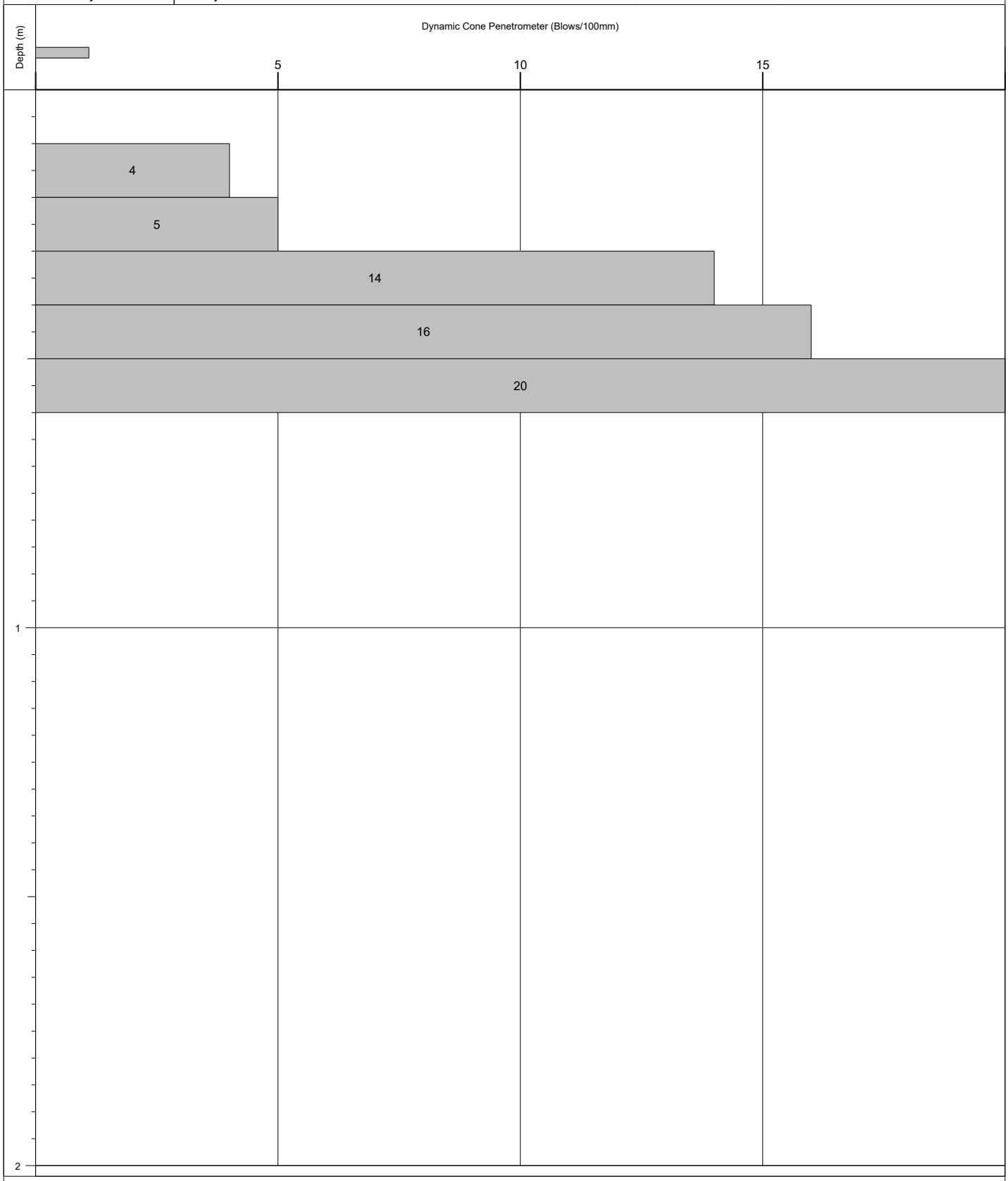
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549136.4m N.5169710.7m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

DCP LOG - DCP1801

Client: Carter Group Ltd
Project: Westhaven Residential Development
Site Location: Rolleston, Christchurch
Project No.: CHC2026-0005
Date: 18/02/2026
Borehole Location: Refer to Site Plan

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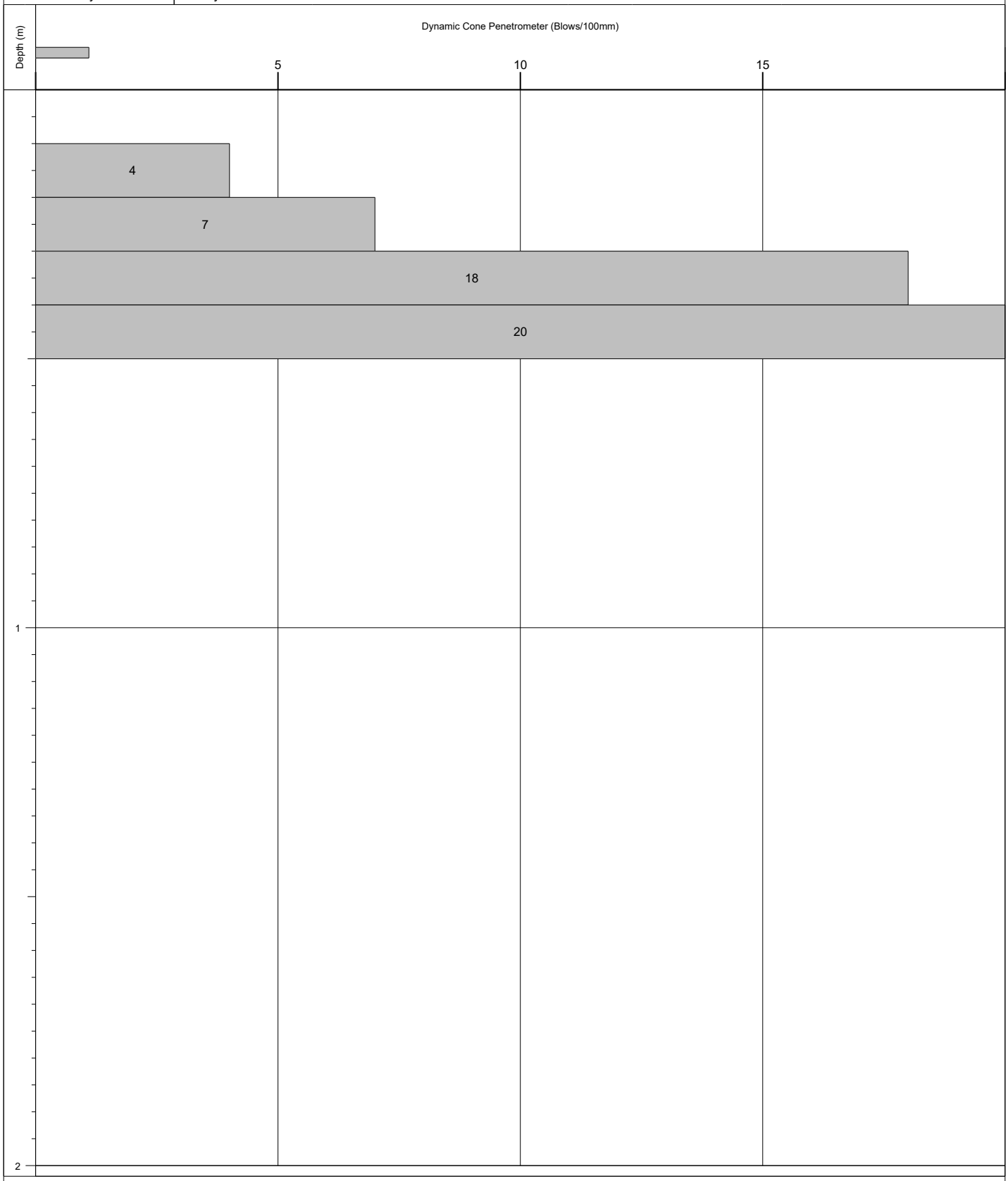
1:10 Sheet 1 of 1

Checked by: CT

Position: E.1549010.2m N.5169630.4m Elevation:
Survey Source: Hand-held GPS Datum:



Termination reason: Refusal on hard ground.

Remarks: Groundwater not encountered.

This report is based on the attached field description for soil and rock, CMW Geosciences - Field Logging Guide, Revision 5 - August 2024.

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BOREHOLE AND TEST PIT LOGS SYMBOLS AND TERMS

SYMBOLS AND ABBREVIATIONS

RL	Reduced Level
EOH	End of Hole
•	Shear vane test result
UTP	Unable to Penetrate
SPT	Standard Penetration Test
N	SPT blows per 300mm penetration
35/90	35 blows per 90mm penetration after seating for SPT
(s)	Inclusive of seating blow count for SPT
GWL	Ground Water Level

Wf	Field water content
Wp	Plastic limit (%)
WL	Liquid Limit (%)
RQD	Rock Quality Designation
SG	Specific Gravity
%F	Percentage fines (<75 microns)
PSD	Particle size distribution
CONS	Consolidation test
COMP	Compaction test
UCS	Unconfined Compressive Strength
k	Permeability coefficient (m/s)
LS	Linear Shrinkage (%)
OC	Organic Content (%)

SOIL

- TOPSOIL
- CLAY
- SILT
- SAND
- GRAVEL
- COBBLES
- BOULDERS
- PEAT
- FILL

CONSISTENCY TERMS

Cohesive Description	Undrained Shear Strength (kPa)
Very Soft	<12
Soft	12 - 25
Firm	25 - 50
Stiff	50 - 100
Very Stiff	100 - 200
Hard	>200

RELATIVE DENSITY

Non-cohesive Description	SPT "N" Value
Very Loose	<4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

ROCK

- LIMESTONE
- MUDSTONE
- SANDSTONE
- CONGLOMERATE
- BRECCIA
- RYHOLITE
- ANDESITE
- BASALT

STRENGTH

Description	Unconfined Compressive Strength MPa
Extremely Weak	< 1
Very Weak	1 - 5
Weak	5 - 20
Moderately Strong	20 - 50
Strong	50 - 100
Very Strong	100 - 250
Extremely Strong	> 250

WEATHERING

- UW - Unweathered (fresh rock)
- SW - Slightly Weathered
- MW - Moderately Weathered
- HW - Highly Weathered
- CW - Completely Weathered
- RS - Residual Soil

SPACING OF DISCONTINUITIES

Term	Aperture (mm)
Very widely spaced	>2000
Widely spaced	600 to 2000
Moderately widely spaced	200 to 600
Closely spaced	60 to 200
Very closely spaced	20 to 60
Extremely closely spaced	<20

Notes

1. Based on New Zealand Geotechnical Society " Field Description of Soil and Rock,Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes" December 2005
2. Composite soil types are signified by combined symbols

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TEST PIT LOG

Hole No: TP1

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, yellowish brown to greyish brown, dense, moist [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
1.4	1.3 m - 1.4 m: Lense of SAND (fine to medium)		
2.4	2.3 m: trace boulders		
4.4	EOTP: 4.40 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Dynamic Cone Penetrometer (DCP) test performed from ground surface.
3. Test pit side walls stable throughout.

Datum:

Coordinates:

Generated with CORE-GS by Geroc - Shallow Investigation with Photo EOTP - 20/10/2021 3:35:44 pm

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TEST PIT LOG

Hole No: TP2

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	
0.2	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.30	EOTP: 2.30 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

Generated with CORE-GS by Geroc - Shallow Investigation with Photo EOTP - 20/10/2021 3:35:44 pm

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TEST PIT LOG

Hole No: TP3

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
4.4	EOTP: 2.20 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

Generated with CORE-GS by Geroc - Shallow Investigation with Photo EOTP - 20/10/2021 3:35:44 pm

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TEST PIT LOG

Hole No: TP4

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	
0.4 – 2.6	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS] 1.0 m - 1.1 m: Lense of SAND (fine to medium)	Late Pleistocene Alluvial Sediments	
2.70	EOTP: 2.70 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Dynamic Cone Penetrometer (DCP) test performed from ground surface.
3. Test pit side walls stable throughout.

Datum:

Coordinates:

Generated with CORE-GS by Geroc - Shallow Investigation with Photo EOTP - 20/10/2021 3:35:44 pm

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TEST PIT LOG

Hole No: TP5

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.6	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.10	EOTP: 2.10 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP6

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.2	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, yellowish brown to greyish brown, dense, moist [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
1.9	1.9 m - 2.0 m: Lense of GRAVEL (fine to medium)		
3.0	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist		
4.4	EOTP: 4.40 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP7

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.6	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.0	EOTP: 2.00 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Depth (m) 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout..

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP8

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.2	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.0	EOTP: 2.00 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP9

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0 – 0.2	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.2 – 2.2	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.2 – 2.3	EOTP: 2.30 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP10

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0 – 1.2	SAND, some gravel (fine to coarse), brown and orangey brown, dry, rootlets, containing concrete cinderblocks, cow ribs, sheep bones, chicken skulls [NON ENGINEERED FILL]	Fill	
1.2 – 2.4	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.4	EOTP: 2.50 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP11

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4 – 1.8	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.0	EOTP: 1.90 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP12

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4 – 4.8	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS] 0.8 m - 0.9 m: SAND (fine to medium)	Late Pleistocene Alluvial Sediments	
3.40	EOTP: 3.40 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Dynamic Cone Penetrometer (DCP) test performed from ground surface.
3. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP13

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0 – 0.2	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL/FILL]	T/S	
0.2 – 0.8	GRAVEL (fine to coarse), sandy (fine to coarse), brown and orangey brown, dry, rootlets, containing rubbish comprising plastic push chair, clothes, metal, concrete fragments, glass bottles, potential asbestos contamination [NON ENGINEERED FILL]	Fill	
0.8 – 1.6	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
1.6	EOTP: 1.50 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP14

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4 – 1.6	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
1.8	EOTP: 1.70 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP15

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0 – 0.2	SILT, some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.2 – 2.2	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.2 – 2.30	EOTP: 2.30 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP16

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4 – 3.2	GRAVEL (medium to coarse, subrounded greywacke), some sand (fine to coarse), some cobbles, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
3.2	EOTP: 3.20 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP17

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, trace gravel (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4 – 1.8	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.0	EOTP: 2.30 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP18

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	
0.4 – 2.0	GRAVEL (medium to coarse, subrounded greywacke), some sand (fine to coarse), some cobbles, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.10	EOTP: 2.10 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Dynamic Cone Penetrometer (DCP) test performed from ground surface.
3. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP19

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
1.0	GRAVEL (medium to coarse, subrounded greywacke), some sand (fine to coarse), some cobbles, yellowish brown to greyish brown, dense, moist		
1.4	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist		
3.2	EOTP: 3.20 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Dynamic Cone Penetrometer (DCP) test performed from ground surface.
3. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP20

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, trace gravel (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	
0.4 – 2.2	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.4	EOTP: 2.30 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Depth (m): 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Dynamic Cone Penetrometer (DCP) test performed from ground surface.
3. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP21

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		11/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.2	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
1.4	GRAVEL (medium to coarse, subrounded greywacke), some sand (fine to coarse), some cobbles, yellowish brown to greyish brown, dense, moist		
2.6	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist		
4.0	EOTP: 4.00 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Dynamic Cone Penetrometer (DCP) test performed from ground surface.
3. Test pit side walls stable throughout.

Datum:

Coordinates:

Generated with CORE-GS by Geroc - Shallow Investigation with Photo EOTP - 20/10/2021 3:35:44 pm

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TEST PIT LOG

Hole No: TP22

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		11/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.4	GRAVEL (medium to coarse, subrounded greywacke), some sand (fine to coarse), some cobbles, yellowish brown to greyish brown, dense, moist		
3.0	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist		
3.2	EOTP: 3.20 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Dynamic Cone Penetrometer (DCP) test performed from ground surface.
3. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP23

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		11/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	
0.4 – 2.4	GRAVEL (medium to coarse, subrounded greywacke), some sand (fine to coarse), some cobbles, yellowish brown to greyish brown, dense, moist [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.6	EOTP: 3.20 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Dynamic Cone Penetrometer (DCP) test performed from ground surface.
3. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP24

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, trace gravel (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4 – 1.8	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.0	EOTP: 2.10 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP25

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, gravelly (fine to coarse), some sand (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	
0.4 – 3.8	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), some cobbles, yellowish brown to greyish brown, dense, moist, some rootlet [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
2.0	2.0 m - 2.1 m: Gravel (fine to medium)		
3.8	EOTP: 3.80 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP26

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		08/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, trace gravel (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4 – 1.8	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Alluvial Sediments	
2.0	EOTP: 1.90 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP27

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		11/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, trace gravel (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4 – 0.8	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
1.0	0.6 m - 0.7 m: SAND, gravelly (fine)		
2.0	EOTP: 2.10 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP28

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		11/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, trace gravel (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4 – 4.8	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS] 0.6 m - 0.7 m: SAND, gravelly (fine)	Late Pleistocene Alluvial Sediments	

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile: EOTP: 5.00 m TARGET DEPTH



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP29

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		11/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.2	SILT, trace gravel (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.4 – 1.8	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS] 1.1 m - 1.2 m: Orangey brown lense	Late Pleistocene Alluvial Sediments	
2.0	EOTP: 2.00 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Test pit side walls stable throughout.

Datum:

Coordinates:

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TEST PIT LOG

Hole No: TP30

Project No:	Project:	Shear Vane:	Date Excavated:	Logged By:	Checked By:
CH01082	Gallina Nominees, Heinz Wattie Pension Fund, and Brookside Road Residential Ltd Brookside Road Plan Change		11/10/2021	KT	

Depth (m)	Description of Strata	Geological Unit	Graphic Log
0.0	SILT, trace gravel (fine to coarse), dark brown, dry, rootlets [TOPSOIL]	T/S	TS
0.2	GRAVEL (fine to coarse, subrounded greywacke), sandy (fine to coarse), minor cobbles, trace boulders, yellowish brown to greyish brown, dense, moist, some rootlets [ALLUVIAL SEDIMENTS]	Late Pleistocene Alluvial Sediments	
1.1	1.1 m - 1.2 m: Orangey brown lense		
2.0	EOTP: 2.00 m TARGET DEPTH		

Undrained Shear Strength (kPa)
Vane readings corrected as per BS 1377
● Shear Vane ○ Residual Shear Vane
50 100 150 200 Values

Dynamic Cone Penetrometer
Test Method: NZS 4402:1988, Test 6.5.2
(Blows / 50mm)
2 4 6 8 10 12 14 16
1 2 2 30 >>

Groundwater: GWNE

Profile:



Excavation Method:

Remarks:
1. Groundwater not encountered on 8/10/2021.
2. Dynamic Cone Penetrometer (DCP) test performed from ground surface.
3. Test pit side walls stable throughout.

Datum:

Coordinates:

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LOG OF TEST PIT TP01

Geotechnical Investigation
130 Dunns Crossing Road
Farringdon, Rolleston
12903.000.011

Client : Hughes Developments Ltd **Shear Vane No** :
Date : 25/05/2021 **Logged By** : DKI/RM
Max Test Pit Depth : 2.4 m **Reviewed By** : JRW
Digger Type/Size : Bucket Excavator **Latitude** : -43.623683662226
Bucket Type/Size : Digging Bucket **Longitude** : 172.3705747354

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TOPSOIL		ML	SILT with minor fine sand and trace rootlets; brown. Low plasticity [TOPSOIL].				D	N/A		
0.5	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor silt and trace rootlets; brown. Well graded. Gravel is sub-rounded to rounded. Sand is fine to coarse.				M	Tightly Packed		
1.0									Tightly Packed		
1.5			GW	Sandy fine to coarse GRAVEL with trace cobbles; brownish grey. Well graded. Gravel is sub-angular to rounded. Sand is fine to coarse.				W	Moderately Packed		
2.0									Tightly Packed		
2.5				Depth of Excavation: 2.4 m Termination Condition: Target depth							
3.0											

Test pit met target depth at 2.4 m.
Scala Penetrometer met practical refusal at 0.4 m depth.
Standing groundwater was not encountered

GEOTECH TEST PIT LOG 130 DUNNS CROSSING ROAD - TP.GPJ NZ MASTER DATA TEMPLATE.GDT 2/6/21

LOG OF AUGER HA13

Geotechnical Investigation
108 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Client Ref. : N/A
Date : 6.11.2019
Hole Depth : 0.2 m
Hole Diameter : 50 mm

Shear Vane No : 1379
Logged By : KF
Reviewed By : JRW
Latitude : -43.622894
Longitude : 172.373074

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded
	TOPSOIL	ML	SILT with some sand, minor gravel and trace rootlets; brown. Low plasticity. Sand, fine. Gravel, fine, subangular to subrounded [TOPSOIL].				D	F-St	
			End of Hole Depth: 0.2 m Termination Condition: Practical refusal						

Scala Penetrometer

Blows per 100mm

2 4 6 8 10 12

>>

0.5

1.0

1.5

Hand auger met practical refusal at 0.2 m depth on inferred gravel.
Scala Penetrometer met practical refusal at 0.3 m depth.
Standing groundwater was not encountered.

LOG OF AUGER HA14

Geotechnical Investigation
108 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Client Ref. : N/A
Date : 6.11.2019
Hole Depth : 0.2 m
Hole Diameter : 50 mm

Shear Vane No : 1379
Logged By : KF
Reviewed By : JRW
Latitude : -43.622343
Longitude : 172.374581

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded
	TOPSOIL	ML	SILT with some sand, minor gravel and trace rootlets; brown. Low plasticity. Sand, fine. Gravel, fine, subangular to subrounded [TOPSOIL].				D	F-St	
			End of Hole Depth: 0.2 m Termination Condition: Practical refusal						

Scala Penetrometer

Blows per 100mm

2 4 6 8 10 12

>>

0.5

1.0

1.5

Hand auger met practical refusal at 0.2 m depth on inferred gravel.
Scala Penetrometer met practical refusal at 0.6 m depth.
Standing groundwater was not encountered.

LOG OF TEST PIT TP03

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 25/11/2019
Max Test Pit Depth : 1.9 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator

Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.625939
Longitude : 172.372464

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TOPSOIL		ML	Sandy SILT with trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].				D	St-VSt		
0.5	ALLUVIUM		SM	Silty fine to medium SAND with some gravel and trace rootlets; greyish brown. Well graded. Gravel, fine to medium, subangular to subrounded.				M	MD-D		
1.0			GW	Sandy fine to coarse GRAVEL with trace silt; grey. Well graded, subangular to subrounded. Sand, fine to coarse.					MD-D		
1.5				Trace cobbles encountered from 1.7 m depth.							
2.0				Depth of Excavation: 1.9 m Termination Condition: Target depth							

Scala Penetrometer: Blows per 100mm — 2 4 6 8 10 12

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

Noticeable sand increase from 0.8 m depth.

LOG OF TEST PIT TP04

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 25/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator

Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.6271
Longitude : 172.374267

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].				D	F-St		
0.5	ALLUVIUM		GW	Sandy fine to medium GRAVEL with some silt and trace rootlets; greyish brown. Well graded, subangular to subrounded.					MD-D		
			SM	Silty fine to medium SAND with minor gravel; greyish brown. Well graded. Gravel, fine to medium, subangular to subrounded.					MD-D		
1.0			GW	Sandy fine to coarse GRAVEL with trace cobbles; grey. Well graded, subangular to subrounded. Sand, fine to coarse.				M	MD-D		
1.5											
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL
Noticeable sand increase from 0.9 m depth.

LOG OF TEST PIT TP12

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 26/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator

Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.628017
Longitude : 172.374975

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					F-St		
	ALLUVIUM		GW	Fine to medium GRAVEL with some sand, silt and trace rootlets; greyish brown. Well graded, subangular to subrounded. Sand, fine.				D	MD-D		
0.5				Sandy fine to coarse GRAVEL with trace rootlets; grey. Well graded, subangular to subrounded. Sand, fine to coarse.							
				No rootlets observed from 0.8 m depth.				M			
1.0				Trace cobbles encountered from 1.0 m depth.							
			GW						MD-D		
1.5				Cobbles become minor from 1.5 m depth.							
								W			
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL

LOG OF TEST PIT TP13

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 26/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator
Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.627819
Longitude : 172.373988

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0.0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					F-St		
0.5	ALLUVIUM		GW	Sandy fine to medium GRAVEL with some silt and trace rootlets; greyish brown with orange mottles. Well graded, subangular to subrounded. Sand, fine. Sand becomes some from 0.4 m depth.				D	MD-D		
1.0			GW	Sandy fine to coarse GRAVEL; greyish brown. Well graded, subangular to subrounded. Sand, fine to coarse.				M	MD-D		
1.5				Trace cobbles encountered from 1.6 m depth.							
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Scala Penetrometer: Blows per 100mm — 2 4 6 8 10 12 (>> at 12)

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL
Noticeable sand increase from 0.7 m depth.

LOG OF TEST PIT TP14

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 26/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator

Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.628684
Longitude : 172.374642

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier – Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					F-St		
	ALLUVIUM		GW	Fine to medium GRAVEL with some sand and silt; brownish grey. Well graded, subangular to subrounded. Sand, fine to medium.				D	MD-D		
0.5			GW	Sandy fine to coarse GRAVEL with trace cobbles; grey. Well graded, subangular to subrounded. Sand, fine to coarse.							
1.0				Cobbles become minor from 1.1 m depth.				M	MD-D		
1.5											
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Scala Penetrometer: Blows per 100mm — 2 4 6 8 10 12

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL

LOG OF TEST PIT TP15

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 26/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator
Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.628875
Longitude : 172.375619

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm (2 4 6 8 10 12)
0.0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].				D	F-St		
0.4	ALLUVIUM			Sandy fine to medium GRAVEL with some silt and trace rootlets; brownish grey. Well graded, subangular to subrounded. Sand, fine to medium. Trace silt and sand becomes some from 0.4 m depth. Trace rootlets observed from 0.6 m depth.				M	MD-D		
1.4			GW	Fine to coarse GRAVEL with some sand and trace cobbles; grey. Well graded, subangular to subrounded.				W	MD-D		
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL
Loosely packed gravel encountered from 1.4 to 2.0 m depth.

GEOTECH TEST PIT LOG 2019.11.27 - TEST PIT LOGS.GPJ NZ MASTER DATA TEMPLATE.GDT 4/12/19

LOG OF TEST PIT TP22

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 26/11/2019
Max Test Pit Depth : 1.9 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator

Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.62955
Longitude : 172.375318

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					F-St		
	ALLUVIUM		ML	Sandy SILT with trace rootlets; light greyish brown. Low plasticity. Sand, fine to medium.				D	F-St		
0.5			GW	Fine to medium GRAVEL with some sand and silt; brownish grey. Well graded, subangular to subrounded. Sand, fine to medium. No silt encountered from 0.6 m depth. Gravel and sand become fine to coarse from 0.8 m depth. Sand becomes trace from 1.1 to 1.3 m depth. Trace cobbles encountered from 1.4 m depth.				M	MD-D		
1.0											
1.5											
2.0				Depth of Excavation: 1.9 m Termination Condition: Target depth							

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL

LOG OF TEST PIT TP24

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 26/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator

Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.629807
Longitude : 172.376332

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					F-St		
			ML	Sandy SILT with trace gravel and rootlets; greyish brown. Low plasticity. Sand, fine.					St-H		
0.5	ALLUVIUM		GW	Fine to medium GRAVEL with some sand and silt; brownish grey. Well graded, subangular to subrounded. Sand, fine to medium.				D	MD-D		
			GW	Sandy fine to coarse GRAVEL with trace cobbles; grey. Well graded, subangular to subrounded. Sand, fine to coarse.					MD-D		
1.0				Becomes moist from 1.0 m depth.							
				Sand becomes trace from 1.2 to 1.4 m depth.							
1.5								M			
				Sand becomes trace from 1.8 to 2.0 m depth.							
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Scala Penetrometer: Blows per 100mm — 2 4 6 8 10 12 (>>)

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL

LOG OF TEST PIT TP25

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 26/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator

Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.630517
Longitude : 172.376123

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					F-St		
0.5	ALLUVIUM		GW	Fine to medium GRAVEL with some sand, silt and trace rootlets; greyish brown. Well graded, subangular to subrounded. Sand, fine. No silt observed from 0.4 m depth.				D	MD-D		
1.0			GW	Sandy fine to coarse GRAVEL with some sand, silt and trace rootlets; greyish brown. Well graded, subangular to subrounded. Sand, fine. Trace cobbles encountered from 0.9 m depth. Cobbles become minor from 1.4 m depth.				M	MD-D		
1.5											
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Scala Penetrometer: Blows per 100mm — 2 4 6 8 10 12 (>>)

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL

GEOTECH TEST PIT LOG 2019.11.27 - TEST PIT LOGS.GPJ NZ MASTER DATA TEMPLATE.GDT 4/12/19

LOG OF TEST PIT TP26

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 27/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator
Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.630801
Longitude : 172.377121

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0.0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					St-VSt		
	ALLUVIUM		GW	Fine to medium GRAVEL with some sand, silt and trace rootlets; greyish brown. Well graded, subangular to subrounded. Sand, fine to medium. No rootlets observed from 0.4 m depth.				D	MD-D		
0.5											
1.0			GW	Fine to coarse GRAVEL with some sand and trace rootlets; grey. Well graded, subangular to subrounded. Sand, fine to coarse.				M	MD-D		
1.5				Trace cobbles encountered from 1.4 m depth.							
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Scala Penetrometer: Blows per 100mm — 2 4 6 8 10 12 (>>)

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL

GEOTECH TEST PIT LOG 2019.11.27 - TEST PIT LOGS.GPJ NZ MASTER DATA TEMPLATE.GDT 4/12/19

LOG OF TEST PIT TP27

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 27/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator

Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.631612
Longitude : 172.376997

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					F-St		
	ALLUVIUM		GW	Fine to medium GRAVEL with some sand, silt and trace rootlets; greyish brown. Well graded, subangular to subrounded. Sand, fine to medium.				D	MD-D		
0.5				Fine to coarse GRAVEL with some sand, trace cobbles and rootlets; grey. Well graded, subangular to subrounded. Sand, fine to coarse.							
1.0			GW					M	MD-D		
1.5				Cobbles become minor from 1.4 m depth.							
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Scala Penetrometer: Blows per 100mm — 2 4 6 8 10 12; >>

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL

LOG OF TEST PIT TP28

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 27/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator

Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.632226
Longitude : 172.377512

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					St-VSt		
	ALLUVIUM		GW	Fine to medium GRAVEL with some sand, silt and trace rootlets; greyish brown. Well graded, subangular to subrounded. Sand, fine.					MD-D		
0.5			GW	Fine to coarse GRAVEL with some sand; grey. Well graded, subangular to subrounded. Sand, fine to coarse. Trace cobbles encountered from 0.7 m depth.				D	L-MD		
1.0											
1.5				Trace rootlets observed from 1.4 to 1.6 m depth. Becomes brownish grey from 1.7 m depth.				M			
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL
Loosely packed gravel encountered from 0.5 to 1.0 m depth.

LOG OF TEST PIT TP29

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 27/11/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator
Shear Vane No : N/A
Logged By : KF
Reviewed By : JW
Latitude : -43.632008
Longitude : 172.378017

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					F-St		
	ALLUVIUM		GW	Fine to medium GRAVEL with some sand and silt; greyish brown. Well graded, subangular to subrounded. Sand, fine.					MD-D		
0.5			GW	Fine to coarse GRAVEL with some sand and trace cobbles; brownish grey. Well graded, subangular to subrounded. Sand, fine to coarse.				D	MD-D		
1.0			GW	Sandy fine to coarse GRAVEL with trace cobbles; grey. Well graded, subangular to subrounded. Sand, fine to coarse.				M	MD-D		
1.5				Becomes wet from 1.8 m depth.							
				Cobbles become minor from 1.9 m depth.				W			
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Scala Penetrometer: Blows per 100mm — 2 4 6 8 10 12

Test pit met target depth
Scala Penetrometer met practical refusal.
Standing groundwater was not encountered.

TS = TOPSOIL

LOG OF TEST PIT TP36

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 05/12/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator
Shear Vane No : N/A
Logged By : KF/CR
Reviewed By : JW
Latitude : -43.62611
Longitude : 172.373398

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					St-VSt		
0.5	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with some silt; greyish brown. Well graded, subangular to subrounded. Sand, fine.				D	MD-D		
			SW	Fine to coarse SAND with trace gravel; grey. Well graded.					MD-D		
1.0			GW	Sandy fine to coarse GRAVEL with trace cobbles; grey. Well graded, subangular to subrounded. Sand, fine to coarse.				M	MD-D		
1.5											
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Scala Penetrometer: Blows per 100mm — 2 4 6 8 10 12 (>>)

Test pit met target depth.
Scala Penetrometer met target depth
Standing groundwater was not encountered.

TS = TOPSOIL

GEOTECH TEST PIT LOG 2019.12.XX - REMAINING TP LOGS.GPJ NZ MASTER DATA TEMPLATE.GDT 9/12/19

LOG OF TEST PIT TP37

Geotechnical Investigation
92 Dunns Crossing Road
Rolleston
12903

Client : Hughes Developments Ltd
Date : 05/12/2019
Max Test Pit Depth : 2 m
Digger Type/Size : 24 Tonne
Bucket Type/Size : Bucket Excavator

Shear Vane No : N/A
Logged By : KF/CR
Reviewed By : JW
Latitude : -43.625636
Longitude : 172.37306

Depth (m BGL)	Material	Excavatability (Relative Scale) Easier–Harder	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm (2 4 6 8 10 12)
0.0	TS		ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine [TOPSOIL].					F-St		
	ALLUVIUM		GW	Fine to coarse GRAVEL with some sand, silt and trace rootlets; greyish brown. Well graded, subangular to subrounded. Sand, fine.				D	MD-D		
0.5			GW	Sandy fine to coarse GRAVEL with trace cobbles; grey. Well graded, subangular to subrounded. Sand, fine to coarse.					MD-D		
1.0			GW	Fine to coarse GRAVEL with some sand and trace cobbles; grey. Well graded, subangular to subrounded. Sand, fine to coarse.				M	MD-D		
1.5				Sand becomes trace from 1.8 m depth.							
2.0				Depth of Excavation: 2 m Termination Condition: Target depth							

Test pit met target depth.
Scala Penetrometer met target depth
Standing groundwater was not encountered.

TS = TOPSOIL

Open Excavation Log

Test Pit No. **TP H-1**

Connell Wagner Limited
195 Hereford St. (PO Box 1061
Christchurch New Zealand
Telephone: +64 3 366 0821
Facsimile: +64 3 379 6955

Client: Selwyn Plantation Board Ltd	Location (measured using hand held GPS): 1547696 , 5172033		Date: 12/09/2008
Project: SPBL Rolleston Plan Change	Logged By: CG	Weather Conditions: cloudy & dry	Job Number: 36951-001

Water	Depth (m)	Soil Symbol	FACE 1 — SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0		Grass over sandy TOPSOIL, brown, moist.
	0.5		Sandy GRAVEL with cobbles and minor boulders. Mid brown, medium to coarse grained, rounded, gap graded, near horizontal long-axis pebble alignment. Moist.
	1		
	1.5		End of Test Pit at 1.5m (Target Depth)
	2		
	2.5		

Water	Depth (m)	Soil Symbol	FACE 2 — SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0		
	0.5		
	1		
	1.5		
	2		
	2.5		

Undrained Shear Strength (kPa) ●
Measured Using a Hand Held Shear Vane[1]
25 50 75 100 125 150

Scala Penetrometer Test[2] ×
(Blows/ 150mm)
2 4 6 8 10 12

Test Description
1 - Hand held shear vane test in accordance with BS1377:1990
2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters

Notes
Groundwater not encountered
Soak test undertaken and reported separately

Pit dimensions
1.0m
2.2m

Connell Wagner

Open Excavation Log

Test Pit No. **TP H-2**

Connell Wagner Limited
195 Hereford St. (PO Box 1061
Christchurch New Zealand

Telephone: +64 3 366 0821
Facsimile: +64 3 379 6955

Client: Selwyn Plantation Board Ltd	Location (measured using hand held GPS): 1547734, 5171797		Date: 12/09/2008
Project: SPBL Rolleston Plan Change	Logged By: CG	Weather Conditions: cloudy & dry	Job Number: 36951-001

Water	Depth (m)	Soil Symbol	FACE 1 — SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0		Grass over silty TOPSOIL, brown, moist.
	0.5		Sandy GRAVEL with cobbles and minor boulders. Mid brown, medium to coarse grained, rounded, gap graded, near horizontal long-axis pebble alignment. Moist.
	1		
	1.5		End of Test pit at 1.4m (Target depth)
	2		
	2.5		

Water	Depth (m)	Soil Symbol	FACE 2 — SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0		
	0.5		
	1		
	1.5		
	2		
	2.5		

Undrained Shear Strength (kPa) ●
Measured Using a Hand Held Shear Vane[1]
25 50 75 100 125 150

Scala Penetrometer Test[2] ×
(Blows/ 150mm)
2 4 6 8 10 12

Test Description
1 - Hand held shear vane test in accordance with BS1377:1990
2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters

Notes
Groundwater not encountered
Soak test undertaken and reported separately

Pit dimensions
1.0m
2.0m

Open Excavation Log

Test Pit No. **TP H-3**

Connell Wagner Limited
195 Hereford St. (PO Box 1061
Christchurch New Zealand
Telephone: +64 3 366 0821
Facsimile: +64 3 379 6955

Client: Selwyn Plantation Board Ltd	Location (measured using hand held GPS): 1547283, 5171554		Date: 12/09/2008
Project: SPBL Rolleston Plan Change	Logged By: CG	Weather Conditions: cloudy & dry	Job Number: 36951-001

Water	Depth (m)	Soil Symbol	FACE 1 — SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0		Grass over silty TOPSOIL, brown, moist.
	0.5		Sandy GRAVEL with cobbles and minor boulders. Mid brown, medium to coarse grained, rounded, gap graded, near horizontal long-axis pebble alignment. Moist.
	1		
	1.5		End of Test pit at 1.4m (Target depth)
	2		
	2.5		

Water	Depth (m)	Soil Symbol	FACE 2 — SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0		
	0.5		
	1		
	1.5		
	2		
	2.5		

Undrained Shear Strength (kPa) ●
Measured Using a Hand Held Shear Vane[1]
25 50 75 100 125 150

Scala Penetrometer Test[2] ×
(Blows/ 150mm)
2 4 6 8 10 12

Test Description
1 - Hand held shear vane test in accordance with BS1377:1990
2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters

Notes
Groundwater not encountered
Soak test undertaken and reported separately

Pit dimensions
1.0m
2.1m

Open Excavation Log

Test Pit No. **TP S-1**

Connell Wagner Limited
195 Hereford St. (PO Box 1061
Christchurch New Zealand

Telephone: +64 3 366 0821
Facsimile: +64 3 379 6955

Client: Selwyn Plantation Board Ltd	Location (measured using hand held GPS): 1548839, 5169926		Date: 12/09/2008
Project: SPBL Rolleston Plan Change	Logged By: CG	Weather Conditions: cloudy & dry	Job Number: 36951-001

Undrained Shear Strength (kPa) ●
Measured Using a Hand Held Shear Vane[1]
25 50 75 100 125 150

Scala Penetrometer Test[2] ×
(Blows/ 150mm)
2 4 6 8 10 12

Water	Depth (m)	Soil Symbol	FACE 1 — SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.	Water	Depth (m)	Soil Symbol	FACE 2 — SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0		Grass over silty TOPSOIL, brown, moist with large tree roots.		0		
	0.5		Gravelly SILT with cobbles and minor clay and boulders. Light brown, cohesive. Gravel is medium to coarse grained, rounded, gap graded, near horizontal long-axis pebble alignment. Moist. Large tree roots in the upper part.		0.5		
	1				1		
	1.5		End of Test pit at 1.4m (Target depth)		1.5		
	2				2		
	2.5				2.5		

Test Description
1 - Hand held shear vane test in accordance with BS1377:1990
2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters

Notes
Groundwater not encountered
Soak test undertaken and reported separately

Pit dimensions
1.0m
2.0m

Connell Wagner

Open Excavation Log

Test Pit No. **TP S-2**

Connell Wagner Limited
195 Hereford St. (PO Box 1061
Christchurch New Zealand
Telephone: +64 3 366 0821
Facsimile: +64 3 379 6955

Client: Selwyn Plantation Board Ltd	Location (measured using hand held GPS): 1549448, 5169261		Date: 12/09/2008
Project: SPBL Rolleston Plan Change	Logged By: CG	Weather Conditions: cloudy & dry	Job Number: 36951-001

FACE 1

Water	Depth (m)	Soil Symbol	SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0		Grass over silty TOPSOIL, with large tree roots up to 60mm diameter, brown, moist.
	0 – 1.5		Gravelly SILT with boulders and minor clay. Light brown, cohesive. Gravel is medium to coarse grained, rounded, gap graded, near horizontal long-axis pebble alignment. Moist. Large tree roots in the upper part.
	1.5		End of Test pit at 1.5m (Target depth)

FACE 2

Water	Depth (m)	Soil Symbol	SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0 – 1.5		

Undrained Shear Strength (kPa) ●
Measured Using a Hand Held Shear Vane[1]
25 50 75 100 125 150

Scala Penetrometer Test[2] ×
(Blows/ 150mm)
2 4 6 8 10 12

Test Description
1 - Hand held shear vane test in accordance with BS1377:1990
2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters

Notes
Groundwater not encountered
Soak test undertaken and reported separately

Pit dimensions
1.0m
1.9m

Connell Wagner

Open Excavation Log

Test Pit No. **TP S-3**

Connell Wagner Limited
195 Hereford St. (PO Box 1061
Christchurch New Zealand
Telephone: +64 3 366 0821
Facsimile: +64 3 379 6955

Client: Selwyn Plantation Board Ltd	Location (measured using hand held GPS): 1548668, 5169475		Date: 12/09/2008
Project: SPBL Rolleston Plan Change	Logged By: CG	Weather Conditions: cloudy & dry	Job Number: 36951-001

Water	Depth (m)	Soil Symbol	FACE 1 — SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0		Grass over silty TOPSOIL, with large tree roots up to 60mm diameter, brown, moist.
	0.5		Silty Sandy GRAVEL with minor cobbles yellowish brown, rounded, gap graded, near horizontal long-axis pebble alignment. Sand is angular. Moist. Large tree roots in the upper part.
	1		
	1.5		End of Test pit at 1.4m (Target depth)
	2		
	2.5		

Water	Depth (m)	Soil Symbol	FACE 2 — SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.
	0		
	0.5		
	1		
	1.5		
	2		
	2.5		

Undrained Shear Strength (kPa) ●
Measured Using a Hand Held Shear Vane[1]
25 50 75 100 125 150

Scala Penetrometer Test[2] ×
(Blows/ 150mm)
2 4 6 8 10 12

Test Description
1 - Hand held shear vane test in accordance with BS1377:1990
2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters

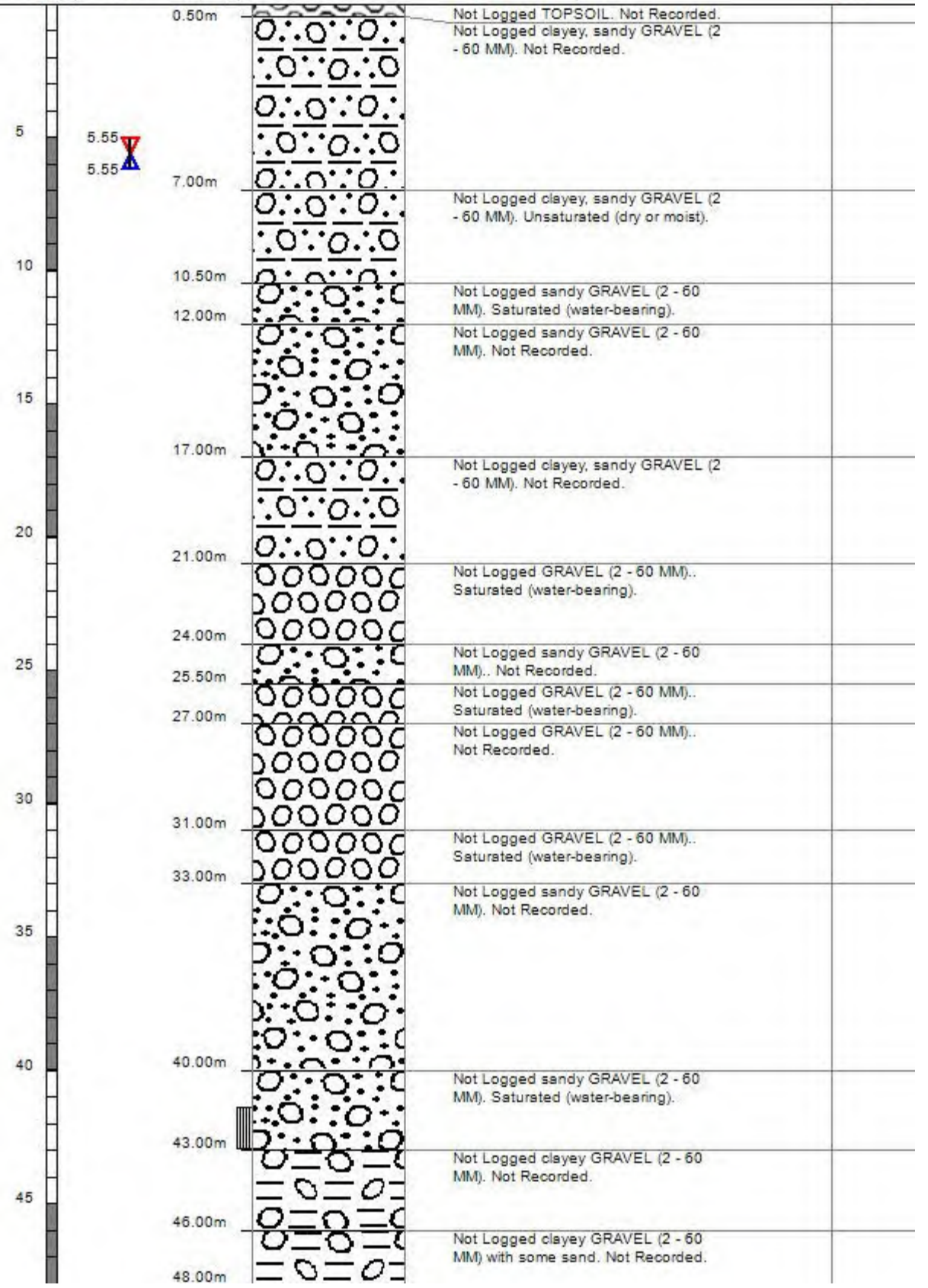
Notes
Groundwater not encountered
Soak test undertaken and reported separately

Pit dimensions
1.0m
2.0m

Borelog for well BX23/0735

Grid Reference (NZTM): 1549221 mE, 5168386 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: m +MSD Accuracy:
Driller: McMillan Drilling Ltd
Drill Method: Rotary/Percussion
Borelog Depth: 48.0 m Drill Date: 13-Jun-2017

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Borelog for well BX23/0895

Grid Reference (NZTM): 1549888 mE, 5168727 mN
Location Accuracy: 50 - 300m
Ground Level Altitude: m +MSD Accuracy:
Driller: Clemence Drilling Contractors
Drill Method: Rotary/Percussion
Borelog Depth: 53.3 m Drill Date: 16-Apr-2019

Environment Canterbury Regional Council
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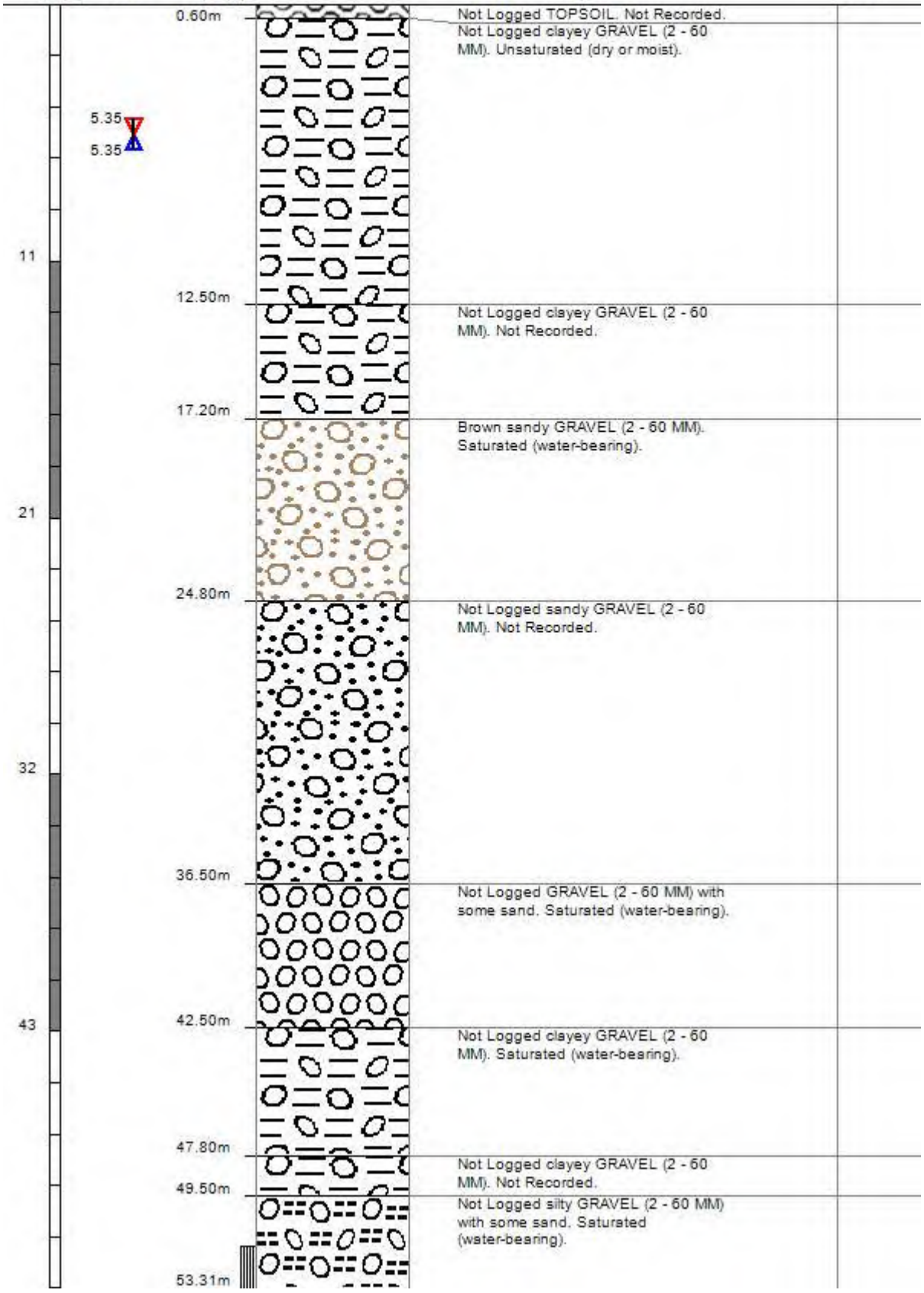

Borelog for well M36/0015

Grid Reference (NZTM): 1548408 mE, 5170591 mN
Location Accuracy: 50 - 300m
Ground Level Altitude: 47.2 m +MSD Accuracy: < 2.5 m
Driller: A M Bisley & Co
Drill Method: Driven Pipe
Borelog Depth: 36.3 m Drill Date:

Environment Canterbury Regional Council
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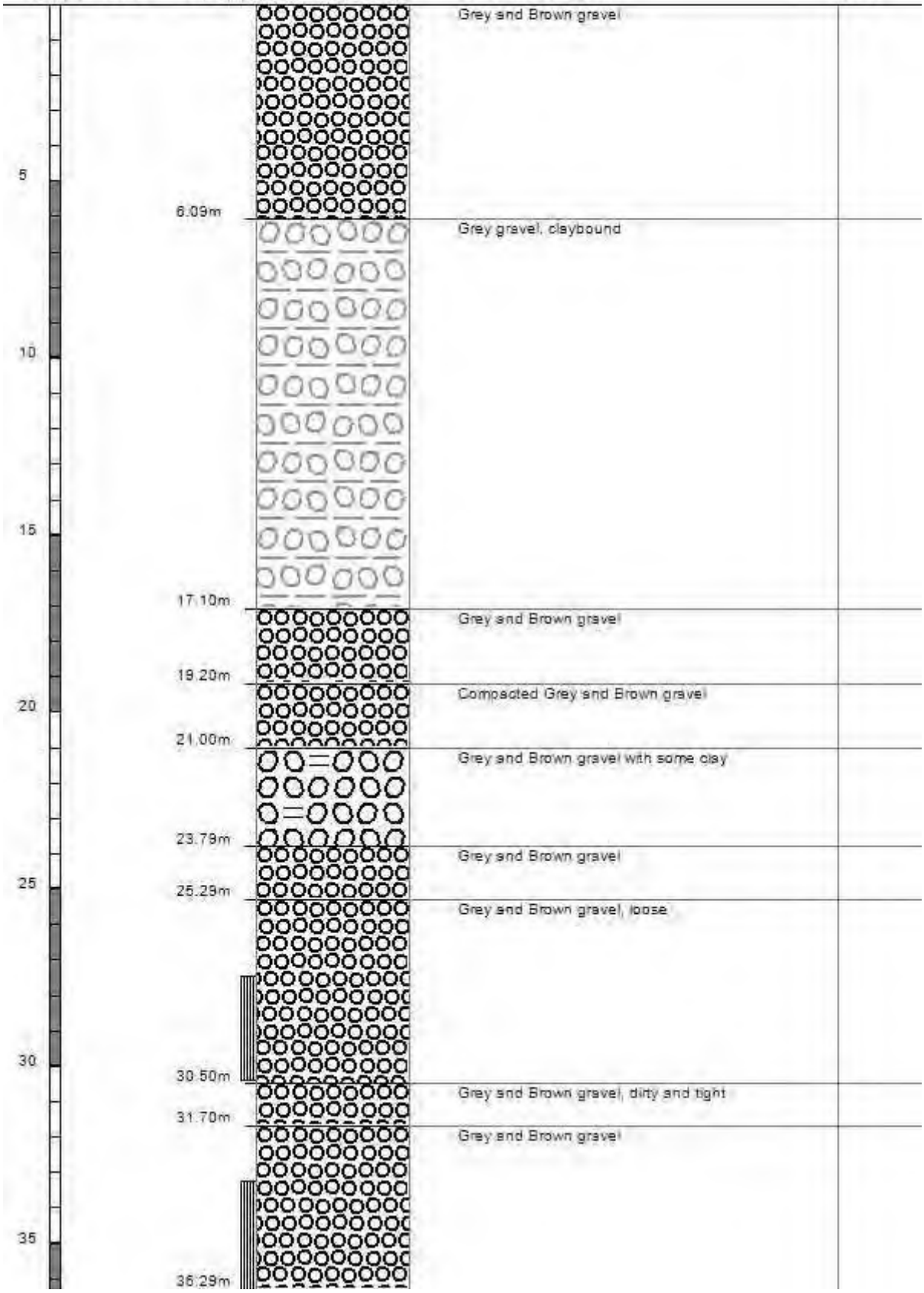
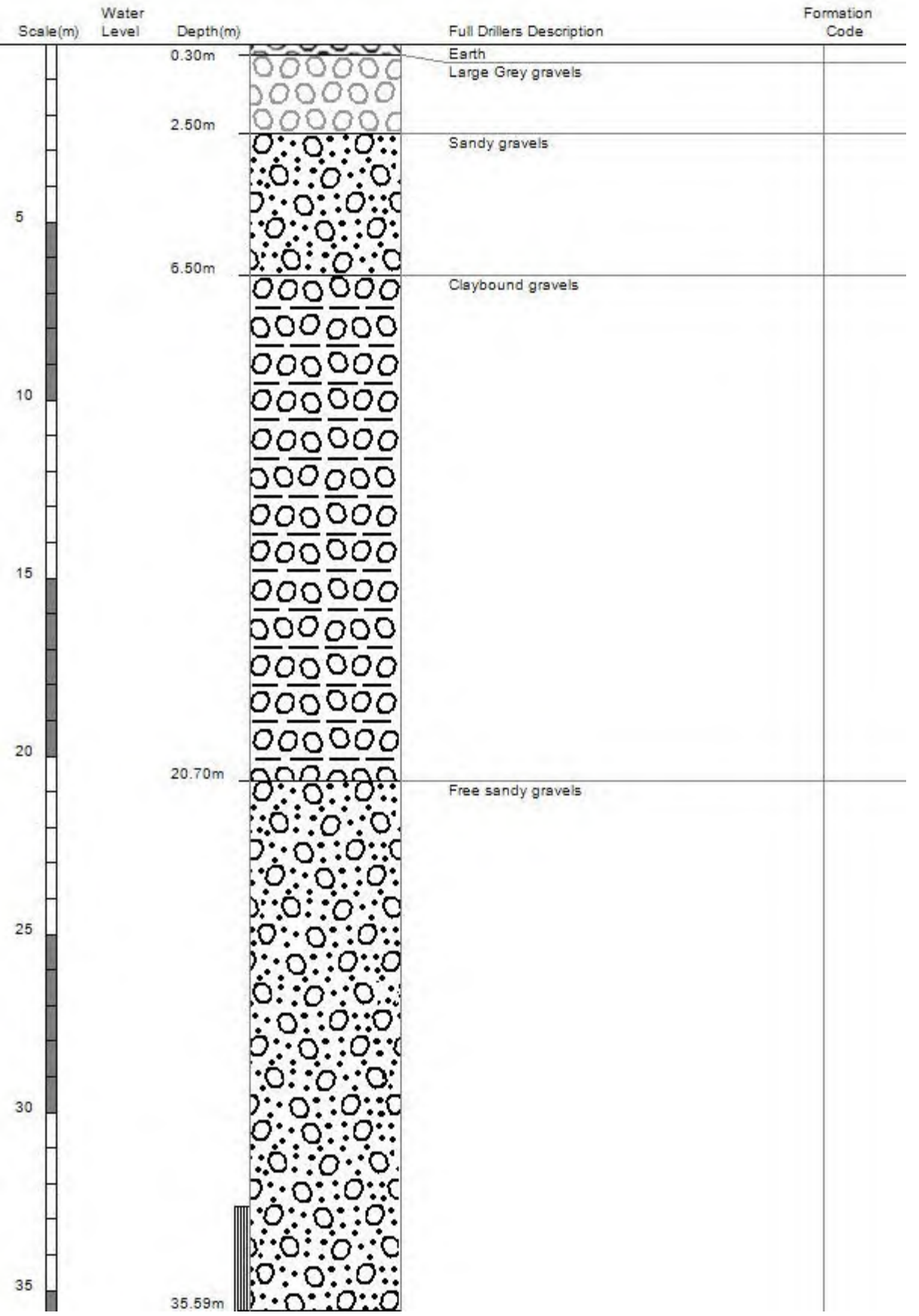


Borelog for well M36/4387

Grid Reference (NZTM): 1549704 mE, 5168988 mN
Location Accuracy: 2 - 15m
Ground Level Altitude: 36.5 m +MSD Accuracy: < 2.5 m
Driller: McMillan Drilling Ltd
Drill Method: Rotary/Percussion
Borelog Depth: 35.6 m Drill Date: 11-Oct-1991

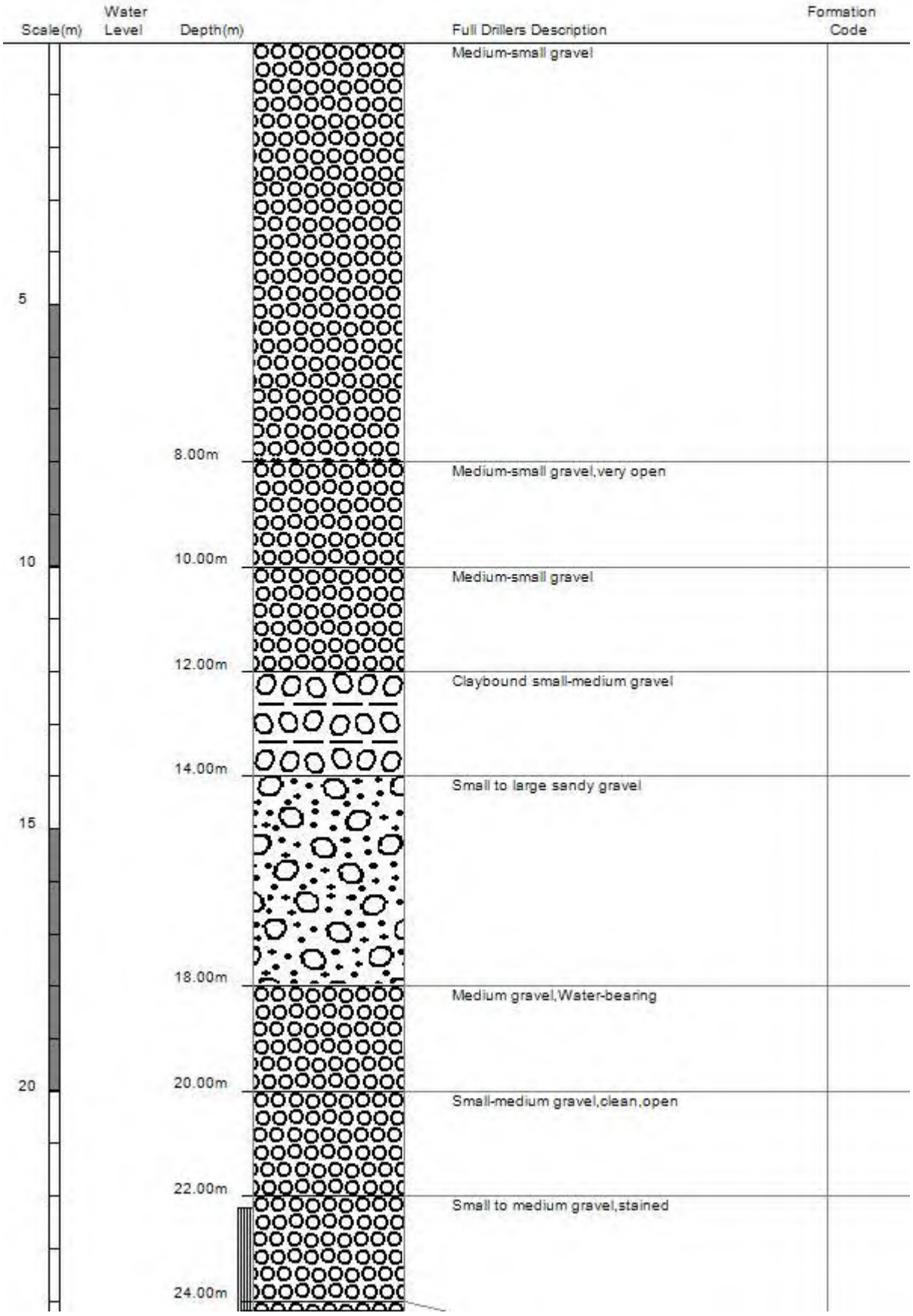
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Borelog for well M36/4449

Grid Reference (NZTM): 1549508 mE, 5169471 mN
Location Accuracy: 50 - 300m
Ground Level Altitude: 38.8 m +MSD Accuracy: < 2.5 m
Driller: Dynes Road Drilling
Drill Method: Cable Tool
Borelog Depth: 24.2 m Drill Date: 09-Jun-1992

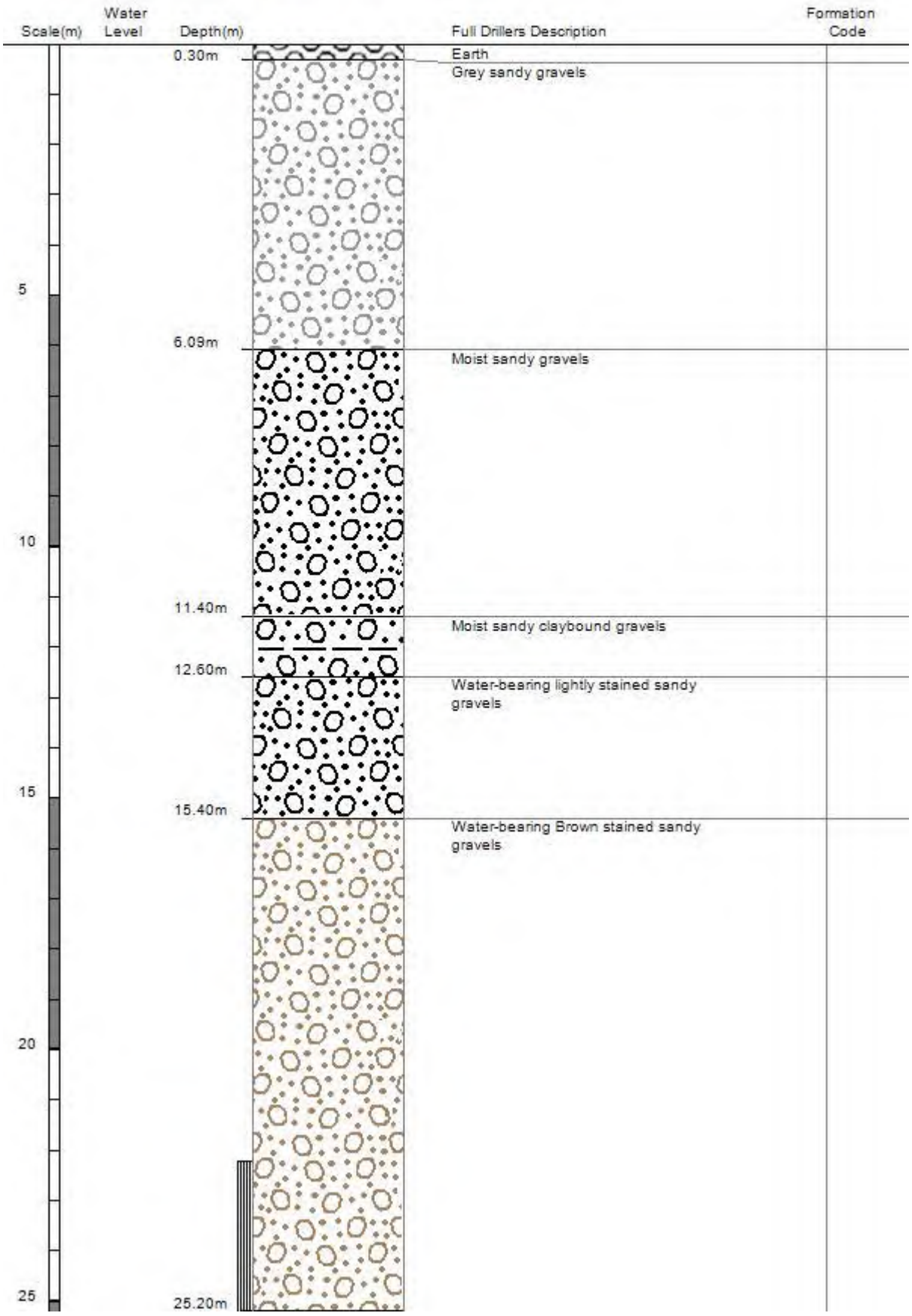
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Borelog for well M36/5022

Grid Reference (NZTM): 1548158 mE, 5169498 mN
Location Accuracy: 2 - 15m
Ground Level Altitude: 41.1 m +MSD Accuracy: < 2.5 m
Driller: McMillan Drilling Ltd
Drill Method: Rotary/Percussion
Borelog Depth: 25.2 m Drill Date: 25-Apr-1996

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Borelog for well M36/7416

Grid Reference (NZTM): 1549058 mE, 5168781 mN
Location Accuracy: 50 - 300m
Ground Level Altitude: 35.5 m +MSD Accuracy: < 0.5 m
Driller: McMillan Drilling Ltd
Drill Method: Rotary/Percussion
Borelog Depth: 47.7 m Drill Date: 18-Aug-2003

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Scale(m)	Water Level	Depth(m)	Full Drillers Description	Formation Code
		0.30m	Earth and gravels	
		0.30m	Earth and gravels	
			Sandy gravels	
5		5.60m	Sandy gravels	
		5.60m	Wet claybound sandy gravels	
10		11.00m	Wet claybound sandy gravels	
		11.00m	Water-bearing claybound sandy gravels	
		13.10m	Water-bearing claybound sandy gravels	
		13.10m	Water-bearing claybound sandy gravels	
		14.70m	Water-bearing claybound sandy gravels	
15		14.70m	Medium water-bearing stained gravels, some sand	
		16.80m	Medium water-bearing stained gravels, some sand	
		16.80m	Small to medium water-bearing gravels	
20		19.70m	Small to medium water-bearing gravels	
		19.70m	Medium water-bearing stained gravels	
		22.50m	Medium water-bearing stained gravels	
		22.50m	water-bearing sandy gravels	
25		26.40m	water-bearing sandy gravels	
		26.40m	Medium water-bearing lightly stained gravels	
30		33.20m	Medium water-bearing lightly stained gravels	
		33.20m	Medium water-bearing lightly stained gravels	
35			Medium water-bearing lightly stained gravels	
40		43.70m	Medium water-bearing lightly stained gravels	
		43.70m	Medium to large well stained sandy gravels	
45		46.80m	Medium to large well stained sandy gravels	
		46.80m		
		47.70m		

Borelog for well M36/8063

Grid Reference (NZTM): 1547469 mE, 5171189 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 48.9 m +MSD Accuracy: < 0.5 m
Driller: McMillan Drilling Ltd
Drill Method: Rotary/Percussion
Borelog Depth: 97.8 m Drill Date: 11-Jan-2013

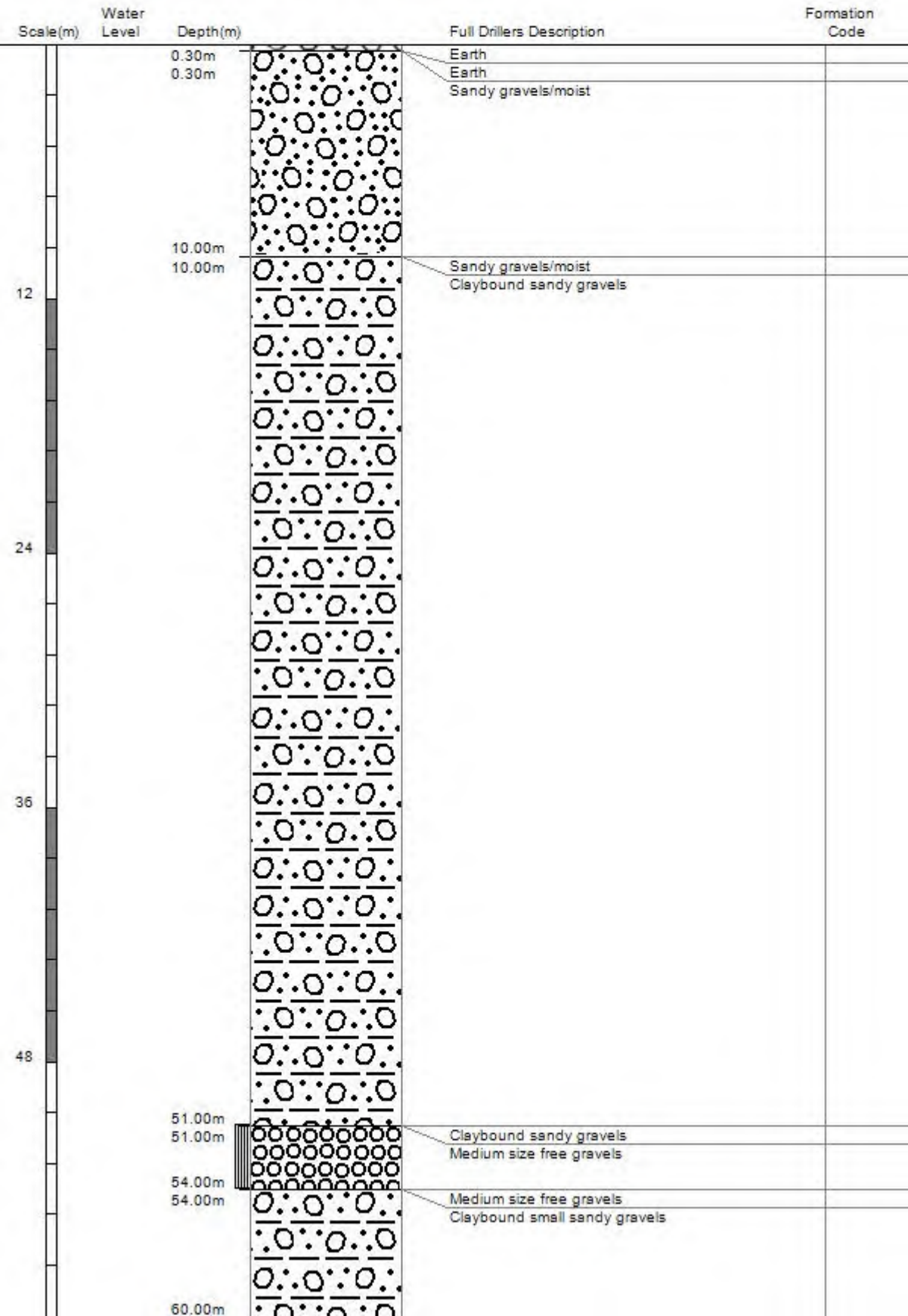
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Scale(m)	Water Level	Depth(m)	Full Drillers Description	Formation Code
		0.40m	EARTH	
		0.40m	EARTH	
			Sandy GRAVEL	
		4.00m		
		4.00m	Sandy GRAVEL	
5			Claybound GRAVEL with minor sand	
10	11.26			
	13.53			
15				
20				
25				
30				
35				
		36.00m		
		36.00m	Claybound GRAVEL with minor sand	
			Sandy med sorted free stained GRAVEL	
40				
		42.00m		
		42.00m	Sandy med sorted free stained GRAVEL	
			Sandy med sorted free stained GRAVEL	
45				
50		50.00m		
		50.00m	Sandy med sorted free stained GRAVEL	
		51.00m		
		51.00m	Yellow CLAY. Saturated (water-bearing).	
			Yellow CLAY. Saturated (water-bearing).	
55			Claybound GRAVEL, some sand	
		59.00m		
		59.00m	Claybound GRAVEL, some sand	
60			Coarse GRAVEL	
65				
		67.00m		
		67.00m	Coarse GRAVEL	
			Sandy med sorted freeish stained coarse GRAVEL	
70				
		72.00m		
		72.00m	Sandy med sorted freeish stained coarse GRAVEL	
			Claybound GRAVEL some sand	
75				
80				
		82.00m		
		82.00m	Claybound GRAVEL some sand	
			Sandy med sorted lightly stained GRAVEL	
85				
		86.00m		
		86.00m	Sandy med sorted lightly stained GRAVEL	
			Coarse GRAVEL	
90				
		91.00m		
		91.00m	Coarse GRAVEL	
			Sandy well/med sorted very free stained coarse GRAVEL	
95				
		97.85m		

Borelog for well M36/8581

Grid Reference (NZTM): 1548830 mE, 5170152 mN
Location Accuracy: 2 - 15m
Ground Level Altitude: 44.4 m +MSD Accuracy: < 0.5 m
Driller: McMillan Drilling Ltd
Drill Method: Unknown
Borelog Depth: 60.0 m Drill Date: 01-Apr-2008

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



NZGD ID: 230508

Machine Borehole Log

Borehole ID: BH01

Project:	Rolleston Access Improvement	**Project number:**	3338703
Site location:	Rolleston	**Client:**	Waka Kotahi NZ Transport Agency
Location:	In paddock adjacent to southwest corner of SH1 intersection with Dunns Crossing Road. SH RP: 01S-0365-B/5.221	**Coordinate system:**	NZTM2000
		Northing:	5172144.4
		Easting:	1547688.2
		Vertical datum:	NZVD 2016
		Ground level (mRL):	58.60
		Location method:	GPS +/- 5m

Installations	Drilling: Return	Drilling: GWL	Drilling: Recovery	Drilling: Method	Drilling: Casing	Drilling: RQD	In Situ Tests: Su (kPa)	In Situ Tests: SPT	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
			100%	SNC						0.0	58.5		Fine to medium sandy SILT, some fine to medium gravel, trace organics, greyish brown; dry. Gravel: sub-angular to rounded, slightly weathered, greywacke. Organics: rootlets. [TOPSOIL]	
										0.5	58.0		'Very dense', fine to coarse sandy fine to coarse GRAVEL, minor silt, minor cobbles; brownish grey; moist. Gravel/cobbles: well graded, angular to rounded, slightly weathered, greywacke.	
										1.0	57.5		*1.00m: some cobbles*	
			21%	SNC				21 40 Nc=50+		1.5	57.0		*1.40m: poor recovery - fines washed out during sonic drilling*	
										2.0	56.5			
										2.5	56.0			
			100%	SNC				20 40 Nc=50+		3.0	55.5		Very dense, fine to coarse GRAVEL, some fine to coarse sand, trace silt; grey; moist. Gravel: well graded, sub-angular to sub-rounded, slightly weathered, greywacke.	
										3.5	55.0		*3.50 - 3.80m: fines washed out during sonic drilling*	
										4.0	54.5			
			87%	SNC				11 19 19 19 16 5/15mm Nc=50+		4.5	54.0		*4.44 - 4.60m: fines washed out during sonic drilling*	
										5.0	53.5			
										5.5	53.0		*5.60 - 5.80m: some cobbles: well graded, sub-angular to sub-rounded, slightly weathered, greywacke.*	
			100%	SNC				19 27 24 30 6/15mm HB Nc=50+		6.0	52.5		Very dense, fine to coarse sandy fine to coarse GRAVEL, some silt; brownish grey; moist. Gravel: well graded, angular to rounded, slightly weathered, greywacke.	
										6.5	52.0			
										7.0	51.5			
			100%	SNC				32 28/45mm Nc=50+		7.5	51.0			
										8.0	50.5		*8.00 - 8.40m: fines washed out during sonic drilling*	
										8.5	50.0		*8.60m: some silt*	
			80%	SNC				26 34/65mm Nc=50+		9.0	49.5			
		▼								9.5	49.0		'Very dense', medium to coarse GRAVEL, some cobbles, minor fine gravel; greyish brown; wet. Gravel/cobbles: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. Fines washed out during sonic drilling.	

Late Pleistocene Alluvium

Date started:	05/07/2024	**Date end:**	09/07/2024
Logged by:	RO	**Drilled by:**	McMillan
Vane ID:	N/A	**Equipment:**	Geoprobe 8140LS
Vane type:	N/A	**Method:**	SNC
Vane width:	N/A	**Inclination:**	90°
SPT No:	368	**Diameter:**	114mm
SPT efficiency:	90%	**Fluid type:**	Water

Comments:

Groundwater measured at 9.77 m below ground level at 1:47 pm on 21/08/2024 within piezometer, post-development. Elevation estimated from LINZ DEM maps. Piezometer completed with hole capped by cement and a stand up toby box installed to a height of 0.4 metres above ground. Hole remained stable throughout drilling.

For Explanation of Symbols and Abbreviations See Key Sheet

NZGD ID: 230508

NZGD ID: 230508

Machine Borehole Log

Borehole ID: BH01

Project:	Rolleston Access Improvement	**Project number:**	3338703
Site location:	Rolleston	**Client:**	Waka Kotahi NZ Transport Agency
Location:	In paddock adjacent to southwest corner of SH1 intersection with Dunns Crossing Road. SH RP: 01S-0365-B/5.221	**Coordinate system:**	NZTM2000
		Northing:	5172144.4
		Easting:	1547688.2
		Vertical datum:	NZVD 2016
		Ground level (mRL):	58.60
		Location method:	GPS +/- 5m

Installations	Drilling: Return	Drilling: GWL	Drilling: Recovery	Drilling: Method	Drilling: Casing	Drilling: RQD	In Situ Tests: Su (kPa)	In Situ Tests: SPT	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
			80%	SNC				10 30 40 20/45mm Nc=50+		10.5	48.5		'Very dense', medium to coarse GRAVEL, some cobbles, minor fine gravel; greyish brown; wet. Gravel/cobbles: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. Fines washed out during sonic drilling.	Late Pleistocene Alluvium
			90%	SNC						11.0	48.0		Very dense, fine to coarse sandy fine to coarse GRAVEL, some silt; greyish brown; wet. Gravel: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. *11.10m: becomes wet*	
								30 30/50mm Nc=50+		11.5	47.5			
			80%	SNC						12.0	47.0		Very dense, cobbly fine to coarse GRAVEL; grey; wet. Gravel: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. Fines washed out during sonic drilling.	
								7 25 40 20/40mm Nc=50+		13.0	46.0			
			61%	SNC						13.5	45.5			
								12 40 45 15/20mm Nc=50+		15.0	44.0		15.08m - End of Borehole, Hole terminated at target depth.	
										15.5	43.5			
										16.0	43.0			
										16.5	42.5			
										17.0	42.0			
										17.5	41.5			
										18.0	41.0			
										18.5	40.5			
										19.0	40.0			
										19.5	39.5			
											39.0			

Date started:	05/07/2024	**Date end:**	09/07/2024
Logged by:	RO	**Drilled by:**	McMillan
Vane ID:	N/A	**Equipment:**	Geoprobe 8140LS
Vane type:	N/A	**Method:**	SNC
Vane width:	N/A	**Inclination:**	90°
SPT No:	368	**Diameter:**	114mm
SPT efficiency:	90%	**Fluid type:**	Water

Comments:

Groundwater measured at 9.77 m below ground level at 1:47 pm on 21/08/2024 within piezometer, post-development. Elevation estimated from LINZ DEM maps. Piezometer completed with hole capped by cement and a stand up toby box installed to a height of 0.4 metres above ground. Hole remained stable throughout drilling.

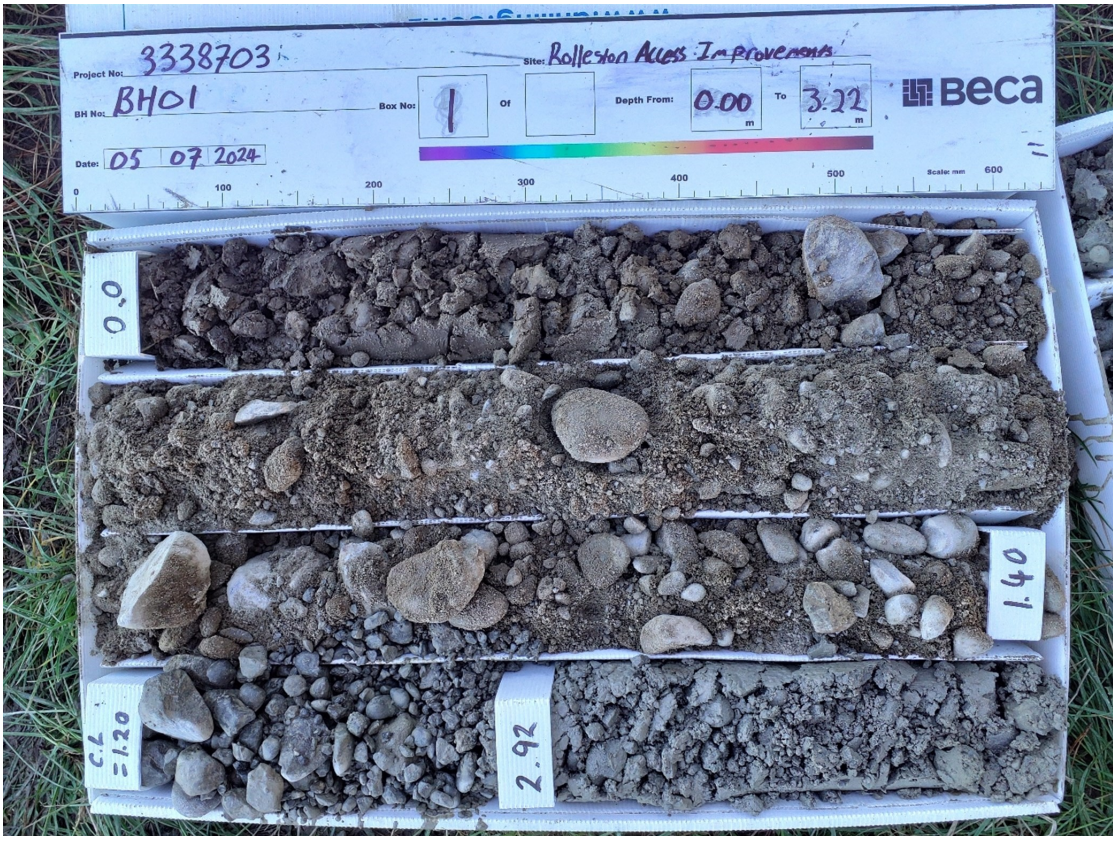
For Explanation of Symbols and Abbreviations See Key Sheet

NZGD ID: 230508

Photo Log

Location ID: BH01

Project:	Rolleston Access Improvement			**Project number:**	3338703
Site location:	Rolleston			**Client Name:**	Waka Kotahi NZ Transport Agency
Location:	In paddock adjacent to southwest corner of SH1 intersection with Dunns Crossing Road. SH RP: 01S-0365-B/5.221	**Coordinate system:**	NZTM2000	**Vertical datum:**	NZVD 2016
		Northing:	5172144.4	**Ground level (mRL):**	58.60
		Easting:	1547688.2	**Location method:**	GPS +/- 5m



Core Box 01 - 0.00mbgl to 3.22mbgl



Core Box 02 - 3.22mbgl to 5.36mbgl

Photo Log

Location ID: BH01

Project:	Rolleston Access Improvement			**Project number:**	3338703
Site location:	Rolleston			**Client Name:**	Waka Kotahi NZ Transport Agency
Location:	In paddock adjacent to southwest corner of SH1 intersection with Dunns Crossing Road. SH RP: 01S-0365-B/5.221	**Coordinate system:**	NZTM2000	**Vertical datum:**	NZVD 2016
		Northing:	5172144.4	**Ground level (mRL):**	58.60
		Easting:	1547688.2	**Location method:**	GPS +/- 5m



Core Box 03 - 5.36mbgl to 7.48mbgl



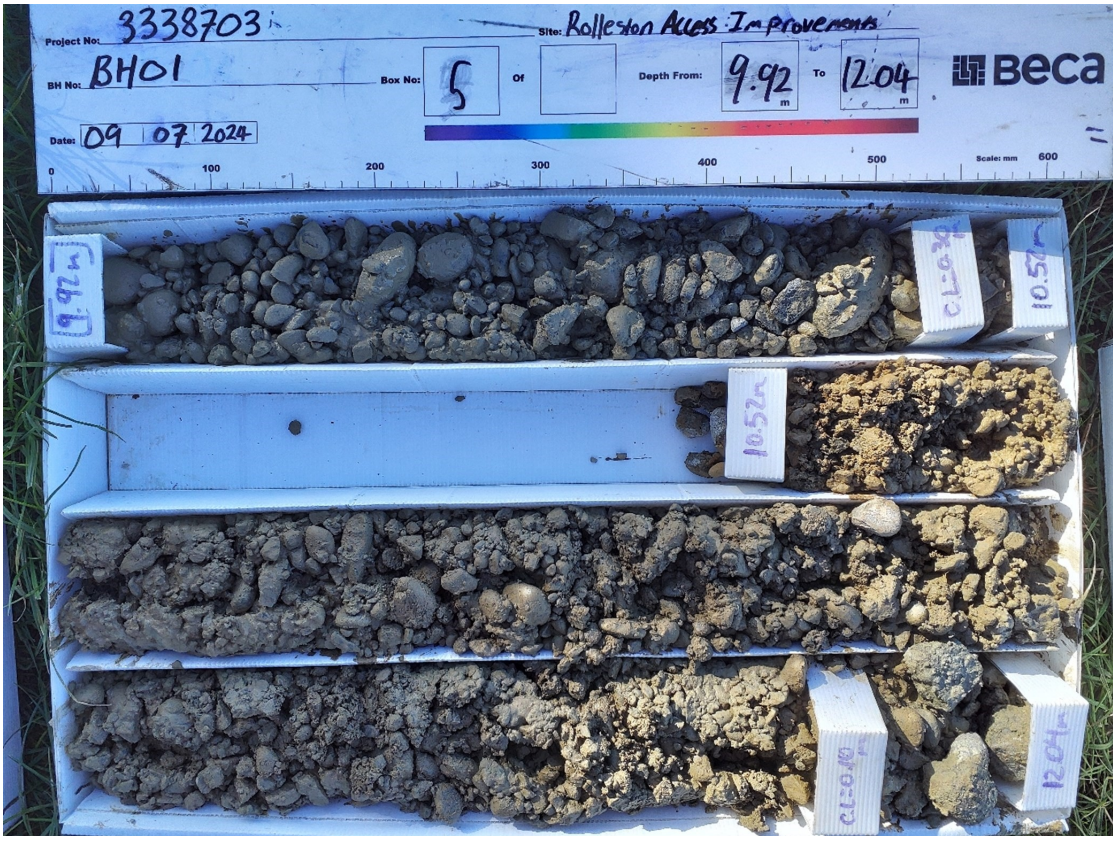
Core Box 04 - 7.48mbgl to 9.92mbgl

Photo Log

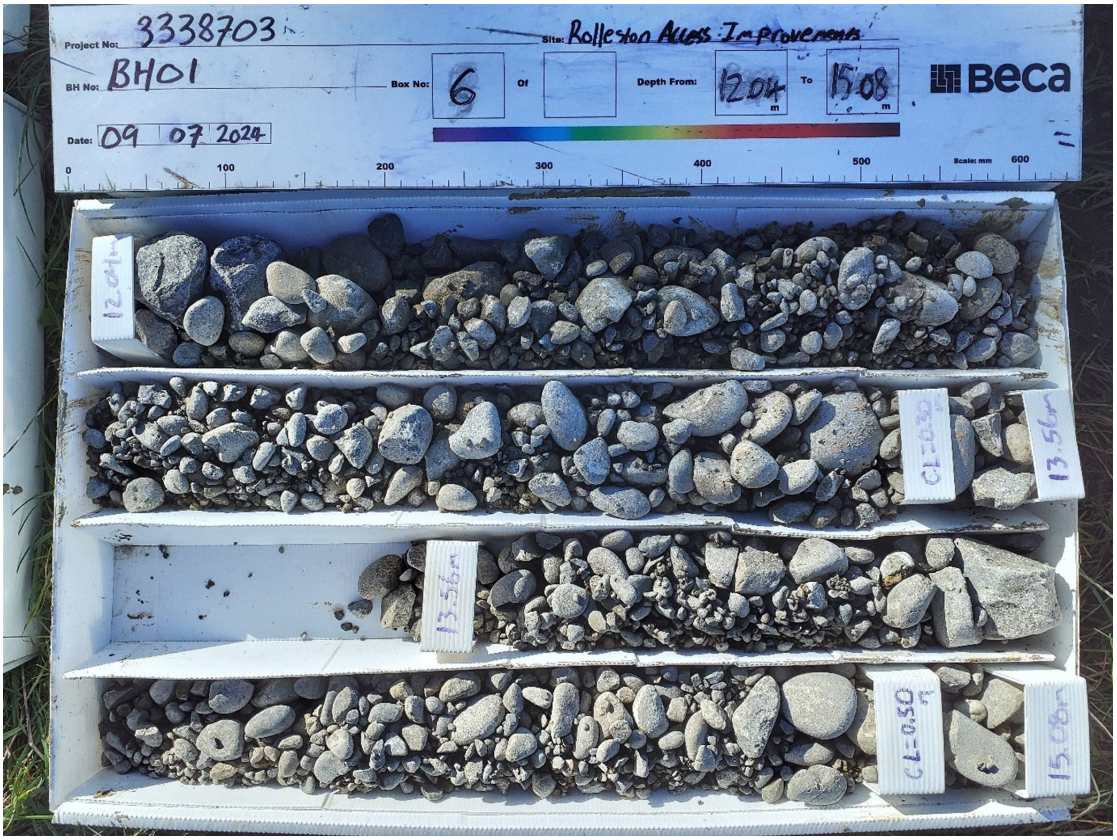
Location ID: BH01

Sheet 3 of 3

Project:	Rolleston Access Improvement			**Project number:**	3338703
Site location:	Rolleston			**Client Name:**	Waka Kotahi NZ Transport Agency
Location:	In paddock adjacent to southwest corner of SH1 intersection with Dunns Crossing Road. SH RP: 01S-0365-B/5.221	**Coordinate system:**	NZTM2000	**Vertical datum:**	NZVD 2016
		Northing:	5172144.4	**Ground level (mRL):**	58.60
		Easting:	1547688.2	**Location method:**	GPS +/- 5m



Core Box 05 - 9.92mbgl to 12.04mbgl



Core Box 06 - 12.04mbgl to 15.08mbgl

NZGD ID: 100580

Soil&Rock Consultants
For well-grounded solutions

CLIENT: Myall & Thurlow Consultants Ltd

PROJECT: Geotechnical Investigation, Dunns Crossing Subdivision, Rolleston

Auger Hole No: TP15

Sheet 1 of 1

Drill Type:	6 Tonne Excavator	Project No:	C17231	Logged By:	MG
Drilled By:	R A Shearing Contractors Ltd	Coordinates:	1549094 E, 5169931 N	Reviewed By:	TK
Date Started:	12/10/17	Ground Elevation:	42m	Surface Conditions:	Near Level, Grass
Date Finished:	13/10/17	Water Level:	Groundwater not encountered	Shear Vane Number:	N/A

STRATIGRAPHY	DEPTH (m)	GRAPHIC LOG	Soil description in accordance with the NZ Geotechnical Society Inc 2005 "Guidelines for Field Description of Soil and Rock in Engineering Use"	WATER LEVEL (m)
TOPSOIL	0.0		SILT, trace fine sand, dark brown. Very soft to soft, moist, non-plastic. (TOPSOIL)	
ALLUVIAL DEPOSITS	0.5		Silty fine to coarse sub-rounded to rounded GRAVEL, light brownish grey. Dense to very dense, moist. (ALLUVIAL DEPOSITS)	
	1.0		Fine to coarse sandy fine to coarse sub-rounded to rounded GRAVEL, brownish grey. Dense to very dense, moist to wet.	
			Wet.	
	1.5		Trace sub-rounded to rounded boulder.	
	2.0		END OF BORE. 2.10 METRES. TOO DENSE TO EXCAVATE	
	2.5			
	3.0			

SCALA PENETROMETER TEST METHOD NZS4402: 1986 test 6.5.2

(Blows per 100mm Increment)

DEPTH (m)	0	5	10	15	20
0.0	0				
	2				
	2				
			10		
				16	
0.5					25
1.0					
1.5					
2.0					
2.5					
3.0					

Comments

HAND AUGER WITH SCALA CHCH LOG C17231_TP01-TP20_12-11-2017_DRAFT.GPJ S+R_2012-AGS - REVISED.GDT 8/11/17

Unit 11, 114 Sawyers Arms Road, Christchurch 8542. Phone 03 352 4519
www.soilandrock.co.nz

NZGD ID: 100580

NZGD ID: 202852

BOREHOLE LOG

Hole # **ST01**

Project:	**192 Dunns Crossing Road**		
For:	**Bonisch**		
Project #:	**4928/2**		
Co-ordinates:	1548933.189, 5170295.342	**Grid system:**	NZTM2000 (E, N)
Drill method:	Excavator	**Contractor:**	LFP
Hole depth:	2.00	**Equipment:**	Excavator
LFP Ref #:	1802		
Date started:	21/06/2023		
Date finished:	21/06/2023		
R.L.:	45.2 m NZVD(2016)		
Logged by:	CLS		
Checked By:	RBW		

R.L. (m)	STRATA DESCRIPTION	USCS	Graphic	DEPTH	Geological UNIT	Water & Piezo	Shear Vane (kPa) 0 100 200	5 10 15 20	sub sampled
45.2	Sandy GRAVEL, minor silt, brown, moist; Gravel, greywacke, rounded, fine to coarse, well graded; Sand, fine to coarse, well graded	GW		0.0	SPRINGSTON FORMATION				
44.7				0.5					
44.2	- 1.2m, coarser gravel (minor cobble)			1.0					
43.7	- 1.6m, becoming interbedded with fine to coarse gravel			1.5					
43.2	E.O.H. Target Depth			2.0					
42.7				2.5					
42.2				3.0					
41.7				3.5					
41.2				4.0					
40.7				4.5					
40.2				5.0			0 25 50 peak (kPa) residual (kPa) Size: mm #:	5 10 15 20 *blows/100mm are calculated from mm/blow as recorded*	0

Notes: R.L. approximate only
Transducer installed at 2.0m BGL

Borehole logged in accordance with the "Guidelines for the Classification and Description of Soil and Rock for Engineering Purposes" Dec 2005 NZGS.
R.L. is inferred and/or interpolated unless otherwise stated.

Shear Vane performed and corrected as per NZGS Guidelines.
Scala Penetrometer Test carried out to NZS 4402: Test 6.5.2 & field measured as mm per blow(s) .

NZGD ID: 202852

NZGD ID: 230864

Test Pit Log

Test Pit ID: IP01
Sheet 1 of 1

Project:	Rolleston Access Improvement	**Project number:**	3338703
Site location:	Rolleston	**Client:**	Waka Kotahi NZ Transport Agency
Location:	On grass verge adjacent to SH1 approx. 170m southwest of intersection of SH1 and Dunns Crossing Road (southbound)	**Coordinate system:**	NZTM2000
		Northing:	5172119.0
		Easting:	1547537.0
		Vertical datum:	NZVD 2016
		Ground level (mRL):	58.80
		Location method:	GPS +/- 5m

Groundwater (m)	In Situ Tests: Su (kPa)	In Situ Tests: Scala blows/50mm	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
		3 5 11		0.0	58.8		Dense, silty fine to medium SAND, trace fine to medium gravel, trace organics; brown; dry. Gravel: well graded, sub-rounded to rounded, slightly weathered, greywacke. Organics: roots/rootlets. [TOPSOIL]	
				0.5	58.5		Dense, fine to coarse sandy fine to coarse GRAVEL, minor cobbles, trace organics; light brown; dry. Gravel/cobbles: well graded, sub-angular to rounded, slightly weathered, greywacke. Organics: rootlets.	Late Pleistocene Alluvium
				1.0	58.0		*0.80m: some cobbles*	
		4 12		1.5	57.5		'Very dense', cobbly fine to coarse GRAVEL, some fine to coarse sand; greyish brown; dry. Gravel/cobbles: well graded, sub-angular to rounded, slightly weathered, greywacke.	
				2.0	57.0		2.20m - End of test pit, target depth.	
				2.5	56.5			
				3.0	56.0			
				3.5	55.5			
				4.0	55.0			
				4.5	54.5			
					54.0			

Date started:	18/06/2024	**Logged by:**	RO	**Comments:**
Vane ID:	N/A	**Contractor:**	CORDE	Groundwater not encountered.
Vane type:	N/A	**Equipment:**	JCB Hydradig 110W	Elevation estimated from LINZ DEM.
Vane width:	N/A	**Method:**	TP	Pit remained stable throughout excavation.
Face orientation:	N/A			

For Explanation of Symbols and Abbreviations See Key Sheet

NZGD ID: 230864

Photo Log

Location ID: IP01

Project:	Rolleston Access Improvement			**Project number:**	3338703
Site location:	Rolleston			**Client Name:**	Waka Kotahi NZ Transport Agency
Location:	On grass verge adjacent to SH1 approx. 170m southwest of intersection of SH1 and Dunns Crossing Road (southbound)	**Coordinate system:**	NZTM2000	**Vertical datum:**	NZVD 2016
		Northing:	5172119.0	**Ground level (mRL):**	58.80
		Easting:	1547537.0	**Location method:**	GPS +/- 5m



IP01 - 0.00mbgl to 2.00mbgl



IP01 - 0.00mbgl to 2.00mbgl

NZGD ID: 230864

Photo Log

Location ID: IP01

Project:	Rolleston Access Improvement			**Project number:**	3338703
Site location:	Rolleston			**Client Name:**	Waka Kotahi NZ Transport Agency
Location:	On grass verge adjacent to SH1 approx. 170m southwest of intersection of SH1 and Dunns Crossing Road (southbound)	**Coordinate system:**	NZTM2000	**Vertical datum:**	NZVD 2016
		Northing:	5172119.0	**Ground level (mRL):**	58.80
		Easting:	1547537.0	**Location method:**	GPS +/- 5m



IP01 - 0.00mbgl to 2.00mbgl

NZGD ID: 230864

NZGD ID: 230865

Test Pit Log

Test Pit ID: IP02
Sheet 1 of 1

Project:	Rolleston Access Improvement	**Project number:**	3338703
Site location:	Rolleston	**Client:**	Waka Kotahi NZ Transport Agency
Location:	Paddock on the corner of SH1 and Dunns Crossing Road	**Coordinate system:**	NZTM2000
		Northing:	5172102.2
		Easting:	1547697.7
		Vertical datum:	NZVD 2016
		Ground level (mRL):	58.20
		Location method:	GPS +/- 5m

Groundwater (m)	In Situ Tests: Su (kPa)	In Situ Tests: Scala blows/50mm	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
		1 3 3 4 3 12 12		0.0	58.0		Medium dense, fine sandy SILT, some organics, minor fine to coarse gravel, trace clay; dark brown; moist. Gravel: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. Organics: rootlets. [TOPSOIL]	
							Medium dense, fine sandy SILT, minor organics, trace fine to medium gravel; dark brown; moist. Gravel: well graded, sub-rounded, slightly weathered, greywacke. Organics: rootlets.	
				0.5	57.5		Very dense, silty fine to coarse GRAVEL, some fine to coarse sand, minor cobbles, trace organics; dark brown; moist. Gravel/cobbles: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. Organics: rootlets.	Late Pleistocene Alluvium
		1 6 8 12		1.0	57.0		Very dense, fine to coarse sandy fine to coarse GRAVEL, some cobbles, trace silt; light greyish brown; moist. Gravel/cobbles: well graded, sub-angular to rounded, slightly weathered, greywacke.	
				1.5	56.5			
				2.0	56.0		2.20m - End of test pit, target depth.	
				2.5	55.5			
				3.0	55.0			
				3.5	54.5			
				4.0	54.0			
				4.5	53.5			

Date started:	01/07/2024	**Logged by:**	NY
Vane ID:	N/A	**Contractor:**	CORDE
Vane type:	N/A	**Equipment:**	JCB Hydradig 110W
Vane width:	N/A	**Method:**	TP
Face orientation:	N/A		

Comments:
Groundwater not encountered.
Elevation estimated from LINZ DEM.
Pit remained stable throughout excavation.

For Explanation of Symbols and Abbreviations See Key Sheet

NZGD ID: 230865

Photo Log

Location ID: IP02

Sheet 1 of 1

Project:	Rolleston Access Improvement			**Project number:**	3338703
Site location:	Rolleston			**Client Name:**	Waka Kotahi NZ Transport Agency
Location:	Paddock on the corner of SH1 and Dunns Crossing Road	**Coordinate system:**	NZTM2000	**Vertical datum:**	NZVD 2016
		Northing:	5172102.2	**Ground level (mRL):**	58.20
		Easting:	1547697.7	**Location method:**	GPS +/- 5m



IP02 - 0.00mbgl to 2.20mbgl



Spoil - 0.00mbgl to 2.20mbgl

NZGD ID: 230877

Test Pit Log

Test Pit ID: PP02

Sheet 1 of 1

Project:	Rolleston Access Improvement	**Project number:**	3338703
Site location:	Rolleston	**Client:**	Waka Kotahi NZ Transport Agency
Location:	382 Dunns Crossing Road (southbound)	**Coordinate system:**	NZTM2000
		Northing:	5171941.9
		Easting:	1547854.5
		Vertical datum:	NZVD 2016
		Ground level (mRL):	56.90
		Location method:	GPS +/- 5m

Groundwater (m)	In Situ Tests: Su (kPa)	In Situ Tests: Scala blows/50mm	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
							ASPHALT	FILL
			B				'Very dense', fine to coarse GRAVEL, some fine to coarse sand, minor silt; light greyish brown; dry. Gravel: well graded, angular to sub-rounded, slightly weathered, greywacke. Broken faces. AP40. [BASECOURSE]	
							'Very dense', fine to coarse sandy fine to coarse GRAVEL, trace silt; light greyish brown; dry. Gravel: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. AP65. [SUB-BASE]	
		1			56.5		Very dense, fine sandy fine to coarse GRAVEL, some cobbles, minor silt; light brown; dry. Gravel/cobbles: well graded, sub-rounded to sub-rounded, slightly weathered, greywacke.	Late Pleistocene Alluvium
		1		0.5				
		10						
		8						
		10						
		10						
							0.80m - End of test pit, target depth.	
				1.0	56.0			
					55.5			
				1.5				
					55.0			

				Comments:
Date started:	26/06/2024	**Logged by:**	NY	Groundwater not encountered.
Vane ID:	N/A	**Contractor:**	CORDE	Elevation estimated from LINZ DEM.
Vane type:	N/A	**Equipment:**	JCB Hydradig 110W	Pit remained stable throughout excavation.
Vane width:	N/A	**Method:**	TP	
Face orientation:	N/A			

For Explanation of Symbols and Abbreviations See Key Sheet

NZGD ID: 230877

Photo Log

Location ID: PP02

Sheet 1 of 1

Project:	Rolleston Access Improvement			**Project number:**	3338703
Site location:	Rolleston			**Client Name:**	Waka Kotahi NZ Transport Agency
Location:	382 Dunns Crossing Road (southbound)	**Coordinate system:**	NZTM2000	**Vertical datum:**	NZVD 2016
		Northing:	5171941.9	**Ground level (mRL):**	56.90
		Easting:	1547854.5	**Location method:**	GPS +/- 5m



PP02 - 0.00mbgl to 0.80mbgl

NZGD ID: 230900

Test Pit Log

Test Pit ID: TP03

Sheet 1 of 1

Project:	Rolleston Access Improvement	**Project number:**	3338703
Site location:	Rolleston	**Client:**	Waka Kotahi NZ Transport Agency
Location:	Paddock on the southeast corner of SH1 and Dunns Crossing Road, approximately 20m south of northern fence line	**Coordinate system:**	NZTM2000
		Northing:	5172149.3
		Easting:	1547636.5
		Vertical datum:	NZVD 2016
		Ground level (mRL):	58.30
		Location method:	GPS +/- 5m

Groundwater (m)	In Situ Tests: Su (kPa)	In Situ Tests: Scala blows/50mm	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
		1 2 2 5 5 5 6 10 9 10 12		0.0 0.5	58.0		Loose, fine sandy SILT, some organics, minor fine to coarse gravel, trace clay; dark brown; moist. Gravel: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. Organics: rootlets. [TOPSOIL]	
							Dense, fine to coarse gravelly SILT, some fine sand, minor organics, trace cobbles; dark greyish brown; moist. Gravel/cobbles: well graded, sub-rounded, slightly weathered, greywacke. Organics: rootlets.	
							Very dense, silty fine to coarse GRAVEL, some fine sand, minor organics; dark brown; moist. Gravel: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. Organics: rootlets.	
					57.5		Very dense, fine to coarse sandy fine to coarse GRAVEL, some cobbles, trace silt; dark greyish brown; moist. Gravel/cobbles: well graded, sub-angular to rounded, slightly weathered, greywacke.	Late Pleistocene Alluvium
		3 12		1.0	57.0			
				1.5	56.5		'Very dense', cobbly fine to coarse GRAVEL, some fine to coarse sand, trace silt; dark greyish brown; moist. Gravel/cobbles: well graded, sub-angular to rounded, slightly weathered, greywacke.	
				2.0			2.00m - End of test pit, target depth.	
					56.0			
				2.5	55.5			
				3.0	55.0			
				3.5	54.5			
				4.0	54.0			
				4.5	53.5			

Date started:	01/07/2024	**Logged by:**	NY
Vane ID:	N/A	**Contractor:**	CORDE
Vane type:	N/A	**Equipment:**	JCB Hydradig 110W
Vane width:	N/A	**Method:**	TP
Face orientation:	N/A		

Comments:

Groundwater not encountered.
Elevation estimated from LINZ DEM.
Pit remained stable throughout excavation.

For Explanation of Symbols and Abbreviations See Key Sheet

NZGD ID: 230900

Photo Log

Location ID: TP03

Sheet 1 of 1

Project:	Rolleston Access Improvement			**Project number:**	3338703
Site location:	Rolleston			**Client Name:**	Waka Kotahi NZ Transport Agency
Location:	Paddock on the southeast corner of SH1 and Dunns Crossing Road, approximately 20m south of northern fence line	**Coordinate system:**	NZTM2000	**Vertical datum:**	NZVD 2016
		Northing:	5172149.3	**Ground level (mRL):**	58.30
		Easting:	1547636.5	**Location method:**	GPS +/- 5m



Spoil - 0.00mbgl to 2.00mbgl



TP03 - 0.00mbgl to 2.00mbgl

NZGD ID: 230902

Test Pit Log

Test Pit ID: TP06

Sheet 1 of 1

Project:	Rolleston Access Improvement	**Project number:**	3338703
Site location:	Rolleston	**Client:**	Waka Kotahi NZ Transport Agency
Location:	On grass verge adjacent to SH1 approx. 40m southwest of SH1 and Dunns Crossing Road intersection (southbound)	**Coordinate system:**	NZTM2000
		Northing:	5172184.4
		Easting:	1547658.9
		Vertical datum:	NZVD 2016
		Ground level (mRL):	58.90
		Location method:	GPS +/- 5m

Groundwater (m)	In Situ Tests: Su (kPa)	In Situ Tests: Scala blows/50mm	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
		0 1 8 8 8 10		0.0	58.9		Very loose, fine sandy SILT, some organics, fine to coarse gravel, trace clay; dark brown; moist. Gravel: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. [TOPSOIL]	
				0.5	58.5		Very dense, silty fine to coarse GRAVEL, some fine to coarse sand, minor cobbles, trace organics; dark brown; moist. Gravel/cobbles: well graded, sub-angular to sub-rounded, slightly weathered, greywacke. Organics: rootlets.	Late Pleistocene Alluvium
		1 6 7 7 11		1.0	58.0		Very dense, fine to coarse sandy cobbly fine to coarse GRAVEL, minor silt; dark brown; moist. Gravel/cobbles: well graded, sub-angular to rounded, slightly weathered, greywacke.	
				1.5	57.5		'Very dense', cobbly fine to coarse GRAVEL, some fine to coarse sand, trace silt; light orange brown; moist. Gravel/cobbles: well graded, sub-angular to rounded, slightly weathered, greywacke.	
				2.0	57.0		'Very dense', fine to coarse sandy cobbly fine to coarse GRAVEL, trace silt; dark brown; moist. Gravel/cobbles: well graded, sub-angular to rounded, slightly weathered, greywacke. *2.00m: trace boulders*	
				2.5	56.5			
				3.0	56.0			
				3.5	55.5			
				4.0	55.0		4.00m - End of test pit, target depth.	
				4.5	54.5			
					54.0			

Date started:	01/07/2024	**Logged by:**	NY	**Comments:**
Vane ID:	N/A	**Contractor:**	CORDE	Groundwater not encountered.
Vane type:	N/A	**Equipment:**	Komatsu PC138US-8OS	Elevation estimated from LINZ DEM.
Vane width:	N/A	**Method:**	TP	Pit remained stable between 0-2.0m. Pit instability between 2.0-4.0m.
Face orientation:	N/A			

For Explanation of Symbols and Abbreviations See Key Sheet

NZGD ID: 230902

Photo Log

Location ID: TP06

Sheet 1 of 1

Project:	Rolleston Access Improvement			**Project number:**	3338703
Site location:	Rolleston			**Client Name:**	Waka Kotahi NZ Transport Agency
Location:	On grass verge adjacent to SH1 approx. 40m southwest of SH1 and Dunns Crossing Road intersection (southbound)	**Coordinate system:**	NZTM2000	**Vertical datum:**	NZVD 2016
		Northing:	5172184.4	**Ground level (mRL):**	58.90
		Easting:	1547658.9	**Location method:**	GPS +/- 5m



TP06 - 0.00mbgl to 4.00mbgl



TP06 - 0.00mbgl to 2.00mbgl

NZGD ID: 230904

Test Pit Log

Test Pit ID: TP08

Sheet 1 of 1

Project:	Rolleston Access Improvement	**Project number:**	3338703
Site location:	Rolleston	**Client:**	Waka Kotahi NZ Transport Agency
Location:	Paddock on the southeast corner of SH1 and Dunns Crossing Road, approximately 70m west of eastern fence line	**Coordinate system:**	NZTM2000
		Northing:	5172042.0
		Easting:	1547706.0
		Vertical datum:	NZVD 2016
		Ground level (mRL):	57.90
		Location method:	GPS +/- 5m

Groundwater (m)	In Situ Tests: Su (kPa)	In Situ Tests: Scala blows/50mm	Samples	Depth (m)	RL (m)	Graphic Log	Soil/ Rock Description	Geological Unit
		0 1 0 1 3 6 5 5 4 4 4 5 12		0.0	57.90		Loose, fine sandy SILT, some organics, minor fine to coarse gravel; dark brown; moist, non-plastic. Gravel: well graded, sub-rounded, slightly weathered, greywacke. Organics: rootlets.	
				0.5	57.5		Dense, silty fine to coarse GRAVEL, some fine sand, minor organics; light orange; brown; moist. Gravel: well graded, sub-angular to sub-rounded, slightly weathered, greywacke.	Holocene Alluvium
							Dense, fine to coarse SAND, minor fine gravel, trace silt, trace organics; dark brown; moist. Gravel: well graded, sub-rounded, slightly weathered, greywacke. Organics: rootlets.	
		1 1 3 12		1.0	57.0		Dense, fine to coarse sandy fine to coarse GRAVEL, some cobbles, trace silt; dark greyish brown; moist. Gravel/cobbles: well graded, sub-angular to rounded, slightly weathered, greywacke.	
				1.5	56.5		'Dense', cobbly fine to coarse GRAVEL, some fine to coarse sand, trace silt; dark greyish brown; moist. Gravel/cobbles: well graded, sub-angular to rounded, slightly weathered, greywacke.	
				2.0	56.0		2.00m - End of test pit, target depth.	
				2.5	55.5			
				3.0	55.0			
				3.5	54.5			
				4.0	54.0			
				4.5	53.5			
					53.0			

				Comments:
Date started:	01/07/2024	**Logged by:**	NY	Groundwater not encountered.
Vane ID:	N/A	**Contractor:**	CORDE	Elevation estimated from LINZ DEM.
Vane type:	N/A	**Equipment:**	JCB Hydradig 110W	Pit remained stable throughout excavation.
Vane width:	N/A	**Method:**	TP	
Face orientation:	N/A			

For Explanation of Symbols and Abbreviations See Key Sheet

NZGD ID: 230904

Photo Log

Location ID: TP08

Sheet 1 of 1

Project:	Rolleston Access Improvement			**Project number:**	3338703
Site location:	Rolleston			**Client Name:**	Waka Kotahi NZ Transport Agency
Location:	Paddock on the southeast corner of SH1 and Dunns Crossing Road, approximately 70m west of eastern fence line	**Coordinate system:**	NZTM2000	**Vertical datum:**	NZVD 2016
		Northing:	5172042.0	**Ground level (mRL):**	57.90
		Easting:	1547706.0	**Location method:**	GPS +/- 5m



TP08 - 0.00mbgl to 1.00mbgl



TP08 - 0.00mbgl to 2.00mbgl

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APPENDIX C
Geotechnical Hazards Methods

NATURAL HAZARDS RISK ASSESSMENT

Westhaven Residential Development

Context

This appendix to CMW report reference CHC2026-0005AC Rev 0 sets out the criteria for and presents the results of an assessment of the geotechnical-related natural hazards associated with this proposed development.

Section 106 of the Resource Management Act (RMA) requires an assessment of the risk from natural hazards to be carried out when considering the granting of a subdivision consent. S106 RMA specifically states that the assessment must consider the combined effect of natural hazards likelihood and material damage to land, other land or structures (consequence).

Section 2 of the RMA defines natural hazards as any atmospheric or earth or water related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire or flooding) the action of which adversely affects or may adversely affect human life, property, or other aspects of the environment.

The National Policy Statement for Natural Hazards 2025 (NPS-NH) provides direction under the Resource Management Act 1991 for assessing the risk associated with natural hazards for subdivision, use and development.

BASIS OF ASSESSMENT

Risk Classification

The occurrence of natural hazards and their potential impacts on the proposed subdivision development is assessed in terms of risk significance, which is based on likelihood and consequence factors. A risk matrix is used to assess the likelihood and consequence factors, the form of which used by CMW for this project is presented in Table C1 which is derived from Appendix 1 of NPS-NH.

Table B1: Risk Matrix

ARI (Years) AEP	Almost certain Up to 10 10% or more	Very Likely 10-20 10% to 5%	Likely 20 – 50 5% to 2%	Possible 50 – 100 2% to 1%	Unlikely 100 – 500 1% to 0.2%	Rare 500 – 5000 0.2% to 0.02%	Very rare >5000 <0.02%
Catastrophic	Very High	Very High	Very High	High	Medium	Medium	Medium
Major	Very High	Very High	High	High	Medium	Medium	Medium
Moderate	High	High	High	Medium	Medium	Low	Low
Minor	Medium	Medium	Medium	Medium	Low	Low	Low
Negligible	Low	Low	Low	Low	Low	Low	Low

Likelihood

With respect to assessing the likelihood or chance of the risk occurring, the qualitative definitions used by CMW for this project are provided in Table B2 for each likelihood classification, which is derived from Appendix 1 of the NPS-NH.

Table C2: Likelihood Classification (extract from NPS-NH)

Likelihood level	Annual exceedance probability (AEP)	Average recurrence interval (ARI) or 'return period'
Almost certain	10% or more	Up to and including 10 years
Very likely	10% to 5%	Over 10 and up to and including 20 years
Likely	5% to 2%	Over 20 and up to and including 50 years
Possible	2% to 1%	Over 50 and up to and including 100 years
Unlikely	1% to 0.2%	Over 100 and up to and including 500 years
Rare	0.2% to 0.02%	Over 500 and up to and including 5,000 years
Very rare	Less than 0.02%	More than 5,000 years

Consequence

In terms of determining the consequence or severity of the natural hazard occurring, the qualitative definitions used by CMW for this project are provided in Table B3 for each consequence classification, which is derived from Appendix 1 of the NPS-NH.

Table C3: Consequence Table (extract from NPS-NH)

Consequence Level	Damage to Property	Potential for Injury or Fatalities
Catastrophic	Severe damage to land and building(s), potential for collapse or total destruction of structures. Building(s) need to be demolished, rebuilt or relocated.	High threat to life safety, with probable fatalities and/or critical injuries.
Major	Major damage to land and building(s), including structural damage. Loss of use and substantial repair required.	Unsafe for people, with potential for many injuries, or critical injuries and/or fatalities.
Moderate	Some damage to land and non-structural damage to building(s). Limited loss of use, repairs required.	Unsafe for people, with potential for injuries, although expected to be minor.
Minor	Minor damage to land and building(s). No loss of use, minimal repairs required.	Isolated minor injuries possible.
Negligible	No loss of use, no building repairs required.	No injuries.

Proportionate Management of Natural Hazard Risk

It is recognised that the natural hazard risk assessment provided herein is qualitative and, due to the wide range of possible geohazards that could occur, is somewhat subjective. Decision-makers must consider the scale and detail of information necessary to assess the risk by having regard to the anticipated level of risk.

Other methods are available to quantitatively assess an acceptable level of geotechnical related natural hazard risk, such as defining an acceptable factor of safety with respect to slope stability or acceptable differential ground settlements with respect to recommended building code limits.

When managing natural hazard risk associated with subdivision, use and development, decision-makers must apply mitigation measures, including location and design, for the purposes of ensuring that:

(a) very high natural hazard risk is avoided;

(b) high or medium natural hazard risk is avoided or mitigated proportionate to the

level of risk; and

(c) any creation of, or increase in, significant natural hazard risk on other sites is avoided or mitigated proportionate to the level of natural hazard risk.

Results of this assessment are presented in ***Table 2*** (Section 6.2).



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